Psychological Factors in Older Adults with Osteoarthritis in Primary Care

Thesis submitted in accordance with the requirements of the University of Liverpool for the Degree of Doctor of Philosophy

by

Gita Elizabeth Bhutani

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Glossary of Abbreviations

Abbreviation	Definition
ADL	Index of Activities of Daily Living
AIMS	Arthritis Impact Measurement Scales
ANOVA	Analysis of Variance
ASES	Arthritis Self Efficacy Scale
BBS	Berg Balance Scale
BDI	Beck Depression Inventory
Belief	Denotes Illness Perception Factor in the CSM model tested in study 1
BIDS	Bath Index Databases Service
BNF	British National Formulary
CB&SS	Cognitive Behavioural and Social Support
CBT	Cognitive Behavioural Therapy
CES-D	Center for Epidemiological Studies – Depression Scale
CFA	Confirmatory Factor Analysis
CFI	Confirmatory Fit Indices
Cogcope	Denotes Coping Factor in the CSM model tested in study 1.
COOP	Dartmouth Primary Care Cooperative Information Project (COOP) charts
COOP_FN	COOP Function Charts
COOP_SS	COOP Social Support
COPD	Chronic Obstructive Pulmonary Disease
COPE	COPE Inventory
COPE_AC	COPE Inventory Active Coping subscale
COPE_PLA	COPE Inventory Planning subscale

Abbreviation	Definition
COPE_PRG	COPE Inventory Positive Reinterpretation and Growth subscale
COPE_SCA	COPE Inventory Suppress Competing Activities subscale
CSM	Covariance Structural Modelling
CSQ	Pain Coping Strategies Questionnaire
D + number	Disturbance (residual error) term in a CSM diagram
df	Degrees of freedom
DoH	Department of Health
E + number	Error term in a CSM diagram
E&E	Education and Exercise
EM	Expectation-Maximisation
EQS	EQS Structural Equation Modelling computer programme
F Values	Statistics reported in ANOVA and MANOVA
F + number	Factor term in a CSM diagram
FLP	Functional Limitations Profile
FLP_PHYT	Functional Limitations Profile - Physical Dimension
FLP_PSYT	F Functional Limitations Profile - Psychosocial Dimension
FU	Follow Up
GDS	Geriatric Depression Scale
GHQ	General Health Questionnaire
GHQ-28	General Health Questionnaire 28
GP	General Practitioner
GSES	General Self Efficacy Scale
GWBS	General Well Being Schedule
GWBS_TOT	General Well Being Schedule Total
HADS	Hospital Anxiety and Depression Scale

Abbreviation	Definition
HADS_A	Hospital Anxiety and Depression Scale - Anxiety subscale
HADS_D	Hospital Anxiety and Depression Scale - Depression subscale
HADS_DT	Hospital Anxiety and Depression Scale - Depression subscale
HANES1	[US] Health and Nutrition Examination Survey
HDRS	Hamilton Depression Rating Scale
HIV	Human Immunodeficiency Virus
IBQ	Illness Beliefs Questionnaire
IBQ_C	Illness Beliefs Questionnaire Control Subscale
Illness/sev	Denotes Illness Severity in the CS model tested in study 1
illsevbel	Denotes Illness Perception factor in the CSM model tested in study 1
IPQ	Illness Perception Questionnaire
IPQ_CC	Illness Perception Questionnaire Control/Cure subscale
IPQ_CNSQ	Illness perception Questionnaire Consequences subscale
IPQ_TIME	Illness Perception Questionnaire Timeline subscale
LM Test	Lagrange Multiplier Test
MADRS	Montgomery-Asberg Depression Rating Scale
MANOVA	Multivariate analysis of variance
MAR	[data] Missing At Random
MCAR	[data] Missing Completely At Random
MD	Missing Data
Medline	Medical literature database
MMSE	Mini-Mental State Examination
MOS	Medical Outcomes Study
MOS	Medical Outcomes Study Social Support Survey

Abbreviation	Definition
MOS_NT	MOS Social Support Survey Total Number Of Friends/Relatives Available
MOS_TOTT	MOS Social Support Survey Total
MRI	Magnetic Resonance Image
NHS	National Health Service
NHS	National Health Service
NJAFF	Number of Joints Affected
NMAR	[data] Not Missing At Random
NSAIDS	Non Steroidal Anti Inflammatories
NSF	National Service Framework
OADURNT	Osteoarthritis Duration
ONS	Office of National Statistics
p	Probability
p Levels	Probability levels
PC	Personal Computer
PGCMS	Philadelphia Geriatric Center Morale Scale
PGMS_TOT	Philadelphia Geriatric Center Morale Scale Total
PR (1 and 2)	Participation Rate
PsycLit	Psychological literature database
PWB	Psychological Well Being
QWBS	Quality of Well Being Scale
RAND	RAND Corporation
RMSEA	Root Mean Square Error of Approximation
SF-36	Medical Outcomes Study 36 Item Short Form Health Survey
SIP	Sickness Impact Profile

Abbreviation	Definition
Socsup	Denotes Social Support Factor in the CSM model tested in study 1.
SPSS	Statistical Package for the Social Sciences computer programme
SRMR	Standardised Root Mean Square Residual
STAI	State Trait Anxiety Inventory
TUAG	Timed Up and Go Task
TUAGT	Timed Up and Go Task
UCLA	University of California and Los Angeles
UK	United Kingdom
US	United States (of America)
USA	United States of America
WoC	Ways of Coping Scale
WOMA_TTT	Western Ontario and McMaster Universities Osteoarthritis Index Total
WOMAC	Western Ontario and McMaster Universities Osteoarthritis Index
WOMAC_TTT	Western Ontario and McMaster Universities Osteoarthritis Index Total

Glossary of Terms

Term	Definition
Acupuncture	A branch of Chinese medicine, now used by some western doctors, in which needles are inserted into the skin at certain points. It is claimed to treat disease by a process described as 'unblocking' of bodily meridians.
Analgesic	A pain relieving drug
Analysis of variance (ANOVA)	A statistical analysis that tests whether there are significant differences between two groups on a number of dependent variables.
Angina	Pain or tightness in the chest as a result of insufficient blood supply to the heart.
Antidepressants	A range of drugs used to treat depression.
Anxiety	An unpleasant emotional state characterised by apprehension, dread, distress and unease.
Appraisal	An evaluative process undertaken by an individual that describes the nature of an interaction between the individual and their environment.
Arthritis	An inflammation in a joint, usually with swelling, redness, pain and restriction of movement.
Arthrocentesis	The puncturing of a joint with a needle to withdraw fluid.
Arthrodesis	Fusion of the bones on either side of joint so that no joint movement can occur.
Arthroplasty	Surgical replacement of a joint, commonly of the hip or knee.
Behaviour	Within the cognitive behavioural therapy framework, refers to an individual's actions.

Term	Definition
Bursa	Plural bursae which are small sacs lined which secretes synovial fluid.
Chi-square	A non-parametric statistical test assessing the proportions of the sample allocated to certain categories and analysing whether this could have occurred by chance. Also reported in the CSM literature as a measure of whether the model differs significantly from the data.
Chronic Obstructive Pulmonary Disease (COPD)	Used to describe two related lung diseases: chronic bronchitis and emphysema. Chronic bronchitis is inflammation and scarring of the airway tubes (bronchi) and emphysema is the enlargement and destruction of the air sacs (alveoli).
Cognition	Refers to mental activities such as thinking and reasoning.
Cognitive behavioural therapy (CBT.)	A 'talking therapy' that focuses on the interaction between thoughts, feelings and behaviours in order to ameliorate the impact of psychological disorders.
Confirmatory factor analysis (CFA)	A form of Covariance Structural Modelling where a set of variables hypothesised to indicate a factor is analysed.
Confirmatory Fit Indices (CFI)	A term used in Covariance Structural Modelling where acceptance of the model relies on CFI values usually in excess of 0.90.
Coping	The process by which an individual manages the demands of the person-environment.
Covariance	Where changes in one variable are accompanied by changes on another variable.

Term	Definition
Covariance structural modelling (CSM)	A set of statistical techniques which allows questions to be answered that involve multiple regression analyses of factors. They are often displayed pictorially.
Crepitus	Grating sensation when arthritic joints or joint surface rub together
Cronbach's alpha coefficient	A measure of the internal consistency of a questionnaire or psychometric test.
Cross-sectional study	A study where participants provide information at one time point.
Depression	A generic term referring to low mood but in psychiatric terms characterised by low mood, reduced interest, anxiety, sleep disturbance, loss of appetite, lethargy, and suicidal ideation.
Diabetes	A disease where insulin is in insufficient supply for the individual's needs.
Dropout	Where participants fail to continue participation in a study
Epidemiology	The study of the occurrence, in populations, of a whole range of conditions that affect health.
External validity	Refers to the extent that the results can be extended to other individuals or settings not part of the particular study.
Friedman analysis of variance	A non-parametric test comparing the performance of the same or matched participants on three or more measures or conditions.
Glucosamine	Glucose with the addition of an amino acid group used in the management of osteoarthritis.

Term	Definition
Gout	An acute inflammatory joint disorder caused by the depositions of monosodium urate monohydrate crystals around the joints, tendons and other tissues.
Gpower	Statistical programme providing estimates of power
Greenhouse-Geisser correction	Used in Multivariate analysis of variance to correct F statistics where there are more than two within-subjects factors
Health belief model	A model of five beliefs thought to influence health behaviour proposed initially by Becker (1974).
Health psychology	A branch of psychology concerned with health maintenance and promotion as well as the prevention and treatment of illness.
Hypertension	High blood pressure
Hypothyroidism	Underactivity of the thyroid gland
Illness Perception	A specific form of appraisal of illness that is both context and content dependent
Intention to treat analysis	Analysing the data by evaluating the outcome for all the participants at the point where they were included or randomised into the study. A number of approaches may be taken.
Item non-response	Where individuals do not complete an item or question on a measure
Jarman indices	Indices of socio-economic deprivation (Jarman, 1983)
Kolmogorov-Smirnov Test	Statistical test provide a statistic that indicates the normality of a given data distribution
Last observation carried forward	Where the last observation provided by a participant who subsequently drops out is inserted as the observation at the next data point.

Term	Definition
Latent variable	Within the Covariance Structural Modelling literature, factors are referred to as latent variables as they represent unobserved or theoretical constructs.
Likert scales	A scale where the participant is given a series of attitude statements and asked to rate them according to levels of disagreement or agreement normally on a three to seven point scale.
Longitudinal study	A study where participants are followed up over a period of time and provide data over a series of time points.
Magnetic Resonance Imaging (MRI)	A method of body scanning that offers a greater degree of image resolution than x-ray.
Mann-Whitney U test	A non-parametric test comparing the performance of different participants on two measures or conditions.
Mauchly's test of sphericity	Used in Multivariate analysis of variance (MANOVA) check the data are appropriate for use with MANOVA where the within subjects factor is greater than two.
Measurement models	Within the Covariance Structural Modelling literature, a model that displays the relationship between a factor and observed variables.
Minimisation procedure	A method of allocating participants to interventions or treatments using selected variables to ensure better balance between the interventions. It is particularly recommended for small samples (<250) (Altman, 1991).
Multiple sclerosis	A progressive central nervous system disease that damages the myelin sheath of the nerves.
Multivariate analysis of variance (MANOVA)	A statistical analysis that tests whether there are significant differences among groups on a number of dependent variables.

Term	Definition
Non-parametric tests	Statistical tests which use ranked or categorical data to determine relations between variables.
Non-steroidal anti-inflammatories (NSAIDS)	A range of drugs with painkilling and inflammation reducing properties.
Nquery 5.0	Statistical package for calculating power
Older adults	People aged 65 years and above
Orthogonal	Where variables are independent of one another
Osteoarthritis	A common form of persistent degenerative joint disease involving damage to the cartilaginous bearing surfaces and sometimes widening and remodelling the ends of the bones involved.
Osteophytes	A bony outgrowth occurring usually adjacent to an area of cartilage damage.
Osteoporosis	Bone atrophy giving rise to 'brittle bones'.
Osteotomy	Cutting of the bone
Parametric tests	A set of statistical tests that rely on data being continuous or interval data, normally distributed and for more than one condition, each normal distribution has the same variance.
Partial eta squared	In Multivariate analysis of variance gives an estimate of effect size
Post hoc univariate analyses	Conducting analysis on selected variables after the Multivariate analysis of variance to identify the effects of single variables.
Power	Defined as 'the probability that a study of a given size would detect as statistically significant a real difference of given magnitude'(Altman, 1991)
Principal components analysis	Set of statistical techniques where the aim is to identify which variables in the data form coherent subsets relatively independent of one another.

Term	Definition
Regression analysis	Statistical analysis that allows prediction of an outcome from a set of variables. A number of different techniques exist, e.g. logistic, multiple.
Rheumatoid arthritis	A degenerative disease of the joints causing inflammation and damage.
Rheumatology	Study and treatment of diseases and disorders affecting the joints, muscles and connective tissue
Root Mean Square Error of Approximation (RMSEA)	A term used in Covariance Structural Modelling that describes the degree of lack of fit relative to the degrees of freedom in the model. Values should range between 0 and 1.
Sample frame	All eligible, potential participants in a study
Self-efficacy	An individual's judgement of their ability to undertake an action
Self-regulatory model	A model of five theoretical constructs thought to influence health behaviour proposed initially by Leventhal et al (1985)
Social Learning Theory	Describes efficacy and outcome expectations to describe how an individual responds in a given situation. First proposed by Bandura (1977).
Social support	Refers to the perceived help and comfort an individual receives from other people.
Standardised Root Mean Squared Residual (SRMR)	A term used in Covariance Structural Modelling that describes the difference between the observed matrix and the covariance matrix. Values should range between 0 and 1.
Stress	In psychological terms, refers to the relationship between the person and their environment that produces tension.
Stressor	The causal agent producing stress.

Term	Definition
Structural models	Within the Covariance Structural Modelling literature, a model that displays the relationship between latent variables or factors.
Synovectomy	Removal of the synovial membrane
Synovial fluid	A clear sticky fluid that lubricates the joints.
T test	A parametric test comparing means on a measure where there are two conditions using either different or same participants.
Type I error	Where a significant result is obtained and the null hypothesis rejected, where it is in fact true.
Type II error	Where a non-significant result is obtained and the null hypothesis accepted, where it is in fact untrue.
Validity	Refers to whether a study has reached well-founded conclusions about its subject matter.
Wilcoxon signed ranks test	A non-parametric test comparing the performance of the same or matched participants on two measures or conditions.
Wilks-Lambdas (F values)	A statistic reported in Multivariate analysis of variance to test the significance of main effects and interactions.

Abstract

Psychological factors in older adults with osteoarthritis in primary care
Gita E Bhutani

A two-phase approach was used to investigate the impact of psychological factors in older people in primary care. The first phase tested a model of factors affecting older people with osteoarthritis. Four hypotheses were tested: (1) functioning and psychological well-being will be associated; (2) illness severity will influence both functioning and psychological well-being; (3) cognitive factors, including attitudes and coping styles, illness beliefs and perceptions of social support; will also influence functioning and psychological well-being (4) the influence of these cognitive factors on psychological well-being and functioning will be independent of and more important than the influence of illness severity. A survey approach with a range of questionnaires and one test of walking were used to indicate the factors included in the hypotheses. There were 157 participants. The analysis was conducted using covariance structural modelling. The results confirmed hypotheses 1 – 3, partially confirmed hypothesis 4, and indicated selective effects of different cognitive factors on function and well-being.

Based on these findings, an intervention study was conducted to evaluate the feasibility and impact of procedures designed to modify cognitive appraisal factors on psychological well-being and functioning. Participants served as their own baseline controls. They were randomised to either a psychological or education intervention, each of which was conducted using a group format for two hours per week for four weeks. The interventions were designed to modify processes suggested in the previous study to influence function and well-being respectively. The psychology group focused on cognitive factors and modification of these and problem-solving. The education group provided information on the illness and medication, physiotherapy and diet. Eighty-six participants completed the group interventions. One month and six month follow-up assessments were conducted with participants. Four hypotheses were tested: (1) education will improve the functioning but not the psychological well-being of the participants; (2) psychological intervention will improve psychological well-being but have no significant effect on functioning; (3) both interventions will increase perceptions of social support; (4) improvements in psychological well-being or functioning will be maintained at one month and six month follow-up. Hypotheses 1 and 2 were not upheld as no difference was found between the types of intervention. Perceptions of social support increased (hypothesis 3) but not at follow-up so hypothesis 3 is partially upheld. Hypothesis 4 was not upheld although some improvements in depression were maintained at one month follow up.

This two-phase study investigated the impact of psychological factors on psychological well-being and functioning in older people with osteoarthritis in primary care. The findings indicate that cognitive appraisal factors have a significant influence on psychological well-being and functioning, as does severity. Manipulation of these factors also has an influence on older people with osteoarthritis but differential effects of different factors could not be isolated using the current design. However, providing group interventions to older people with osteoarthritis in primary care has a beneficial effect. Therefore, future directions could focus on better delivery of the groups, utilising some of the findings to generate bibliotherapy approaches in primary care, and using the methodology with other chronic physical health groups.

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Chapter One: Older adults and osteoarthritis

1.1 Physical health problems in older adults

Approximately 17% of the United Kingdom (UK) population is aged 65 years and above and it is expected that this proportion will rise to 20% by 2030 (Bromley, 1988). Older adults are more likely to suffer from disability and increasing age contributes to this. There is very high prevalence of ill-health in the over-65 population (Bradbury, 1995). On average, elderly people complain of around five medical problems each at any one time, and only 10% of those over 75 years admit to no physical symptoms at all. In the United States of America (USA), Verbrugge (1995) noted that between ages 60 – 69 years, 45% of women and 35% of men suffer from two or more medical problems. These rates rise to 70% and 53% respectively, above the age of 80 years. The most common chronic physical health problems in older adults include cardiovascular, musculo-skeletal and respiratory problems (Briggs, 1993). In the USA, Verbrugge (1995) reports arthritis (mainly osteoarthritis) as the most common health problem affecting the over 65 age group; quoting rates of around 52% in women aged 65 – 74 years, and 36% in men in the same age group across a range of samples from 1983 to 1993.

Furthermore, older adults are currently amongst the heaviest users of the National Health Service (NHS) and comprise 50% of inpatients. The NHS spends 39% of its gross expenditure on the over-65 population and Social Services spend 47% of their annual budget on elderly care (Department of Health (DoH), 2001). The National Service Framework (NSF) for Older People (DoH, 2001) focuses on significant conditions affecting the elderly including stroke, falls and mental health.

1.2 Osteoarthritis

1.2.1 Aetiology and epidemiology

Osteoarthritis is described as a slowly progressive disorder that occurs with increasing age. It mainly affects weight bearing joints and peripheral and axial articulations (Bland & Cooper, 1984). It has been defined as a condition of synovial joints with cartilage loss and changes in bone structure (Jones & Doherty, 1999). It was previously thought that osteoarthritis was an inevitable consequence of ageing and trauma. Age is known to be related to the development of osteoarthritis which may be due to an age related reduction in efficiency of body systems, for example, a

decrease in the responsiveness of repair mechanisms. Now it is generally thought that osteoarthritis is a dynamic process relating to repair activity within the joint (Jones & Doherty, 1999). The most common joints affected are the hip, knee, lower spine, thumb, fingers, shoulders, neck and sometimes the big toe (Arthritis Foundation of New South Wales, 1996). In osteoarthritis, the water content of the cartilage increases and the impact-absorbing ability of the cartilage decreases. This leads to the surface of the cartilage degenerating by flaking or forming tiny crevices. There is an increase in friction in this area which leads to thinning and breakdown of the cartilage. This may lead to loss of the cartilage cushion and this causes friction between the bones. In addition, inflammation of the cartilage can also stimulate new bone outgrowths (spurs or osteophytes) to form around the joints (Arthritis Foundation of New South Wales, 1996; Arthritis & Rheumatism Council, 1991; Hosie & Dickson, 2000; Jones & Doherty, 1999).

Trauma can lead to the development of osteoarthritis because fractures, ligament damage or meniscal cartilage tears can alter the weight distribution around the joint abnormally (Hosie & Dickson, 2000; Jones & Doherty, 1999). Certain occupations have also been associated with an increased risk of osteoarthritis. These include farmers (particularly in the hip), miners, footballers and weightlifters (Grennan, 1984; Hosie & Dickson, 2000). No association has been found between osteoarthritis and long distance running in former athletes (Lane & Buckwalter, 1993). More recent studies have suggested that it is the duration rather than the intensity of the activity that is important (Cicuttini & Spector, 1998). Classification of osteoarthritis is inexact but two categories are commonly described, primary and secondary. Primary osteoarthritis is where no underlying cause can be defined whereas secondary osteoarthritis is where there may be a past history of abnormality or trauma. There is some evidence that osteoarthritis may be inherited but this accounts for a very small percentage of 'primary' osteoarthritis cases (MacGregor & Keen, 1999).

Obesity is also known to be associated with osteoarthritis. The relationship is unclear but it is thought that the extra weight in the joints contributes to cartilage breakdown and the excess fatty tissue may produce abnormal hormone levels but these have not been identified (Hosie & Dickson, 2000)

1.2.1.1 Prevalence rates

In the United Kingdom, more than eight million people annually consult their family doctor about some form of arthritis, not including back pain (The British Society for

Rheumatology, 1994). More than four million of these suffer from osteoarthritis and are aged 65 years and above (ibid.). Prevalence rates for osteoarthritis in the UK range from; 4.9% in 16 to 44 year olds, 19.8% in 45 – 64 years, and up to 44% in the 65 years and above group. In the USA, it has been estimated that arthritis and musculoskeletal disorders affect over 30 million people aged 45 years and above with about half of these being aged 60 and upwards (Lubeck, 1995).

1.2.1.2 Age & sex distribution

The prevalence of osteoarthritis increases with age with at least 85% of those aged 70 to 79 years having osteoarthritis and incidence rates of 35% in the knee as early as age 30 (Bland & Cooper, 1984). It has been noted that 60% of over-65s had at least one joint moderately affected (Croft, 1990), and that knee osteoarthritis increased with age with 27% affected under the age of 70 years rising to 44% in those aged 80 and above (Felson et al, 1987). Higher prevalence of osteoarthritis is found in men below the age of 50, and in women above the age of 50 (Verbrugge, 1995). Women are affected more in the knees and the small joints of their hands and feet whereas men suffer more in the hips and cervical and lumbar spinal areas (Verbrugge, 1995).

1.2.1.3 Historical features

Osteoarthritis has been a part of the human condition for many hundreds of thousands of years. *Homo sapiens neanderalis* (Neandertal man) lived between 120,000 and 35,000 years ago and was known to have suffered from osteoarthritis. Excavations in the Indus Valley of Bronze Age settlements (2500 BC) have found skeletons with osteophyte formation (bony outgrowths), pitting of articular (joint) surfaces and ankylosis (stiffening) which are all common features of osteoarthritis. Examination of the skeletons of native Britons from Roman times indicated that the joints most commonly involved were the cervical, dorsal and lumbar vertebrae with the peripheral joints most commonly affected being the patella, shoulder, hip, wrist, knee and metacarpophalangeal joint (in the hand). Skeletons from the early Saxon period gave prevalences of 28% of osteoarthritis of the hip but prevalences of 47% for vertebral spondylosis (spinal degeneration).

Prevalence rates amongst men and women have varied over the past 2000 years. During the Roman times in Britain, skeletons of native Britons were found to have 80% prevalence rates in males and 52% in females. The 18th and 19th centuries also show high prevalence rates of osteoarthritis with the range in males from 35%

to 50% in the 45 – 64 years and 65+ age group respectively (MacLennan, 1999). For women, these figures are respectively 20% and 36%. As noted above, 20th century prevalence rates are much higher.

Thus, osteoarthritis is likely to present a significant clinical problem in the 21st century due to the high prevalence rates found and the increasing numbers of older adults in the population.

1.2.2 Clinical features

1.2.2.1 Diagnosis

There are no diagnostic tests for osteoarthritis and a clinical diagnosis is usually made on the basis of history and physical examination (Afable & Ettinger, 1993). Analysis of the location, duration and character of the joint symptoms and their appearance is conducted. X-ray findings can contribute to diagnostic information. In osteoarthritis, X-rays may show loss of joint cartilage, narrowing of the joint space between adjacent bones and formation of osteophytes but these may not always be present in the early stages. There may also be marked changes on X-ray despite the absence of symptoms (Croft, 1990). Self-reports may underestimate the true prevalence of musculoskeletal conditions by 18% (Hughes et al, 1993). It is important to exclude other causes of pain. In particular, knee cap problems or a torn meniscus should be referred for appropriate treatment. Blood tests are used to exclude diseases that can cause secondary osteoarthritis, as well as to exclude other arthritic conditions that can mimic osteoarthritis. Arthrocentesis may also be performed, where a sterile needle is used to remove joint fluid for analysis. Joint fluid analysis is useful in excluding gout, infection, and other causes of arthritis (Arthritis Foundation of New South Wales, 1996; Hosie & Dickson, 2000).

Occasionally, Magnetic Resonance Imaging (MRI) may be used to examine the joint (for example, the knee) more closely. If the diagnosis is still unclear, arthroscopy may be used to look inside the joint to examine the surfaces for changes. In arthroscopy, a small fiberoptic television camera is inserted into the knee joint through a very small incision, about six millimetres. Abnormalities of and damage to the cartilage and ligaments can be detected and sometimes repaired through the arthroscope (Arthritis Foundation of New South Wales, 1996; Hosie & Dickson, 2000).

1.2.2.2 Functioning and disability

1.2.2.2.1 Pain and stiffness

Clinically, the symptoms include pain, deformity, limitation of motion and progressive disability (Bland & Cooper, 1984). The most common symptom is pain which is related to the use of the joint. The pain may be worse with initial movement and then ease but then become worse again as the activity continues (Hutton, 1995) In addition, guarded movement has also been found in response to pain (Keefe et al, 1987). A number of pathological processes may contribute to this which include increased pressure on the capsule and ligaments, increased intracapsular pressure, inflammation, alterations in the muscle function. Stiffness is also found in osteoarthritis particularly after a period of immobility such as sitting or lying, this normally wears off as the joint is used.

In addition to this, crepitus can be felt and most commonly occurs at the knee or shoulder. It is usually as a result of some joint misalignment and can be felt as 'creaking joints'. It may be accompanied by pain. The growth of osteophytes can lead to enlargement of the joint and swelling of the soft tissue around it. The joint can thus appear deformed. Furthermore, the soft tissue swelling may be due to inflammation in the synovial fluid or in the bursae. If the osteoarthritis is severe, then obvious deformity of the joints can occur due to the destruction of the cartilage and bone. This is particularly noticeable in the knee joints where the joint tends to be pushed outwards (varus knee) (Hosie & Dickson, 2000).

1.2.2.2.2 Radiological evidence related to pain

It has been noted that 'the epidemiology of osteoarthritis and the epidemiology of knee pain have little in common' (Hadler, 1992). In studies using a largely female older sample (80% female, mean age 71 years; and 100% female, mean age 64 years respectively), it was found that radiological evidence of osteoarthritis is not related to the presence of pain (Salaffi et al, 1991; Summers et al, 1988). This was further confirmed in a large study which included a younger population (age range 45 to 74 years reported) with equivalent numbers of men and women (Davis et al, 1991, 1992) but it was also noted that if radiological evidence was present then its severity was found to be associated with pain. (details to be found in Appendix 1.1, Table 1.1). These three studies cited also note that psychological factors influence the pain experience including anxiety and depression. A review of pain reporting in knee osteoarthritis found that pain is not necessarily associated with pathology but

the likelihood of knee pain increases with radiographic severity (Creamer & Hochberg, 1997). The review also noted that research has been limited on the relationship of pain and psychological functioning despite evidence that non-pharmacological interventions may be helpful (ibid.).

1.2.2.2.3 Sex differences

It is unclear if there are sex differences in osteoarthritic pain. An early study by Davis (1981) found that women were no more likely to report symptoms than men but this included younger participants (age range 25-74). Some studies have highlighted that functional impairment is more pronounced in women (Davis et al, 1991; Verbrugge et al, 1995) but have attributed this to the higher levels of osteoarthritis found. Older women are more disabled than older men with respect to performing personal care and household activities which was attributed to the higher rate of arthritis in women but the age range was not specified (Verbrugge, 1995). More recently, two studies of older participants (mean age 64 years and 61 years) found that women reported significantly higher levels of pain and physical disability and also exhibited more pain behaviour (Creamer et al, 1999; Keefe et al, 2000) (details in Appendix 1.1, Table 1.2).

1.2.2.2.4 Factors associated with functional impairment

Generally, there is a decrease in the range of movement of the joint due to pathological changes in the bone and a thickening within the capsule. There may also be weakness and impaired function in the muscles around the joint. This can lead sufferers to feel that the joint is giving way. These can lead to a lack of mobility and impairment in activities of daily living. A large population based study that examined functional impairment in arthritis noted that the arthritic group had greater difficulty walking, kneeling or crouching, standing, and transfers. For example, knee osteoarthritis may make it difficult to get in and out of a chair (Verbrugge, 1995).

A range of studies have investigated the association between osteoarthritis and functioning on a number of variables. Associations between functioning and comorbidity, pain, obesity and reduction in social functioning were found (Creamer et al, 2000; Davis et al, 1991; Hopman-Rock et al, 1996; Klinger et al, 1999; van Baar et al, 1998; Verbrugge et al, 1991, 1995) (see Appendix 1.1, Table 1.3). These studies included mean ages between 65 to 76 years. The difficulties found were

moderate and are mediated by psychological factors including depression and social support.

A link between arthritis and physical dysfunction, personal care and household care was found, which was exacerbated by the presence of concurrent medical problems (Verbrugge et al, 1991; age range not reported). The relationship between physical dysfunction and social functioning was not straightforward.

Clearly, functional impairment not only relates to the presence of osteoarthritis but psychological factors which have an influence on functioning. Thus, consideration of the effects of osteoarthritis should not exclude psychological effects.

1.2.2.3 Psychological effects of osteoarthritis

1.2.2.3.1 Depression and anxiety

Community studies have reported rates of 11% - 29% for depression of clinical severity in older people (mean ages 68 to 75 years)(Callahan et al, 1994; Turrina et al, 1994; van Marwijk, 1994, Woods & Roth, 1999). Anxiety-related disorders have been reported to affect about 15% of the older adult population and to have a high rate of comorbidity with depression (mean age 76 years) (Manela et al, 1996).

Depression has also been found to be associated with physical ill health in community samples (mean ages 70 to 75 years) (Beekman et al, 1997; Kennedy et al, 1989; Livingston et al, 1990). A large scale study (n=3000+) noted that depressed participants (mean age 69 years) were more likely to have a comorbid physical illness (Hendrie, 1995). Furthermore, dysthymia in older people (mean age 74 years) has also been associated with significant physical impairment (Kirby et al, 1999). A community study investigating anxiety and depression found that poorer health status was predictive of higher depression and anxiety scores as measured by questionnaire (Geriatric Depression Scale (GDS), State Trait Anxiety Inventory (STAI)) (mean age 74 years) (Colenda & Smith, 1993).

An investigation of depression in elderly hospitalised patients with medical illness (mean age 74 years) using a range of measures identified between 10 and 23% of patients with depressive symptoms. The depressive symptoms were associated with physician-rated illness severity (Koenig et al, 1988). Two large studies of chronic illness (n=3000+) found high levels of depression (14-17%) and anxiety (14-

39%) in eight chronic conditions including osteoarthritis (Ormel et al, 1997; Penninx et al, 1996) (age ranges 55 to 84 years), and a study of older Dutch people (age range 55 – 89 years) found a significant association between arthritis and depressive symptoms as measured by the Center for Epidemiological Studies – Depression Scale (CES-D) (Beekman et al, 1995).

It is clear that prevalence rates of depression in older people vary between 10 – 29%. Depression is clearly associated with physical ill-health, clinically, this is to be expected. There have been comparatively few studies which explicitly focus on depression and anxiety in osteoarthritis.

Nine studies were identified in the literature which focused on depression or negative affect and osteoarthritic pain (Abdel-Nasser et al, 1998; Blixen & Kippes, 1999; Creamer et al, 1999; Dekker et al, 1993; Dexter & Brandt, 1994; Hawley & Wolfe, 1993; Rajala, 1995; Zautra et al, 1994; Zautra & Smith, 2001) (see Appendix 1.1, Table 1.5). Where mean ages were reported, the range was between 55 and 75 years. In five of the studies, correlational methods were used which identified an association between depressive symptoms and osteoarthritic pain (Creamer et al, 1999; Dekker et al, 1993; Dexter & Brandt, 1994; Zautra et al, 1994; Zautra & Smith 2001). The remaining four studies noted rates of depression in their samples between 10% and 46% using a range of measures (Abdel-Nasser et al, 1998;Blixen & Kippes, 1999; Hawley & Wolfe, 1993; Rajala, 1995).

Only one study was identified examining anxiety in osteoarthritis (Creamer et al, 1999). Participants (n=374, mean age 64 years) had knee osteoarthritis. Anxiety was measured by the Arthritis Impact Measurement Scales (AIMS) (Meenan et al, 1980). Anxiety scores were significantly higher in women who reported ever having had pain or current pain. No relationship between pain reporting and anxiety was found in men. A review of the literature on the relationship between psychosocial variables and pain reporting in osteoarthritis of the knee supported an association between knee pain and depression and/or anxiety. Levels of depression were reportedly higher in hospital outpatients (33%) than in community samples (26%) (Creamer & Hochberg, 1998).

These studies indicate that depression is present in an osteoarthritic population at rates that exceed that of the normal older adult population. Given the prevalence of osteoarthritis in the older adult population, the high levels of affective distress found

indicates a significant psychological problem within this population which must be addressed.

1.2.3 Treatment/Management of osteoarthritis

There is no cure for osteoarthritis and treatment focuses on symptom relief (including pain management) and trying to maintain or improve the individual's quality of life. Hochberg et al (1995a, 1995b) and the American College of Rheumatology (2000) in their guidelines on the medical management of osteoarthritis emphasise the use of both pharmacological and non-pharmacological treatments. The latter should include education, support, diet, physiotherapy, occupational therapy and exercise.

1.2.3.1 Pain management

Pain management in osteoarthritis combines the use of a range of techniques and thus cannot be described as a technique in itself. It has been suggested that pain management in osteoarthritis should include education, psychological support and aids and adaptations (Perrot & Menkes, 1996). This is similar to the recommendations noted above. A questionnaire based study (Davis et al, 1990) (details in Appendix 1, table 1.6) exploring the use of pain management in older adults with a diagnosis of osteoarthritis or rheumatoid arthritis found differences in pain management methods used according to age but not according to diagnosis (osteoarthritis vs. rheumatoid arthritis). The older group (mean age 72 years) utilised fewer pain management methods than the younger group (mean age 49 years). The most widely used pain management methods (used by more than 50%) in the 65 plus years group were: prescribed medication, distracting techniques, heat application, exercise, heated pool or tub or shower, resting, talking with individuals who understand. These methods cover a range of interventions both pharmacological and non-pharmacological. In the sections below, a number of interventions are described which when combined in various formats are described as pain management.

1.2.3.2 Medication

Medication is used to alleviate pain and reduce inflammation. Analgesics and non-steroidal anti-inflammatories (NSAIDS) are the main types of medication used in treatment. Some people with osteoarthritis do not suffer inflammation so pain relief is the main requirement. Simple analgesia is usually preferred and is the most common first line treatment. For many people, paracetamol is effective but

compound preparations may also be used. Examples of these are co-codamol, co-proxamol, co-dydramol. Aspirin is not usually recommended due to its potential gastro-intestinal effects.

For those who suffer from both pain and inflammation, NSAIDS are used as they have both a painkilling and anti-inflammatory effect. The differences between the different NSAIDS are small but people vary in how they respond to and tolerate different drugs. About 60% of patients will respond to any NSAID; of the remainder, those who do not respond to one may well respond to another. Side effects can include stomach complaints, heartburn, indigestion, rashes and wheeziness. One of the greatest risks is that of gastro-intestinal ulceration, perforation and bleeding. There are also risks related to kidney and liver functioning (Miller, 2000). In the USA, it has been estimated that 2 - 4% of those on NSAIDS will develop complications. Of those who develop complications, the morbidity rate is approximately 15% (Luggen, 2001). Stomach problems and asthma are contraindications for the use of NSAIDS. Ibuprofen, naproxen and diclofenac are thought to be less likely than the other traditional NSAIDs to cause gastrointestinal problems (Drugs & Therapeutics Bulletin, 1996). The newer medications such as the COX-2 inhibitor drugs Celebrex and Vioxx are less likely to cause gastrointestinal bleeding than the older NSAIDS but similar cautions apply in relation to kidney and liver functioning (British National Formulary (BNF, 2001). These medications have now been discredited due to the increased risk of myocardial infarction and stroke associated with them (BNF, 2004). In addition, topical preparations can be used which are applied to the skin as either a rub or embrocation. These can make the skin feel warm (rubefacients) or cool and individuals will respond differently, in that some may find help in pain relief whereas others will find the pain worsens (Hosie & Dickson, 2000).

Some antidepressants are known to be helpful in pain relief especially in low doses, and sometimes they may help sleep but controlled trial data are unavailable (Drugs & Therapeutics Bulletin, 1996). Glucosamine and chondroitin have been noted as having some efficacy in the management of osteoarthritis but the evidence to date is still limited as to their mechanism or efficacy (Felson & McAlindon, 2000). Steroid injections (e.g. hydrocortisone) are sometimes used, which can have a lasting effect of around four to five weeks. These are not beneficial to all patients and some suffer side-effects including flare-ups and pain, or reactions to the drug or local anaesthetic before the injection. Furthermore, they should not be given more than three to four times a year (Hochberg et al, 1995). Also injections are not usually

recommended for those with diabetes, hypertension, osteoporosis or hypothyroidism.

Therefore, medication may not be of benefit to all patients due to individual variation in response to the drug and also the possibility of unpleasant side effects with some medication. Some of the newer treatments (glucosamine) require further investigation to determine their utility in the management of osteoarthritis.

1.2.3.3 Acupuncture

The use of acupuncture in knee osteoarthritis has been reviewed (Ezzo et al, 2001). Variation in the delivery of acupuncture meant that some studies were described as delivering 'sham' acupuncture as opposed to 'real' acupuncture. Despite this, it was noted that real acupuncture was effective for pain but not more effective than sham acupuncture for functioning. In addition, there was limited evidence that acupuncture was more effective than treatment as usual.

1.2.3.4 Surgery

There are a number of surgical techniques used in the management of osteoarthritis. The most common technique is joint replacement, also known as arthroplasty. Hips and knees are the most common joint replacements in osteoarthritis (British Society of Rheumatology, 1998). The artificial joint is not thought to last longer than around 15 years and thus surgery is often postponed as long as possible to avoid repeat operations. Around 50,000 hip replacements were performed in 1994-5 in the UK but waiting lists tend to be long with more than 50% of patients waiting over three months and 22% waiting more than six months (DoH, 2003).

In osteotomy, a piece of bone next to the joint causing pain is cut and refixed in a different position. In arthrodesis, a joint is fixed permanently in one position. When the joint is fixed it can no longer move but it is no longer painful. In a synovectomy, the lining of the joint is removed if it is very inflamed and causing damage. These last three surgical procedures are more likely to be performed if there has been some trauma involved such as accident or injury to the joint. At present, joint replacement is by far the most common form of treatment (Grissom & Dunagan, 2001; Jinks et al, 2003; Salmon et al, 2001).

Surgery is usually postponed for as long as possible and thus many people with osteoarthritis will continue to live with pain and inflammation for many years before an operation is suggested and lengthy waiting lists will also add to the time spent in pain (Moran et al, 2003).

1.2.3.5 Diet

Given that obesity is implicated in osteoarthritis, sufferers are encouraged to maintain a normal body weight and healthy diet. There is no evidence that any specific diet helps osteoarthritis but vitamins C and D may affect the progression of osteoarthritis (Hosie & Dickson, 2000). Dietary advice may be offered generally by primary care staff but there is limited follow-up and compliance (Becker, 1985).

1.2.3.6 Physiotherapy and exercise

Published guidelines on the medical management of osteoarthritis suggest that physical therapy should include 'range of motion exercises, quadriceps strengthening exercises and assistive devices for ambulation' (Hochberg et al, 1995). It has been suggested that these appear to have a similar effect size to drug treatments (Dieppe, 1999). The American College of Rheumatology (2000) emphasises the use of quadriceps-strengthening and aerobic exercise for patients with knee osteoarthritis. Range of motion exercises are defined as stretching beyond the initial tension point which can increase mobility (Ross, 1997). In addition, weight-bearing exercises which improve muscle strength can help with joint pain and swelling by supporting the joint. Aerobic exercise is also of benefit in increasing muscle strength and overall conditioning e.g. walking, dancing and swimming (ibid.). Physiotherapy input can be of benefit in providing expert assessment and advice on specific exercise and joint protection.

A review of the literature on exercise therapy in osteoarthritis and rheumatoid arthritis identified only six studies focusing on osteoarthritis (Dekker et al, 1993). It was concluded that aerobic exercise and recreational exercise (e.g. walking) were of benefit in improving functioning in the majority of osteoarthritis sufferers. Caution has been recommended in implementing exercise therapy in those with severe joint disease or during an active inflammatory flare-up (Lane & Buckwalter,1993; Bokovoy & Blair, 1994).

A comparison of aerobic walking and aerobic aquatics with a range of motion control group in rheumatology outpatients found that the first two produced significant

improvements in anxiety and depression and also maintenance of activity in 60% at 12 month follow-up (mean age 64 years) (Minor et al, 1989). Improvements in functioning, a reduction in pain and medication use have been demonstrated after fitness walking or aerobic exercise programmes for osteoarthritis of the knee (mean age 69 years in both studies) (Kovar et al, 1992; Ettinger et al, 1997).

Relatively low compliance rates have been found with exercise regimes in osteoarthritis. One study found that 40% of participants exercised at least once per week but only 10% were performing both strengthening and stretching exercises correctly. Only 42% of the group had received medical advice to exercise. This advice was more likely to be provided at secondary care but not followed up to see if the older people (mean age 75 years) were performing the exercises correctly (Dexter, 1992). A more recent study found that advice to exercise was beneficial and intention to exercise measures were higher at 12 month follow up but no differences were found in pain and stiffness (mean age 69 years) (Halbert et al, 2001). Only a minority of doctors provide advice about exercise and fewer still follow up their patients regarding the advice given (Bradley, 2000) (see Appendix 1.1, table 1.7 for details).

This suggests that exercise is beneficial in osteoarthritis but limited compliance and incorrect exercise movement may reduce the effectiveness of this approach. Exercise in isolation may not therefore be the treatment of choice in the management of osteoarthritis.

1.2.3.7 Aids and adaptations

A range of tools and equipment are available for home use to help manage the limitations that may be imposed by the osteoarthritis. They can help to protect the joint. These can include appropriate footwear, grab rails, raised toilet seats, long-handled tools, wide handled tools, tap levers etc. One study found that the average number of aids used was 2.2 with the most common being related to kitchen and bathroom activities, e.g. long handled tools, bath boards (Mann et al, 1995) (details in Appendix 1, table 1.8) but information on their use and efficacy is scarce.

1.2.3.8 Education

Health education has been defined as 'any planned activity which promotes health or illness related learning; that is, some relatively permanent change in an individual's competence or disposition' (Tones, 1990). The American College of

Rheumatology (2000) recommends education about osteoarthritis as being of benefit in decreasing pain and improving function. It has been noted that physicians can underestimate their patients' wishes for education and information about osteoarthritis and overestimate their desire for medication (Bradley, 2000). In contrast, it has been found that osteoarthritis patients wanted information about the disease and this desire was associated with severity of pain as measured by questionnaire (mean age 61 and 71 years respectively, rheumatology outpatients) (Mahmud et al, 1995; Neville et al, 1999) (details in Appendix 1.1, table 1.9).

There were no studies identified in the literature which focused solely on education in osteoarthritis. The studies identified included exercise and education (Allegrante et al, 1993; Ettinger et al, 1997; Kovar et al, 1992; Minor & Brown, 1993; Sullivan et al, 1998) (mean ages 64 to 70 years, rheumatology outpatients). These studies used exercise training including walking as well as education on osteoarthritis. Some studies (Ettinger et al, 1997, Minor & Brown, 1993) reported behavioural approaches also. All studies reported improvements in exercise and walking compared to control groups but one study reported that these were not maintained at 12 month follow-up (Minor & Brown, 1993).

Two reviews note that there has been limited research in osteoarthritis and the focus in arthritis has tended to be on rheumatoid arthritis (Barlow, 2001; Daltroy & Liang, 1988). Furthermore, many of the studies cited include other components of intervention such as exercise therapy and/or psychosocial intervention approaches. The author's own literature search supports this in that few studies were identified which focus on osteoarthritis, and few of these studies are solely restricted to education.

A meta-analysis was conducted comparing patient education interventions with NSAID treatments in both osteoarthritis and rheumatoid arthritis (Superio-Cabuslay et al, 1996). Patient education was defined as formal structured instruction but the cited interventions also included symptom management; for example, biofeedback or exercise. The meta-analysis (Superio-Cabuslay et al, 1996) used standardised gain difference as the measure of effect size. This was defined as change in the control group subtracted from change in the intervention group and divided by the standard deviation of the pooled pre-treatment groups. In the studies examined, most of the participants were being treated with medication. Effect sizes in the trials were thus taken to support the additional effects of education. They found that

'educational interventions provided additional benefits that are 20 – 30% as great as the effects of NSAID treatment for pain relief in both osteoarthritis and rheumatoid arthritis'. The patient education studies also included social support, exercises and biofeedback which may confound the findings as does the difficulty of comparing studies with different interventions and durations.

A further search of the literature has not identified any studies that investigate the utility of a purely educational approach. Clearly, education is more commonly combined with other approaches such as exercise, social support, biofeedback and psychological interventions. Often, it is used as an intervention control group (see below). Conclusions on the utility of educational approaches are therefore limited, but the literature to date would imply that education has been of benefit when combined with another approach, e.g. exercise. In addition, the majority of studies have used rheumatology outpatients which reduces their generaliseability to the wider osteoarthritic population.

1.2.3.9 Psychological interventions

1.2.3.9.1 Cognitive Behaviour Therapy (CBT) and coping skills training

Cognitive behaviour therapy (CBT) approaches have been incorporated into a range of interventions. There appear to be no studies in the literature which have investigated a 'pure' CBT approach in osteoarthritis. A review in 1995 (Hawley, 1995) identified only two CBT studies in osteoarthritis (Keefe et al, 1990a, b; Calfas et al, 1992). A more recent review (Morley et al, 1999) only added one further study which focused on spouses of sufferers (Keefe et al, 1996). A further literature search was carried out by the author using a range of databases (Medline, PsycLit, Bath Index Databases Services (BIDS)) and search terms including cognitive therapy, behaviour therapy, CBT, coping skills and osteoarthritis but no more recent studies were identified.

Research by Keefe et al (1987a, b, 1990 a, b; Keefe & Caldwell, 1997) (for details see Appendix 1.1, table 1.10) focused on identifying pain coping strategies in osteoarthritis (mean age 63 years, rheumatology outpatients). Their findings indicated that participants who had high self-ratings of control over pain used cognitive strategies e.g. rational thinking, low catastrophizing and diverting attention. Further research concentrated on teaching osteoarthritis sufferers to utilise these cognitive coping strategies. Keefe et al (1990) describe lower levels of

psychological and physical disability maintained at six months in their pain coping treatment intervention compared with education about osteoarthritis and treatment as usual. The smaller scale study by Calfas et al (1992) (mean age 67 years recruited through community advertising) largely supported these findings with the cognitive behavioural group improving more than the education control group but these effects did not last over the 12 month follow-up period. (see Appendix 1.1, table 1.8 for details). The CBT group included cognitive techniques focusing on improving coping with pain, monitoring thoughts, feelings and behaviours, and behavioural work to improve functioning. Both these studies utilised the CBT approach, but focusing on pain and functioning. It is unclear how much they also addressed the general psychological well-being of their participants. These studies suggest that CBT approaches are useful in osteoarthritis but the evidence to date is sparse.

1.2.3.9.2 Arthritis self-management programmes

Self-management has been defined as 'the day-to-day tasks an individual must undertake to control or reduce the impact of disease on physical health status....[and]...cope with psychosocial problems generated or exacerbated by chronic disease' (Clark et al, 1991). There are three components to successful self-management: (1) sufficient knowledge and informed decision-making; (2) performing activities to manage the condition; (3) maintaining adequate psychosocial functioning. In their review of self-management in a range of chronic diseases (asthma, Chronic Obstructive Pulmonary Disease (COPD), diabetes, heart disease and arthritis), Clark et al (1991) noted that many studies were not explicitly focused on older adults and that differences and/or commonalities may be found in how older adults cope with chronic disease.

Arthritis self-management programmes developed from research by Lorig and colleagues (Lorig & Gonzalez, 1992, Lorig & Holman, 1993, Lorig et al, 1993). They incorporated both a patient education role and attempts to improve psychosocial functioning. The programmes, in their original form, comprised 12 hours of group intervention incorporating information about the disease and medical treatment, exercise plans and cognitive pain management. At four month follow-up, reduction in pain, disability and depression was found as well reduced frequency of visits to the general physician (mean age 64 years) (Lorig & Holman, 1993). Replication of these studies in a UK setting (mean age 60 years) (Barlow et al, 1997, 1998) found a reduction in pain, disability and depression and reduction in

visits to the general practitioner. Both studies included arthritis of other types, and recruited participants through community advertising. More recently, an examination of the cost effectiveness of arthritis self-management programmes was undertaken. This found that participants in the self-management groups (mean age 70 years) displayed reductions in feelings of helplessness and also health care costs increased less than in the control group (treatment as usual) (Groessl & Cronan, 2000) (for details see Appendix 1.1, table 1.11).

The literature indicates that arthritis self-management programmes are of benefit in improving psychological well-being in a range of arthritic conditions including osteoarthritis. Due to the mixed range of participants, which parts benefit people with osteoarthritis is not known. Furthermore, the participants were recruited through community advertising and this may not have been representative of the general osteoarthritis population found in primary care. Consequently, the findings are not generaliseable to an osteoarthritic population and further work is necessary. In addition, arthritis self-management programmes include both educative and psychological techniques. This presents a difficulty in that the key beneficial aspects of these programmes have not been identified. In a review of arthritis self-management programmes, it was noted that the relationship between psychological well-being at the start of the program and improved outcomes at the end of the program was not clear (Lorig et al, 1989b). Therefore, while arthritis self-management programmes are of benefit, the processes they affect require further explanation. This will be explored further in the next chapter.

1.2.3.9.3 Other interventions

Weinberger and his colleagues (Weinberger et al, 1986; Weinberger et al, 1989; Rene et al, 1992) (for details see Appendix 1.1, table 1.12) hypothesised that regular telephone contact with osteoarthritis patients (mean ages 62 to 66 years) would provide support (both social and information) and thus improve pain. They recruited participants from rheumatology clinics and demonstrated improvements in pain, physical and psychological functioning following telephone intervention, as measured by pre and post questionnaires. They suggest that this may be a cost-effective way of improving functioning in osteoarthritis sufferers. It remains unclear as to the mechanism for the improvement and how the telephone interviewers provided support.

1.2.3.9.4 Summary of psychological interventions

Within the psychological intervention literature, there is some evidence that psychological interventions are of benefit to older adults with arthritis. Most of the studies include older adults with mean ages ranging from 60 to 75 years. Few studies focus on osteoarthritis exclusively, including different types of arthritis in their samples. This limits their generaliseability, and suggests that there is a need to focus on osteoarthritis exclusively to identify what works best for this group. In addition, many of the studies have combined approaches with different treatment rationales; for example, combining educational and psychological approaches. This is particularly evident in the arthritis self management programmes. Thus, it is difficult to ascertain the most effective intervention(s) in alleviating osteoarthritis in older people due to the possible confounding factors of a multiplicity of intervention strategies. Furthermore, the majority of these studies have used rheumatology clinic samples or advertised in the media for participants. This limits their generaliseability to only those populations and does not allow generalisation to primary care where most older people with osteoarthritis present. Thus, there is a significant gap in the literature regarding psychological approaches to osteoarthritis within the older adult population.

1.3 Conclusions

It is clear that osteoarthritis is a disease process whose prevalence increases with age. It is known that the older adult population is increasing in size. Therefore, osteoarthritis in older people will be an increasingly important problem for health professionals to manage. The majority of older people with osteoarthritis present, and are managed to primary care. Many studies have included a range of arthritic conditions limiting conclusions specifically about osteoarthritis. In addition, the majority of studies have either advertised for participants or used convenience samples in rheumatology clinics. These samples can provide useful information on osteoarthritis but caution is needed in applying these findings in primary care. Consequently, a study focusing on primary care is necessary to address this gap and contribute to the evidence base needed to improve the management of osteoarthritis in older people.

The main symptoms associated with osteoarthritis are pain, stiffness and functional impairment although these are not always associated with radiological severity. Many of these symptoms are also associated with the presence of depression. Osteoarthritis is a degenerative disease and treatment focuses on symptom

management and maintaining an individual's psychological well-being. Medication is not of benefit to all, and surgery often involves lengthy waiting times due both to the effects of demand and also the limited lifespan of joint replacements.

Research has also focused on non-pharmacological interventions such as exercise, education and psychological approaches. Varying degrees of success in improving symptoms and lifestyle management have been found. Many studies have included a range of techniques, and the effectiveness of each component cannot be clearly specified. Studies have also struggled to explain the mechanisms of change involved. Consequently, an understanding of these mechanisms is important to ensure that interventions are effective and evidence based.

Within the literature, education, exercise, CBT approaches to pain coping, and arthritis self management have all demonstrated improvements in psychological well-being and functioning in older adults with osteoarthritis. What is not known is which of these is most effective, and with whom. Understanding how these interventions improve psychological well-being and functioning in osteoarthritis is not well-described. An understanding of what works for whom and why, is important in developing effective, evidence based interventions. Therefore, the theoretical concepts which underpin intervention approaches need further exploration. Only through a clear understanding of the theoretical concepts, which underpin much of the work in developing interventions, can an appropriate model of psychological factors in osteoarthritis be developed and tested. The next chapter will describe the theoretical issues and review the evidence.

Chapter Two: Psychological factors influencing adjustment to physical ill-health in older people: a review of the literature

2.1 The underpinnings of health psychology

The treatment and management of osteoarthritis in older adults has included both physical and psychological approaches. Physical and pharmaceutical treatments are of benefit to osteoarthritis sufferers but they do not completely ameliorate the symptoms of pain and stiffness nor compensate for loss of function. Psychological interventions have demonstrated some benefit to osteoarthritis sufferers in clinical rheumatology settings. Understanding of how these interventions work, and their application in primary care settings is an important research area that has been neglected. An understanding of the psychological concepts involved is imperative to the development of a more effective approach to the management of osteoarthritis in older people. The focus of this chapter will be on reviewing the literature on the psychological factors related to the management and treatment of osteoarthritis. This literature seeks to explain how people respond to illness and to deliver interventions to improve how people cope with chronic illness (e.g. Broome & Llewellyn, 1995). The literature reviewed will be in the field of health psychology where biopsychosocial models predominate, and in clinical psychology where specific psychological intervention techniques are described. There is overlap between these two areas and the theoretical basis for this will be described first.

The link between physical experience and psychological well-being was made over 2000 years ago by Hippocrates who assumed that physical experience influenced psychological functioning. More recently, Freud inferred that psychological experiences could influence physical experience (Freud, 1933, 1973) with psychological experiences causing loss of physical function, for example paralysis, blindness. Freud drew examples from his clinical work with women who had suffered from a range of psychological stressors to demonstrate the effect of psychological stress on physical functioning (ibid.). It was not until the 1930s that more systematic experimental work was conducted by Selye.

Selye defined stress as a bodily response to unfavourable environmental demands (including psychological ones). He sought to explain the metabolic responses to these unfavourable environmental demands by identifying hormonal releases in

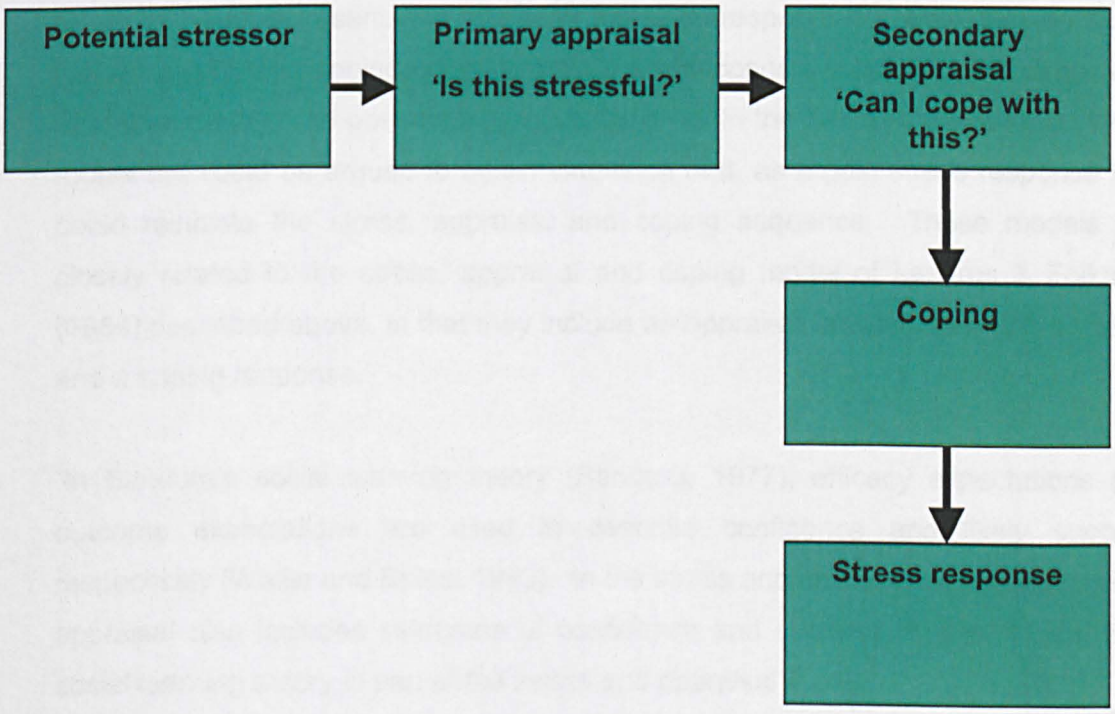
response to stressors. He defined environmental demands as 'stressors' which affected physical responses and processes. These stressors could include both physical illnesses and psychological challenges (Lazarus & Folkman, 1984; Salmon, 2000). The identification of metabolic responses to stress led to increasing work on the effects of psychological stressors on physical functioning in a range of groups including soldiers and students (see Lazarus & Folkman, 1984). Clear differences in individual responses to the same situations were found. For example, not all students displayed increased heart rate prior to entering an examination. Consequently, the concept of stress could not be defined as a 'universal metabolic response' as Selye's early work had concluded because of those different individual responses to stress. Instead, stress was now perceived as a response that could be influenced both by the individual and their environment. The focus of research then shifted to the relationship between the person and their environment containing the potential stressors (Lazarus, 1966). Two directions emerged in this research. The 'stress and appraisal model' developed by Lazarus & Folkman (1984) focused on stress and stress responses to physical stressors, illnesses or environments. The second direction took place in the field of clinical psychology following the development of the cognitive behavioural model. The cognitive behavioural model focuses on thoughts and behaviours as responses to stressors that can be ameliorated by modifying the thoughts and behaviours.

2.1.1 Stress and appraisal

Lazarus & Folkman (1984) developed the stress and appraisal concept in relation to psychological stress which they defined as: "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being". They noted that it is not an original idea that how an individual 'construes an event shapes the emotional and behavioural response' (ibid.). Lazarus & Folkman outlined cognitive appraisal and coping as the two processes which mediate the person-environment relationship (ibid.). They defined cognitive appraisal as, "an evaluative process that determines why, and to what extent, a particular transaction, or series of transactions, between the person and the environment is stressful"; and coping as "the process through which the individual manages the demands of the person-environment relationship that are appraised as stressful and the emotions they generate" (ibid.)(see Figure 2.1).

Appraisal has two main components – primary and secondary. Primary appraisal has been characterised by the question, "Am I in trouble or being benefited, now or in the future, and in what way?" (ibid.). Secondary appraisal asks "What if anything can be done about it?" (ibid.). Lazarus & Folkman (ibid.) examine three types of primary appraisal: irrelevant, benign-positive, and stress. Stress appraisals are of most relevance to health and illness. Three types of stress appraisal are included in this taxonomy: harm/loss, threat and challenge. The first, harm/loss, relates to something that has already occurred, whereas the last two concern anticipated or potential events. The defining difference between threat and challenge appraisals appears to be that with the latter there is potential for psychological growth, but they are not intended to be mutually exclusive (ibid.). Lazarus and Folkman then describe secondary appraisal as a process that examines available coping options. It examines the likely success of a particular coping option, the confidence that the individual has in applying the option, and an evaluation of the consequences. The model in Figure 2.1 displays the stress and appraisal model pictorially. From this, it can be seen that a potential stressor is first appraised as to whether it is stressful (primary appraisal), and subsequently whether the individual can cope with the potential stressor (secondary appraisal). Then the individual initiates a coping response which will influence their response to the stressor.

Figure 2.1 Stress, appraisal and coping model (Lazarus & Folkman, 1984)



Much of the work in the stress and appraisal area has focused on the psychological responses to physical illness. This aligns with Selye's work in that physical illness can be seen as one form of unfavourable environmental demand. The stress and appraisal literature has focused on developing models which attempt to explain appraisal and coping with physical illness (the stressor).

Early work focused on the development of models such as the Health Belief model and its revisions (Becker, 1974; Becker & Rosenstock, 1987), the Self-Regulatory model (Leventhal et al, 1985), and social learning theory (Bandura, 1977). The revised health belief model included five beliefs thought to influence health behaviour. These beliefs are: vulnerability, motivation, change, benefits and costs, and self-efficacy. It can be seen that beliefs about vulnerability (am I likely to be ill?) correspond to primary appraisal; and beliefs about motivation, change (changing will improve how I feel) correspond to secondary appraisal; and self efficacy (confidence that one can undertake an action) and behavioural intentions (I can do something to help) to coping.

The self-regulatory model includes the concepts of: interpretation, emotional response, representation of health threat, coping and appraisal. The interpretation concept and emotional response correspond to primary appraisal ('am I under threat?'). The representation of health threat corresponds to secondary appraisal (can I cope?). The coping concept directly corresponds to coping in the stress and appraisal model. The post-coping appraisal is not in the Lazarus & Folkman (1984) model but could be argued to be an extension of it, as a post stress response that could reinitiate the stress, appraisal and coping sequence. These models are closely related to the stress, appraisal and coping model of Lazarus & Folkman (1984) described above, in that they include an appraisal or analysis of the situation and a coping response.

In Bandura's social learning theory (Bandura, 1977), efficacy expectations and outcome expectations are used to describe confidence and likely success respectively (Waller and Bates, 1992). In the stress and appraisal model, secondary appraisal also includes estimates of confidence and success likelihood, and thus social learning theory is part of the stress and appraisal model.

The main theories relating to psychological factors in physical illness in health psychology can be seen to have been derived from the stress, appraisal and coping model. Three questions which encompass each model's components are displayed in Table 2.1 below.

Table 2.1 Similarities between terms used in models of health and CBT described as responses to three questions

Question / Model	How do people think about their illness?	What do people do about their illness?	How does social support affect the impact of illness?
Stress and Appraisal	Appraisal	Coping	Social Support
Health Belief	Beliefs: vulnerability, motivation, change, benefits and costs	Self-efficacy	
Self-Regulatory	Illness perceptions: interpretation, emotional response, representation of health threat	Coping	
Social Learning Theory	Efficacy and outcome expectations	Behaviour	
Cognitive-behavioural	Cognition	Cognition, Behaviour	Social network

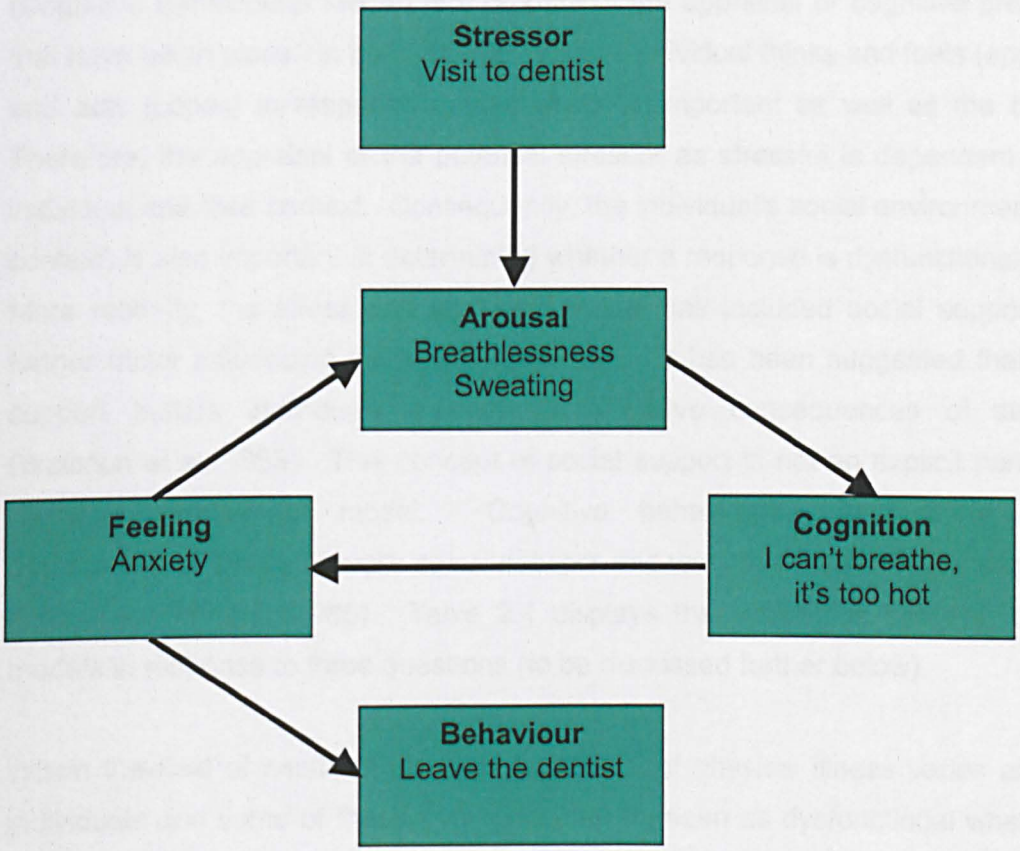
2.1.2 Cognitive behavioural model

A parallel development in the field of psychology has been the study of individual psychopathology. Early work by Freud suggested that early life experiences and their interpretation could serve as a means to understanding psychopathology and thus lead to change in an individual. Behavioural work in the mid 20th century suggested that classically conditioned responses could explain the concept of anxiety and behavioural interventions sought to change an individual's behavioural response to a stressor. These two theories demonstrate the importance of previous experience in determining future responses. More recently, there has been a focus on cognitive approaches to anxiety influenced greatly by the work of Beck (e.g. Beck & Emery, 1985).

Beck and Emery (ibid.) emphasise the importance of cognitive factors in therapeutic approaches which seek to change how an individual thinks about a particular

situation. In their example of a dental phobic with physiological arousal symptoms of breathlessness and sweating in the dentist's chair, their cognitions would include 'can I cope with this?', 'I can't breathe', 'I'm too hot'. The behavioural response might be to leave the dentist's chair to alleviate the breathlessness and sweating and to change the cognitions ('I can breathe now'). The cognitive-behavioural intervention would aim to persuade the individual to use behavioural approaches such as relaxation techniques to reduce physiological arousal, and cognitive techniques to change the thoughts contributing to the arousal. The individual would be encouraged to think 'I can cope', 'It's OK, I can breathe'. The cognitive behavioural approach has been used successfully in interventions for anxiety, depression and other psychological problems. Intervention is focused on cognitions and behaviours. The cognitive behavioural model is displayed in Figure 2 and shows the interrelationships between cognitions, behaviours and feelings with the example of the dental phobic.

Figure 2.2 Cognitive-behavioural model of anxiety (Beck & Emery, 1985)



2.1.3 The similarities between the stress and appraisal model and the cognitive behavioural model

Both the stress and appraisal model and the cognitive behavioural model ultimately derive from the work of Selye. Despite the apparently divergent paths of development of these theories, there is clear overlap. Both stress and anxiety are described as responses to 'noxious stimuli' (Lazarus & Folkman, 1984; Beck & Emery, 1985). The responses are determined by the individual's previous experience and interpretation of the current event. Cognitions and appraisals are characterised by how a person thinks about a stressor, and coping is the individual's response to the situation, this corresponds with the behavioural component in the cognitive behavioural model. In addition, how a person thinks about a stressor may also help them cope; therefore, cognitions can also be a coping response.

If an individual responds to a stressor by displaying the symptoms of stress or anxiety, then this is a response which may be more or less maladaptive depending on the context. This stress response (Stress and Appraisal model) or arousal (Cognitive Behavioural Model) is a product of the appraisal or cognitive processes that have taken place. In both models, how an individual thinks and feels (appraisal) and acts (copes) in response to a stressor is important as well as the context. Therefore, the appraisal of the potential stressor as stressful is dependent on the individual and their context. Consequently, the individual's social environment (their context) is also important in determining whether a response is dysfunctional or not. More recently, the stress and appraisal model has included social support as a further factor influencing the stress response. It has been suggested that social support buffers individuals against the negative consequences of stressors (Wallston et al, 1983). This concept of social support is not an explicit part of the cognitive behavioural model. Cognitive behavioural interventions include assessment of the individual's social network and work to improve these is included if required (Fennell, 1989). Table 2.1 displays the similarities between the two models in response to three questions (to be discussed further below).

Within the field of health psychology, appraisal of physical illness varies amongst individuals and some of these appraisals can be seen as dysfunctional where they do not improve or maintain an individual's good health. With cognitive behavioural models, a dysfunctional response to a stressor (e.g. the dental phobic) is the focus of intervention. The aim of intervention is to change the dysfunctional responses to stressors. Therefore, both the health psychology physical illness models and

cognitive behavioural models are two areas of literature which have a great deal of shared theory although that has not been explicitly recognised. Consequently, when investigating psychological factors in chronic illness, literature from both these areas should be considered in identifying the key psychological concepts.

2.2 What are the key psychological factors that relate to living with chronic illness in older people?

To answer this question, both the stress and appraisal model and the cognitive behavioural model will guide the review. Both models include concepts of appraisal or cognition, and coping or behaviour (and cognition as a form of coping). Social support is present explicitly in the stress and appraisal model, and implicitly in the cognitive behavioural model. For this review, these psychological concepts will be reviewed within the context of chronic illness. These concepts can be seen as referring to three questions (see Table 2.1). There are three parts to this review, corresponding to those questions: how do older people think about their illness; what do they do about it; and how does social support affect the impact of illness in older people? These three questions will be addressed in discussing the literature reviewed on the psychological factors associated with chronic illness in older people.

2.3 How are the key psychological factors relating to living with chronic illness in older people described in the literature?

There is variation in how the three questions (concerning how people think about their illness, what they do about it and how they are supported) are described in the literature. There are different models of health behaviour which label these terms differently. These must be considered in order to identify the relevant terms to include in the literature search strategy.

2.3.1 Ways of conceptualising how older people think about their illness

Appraisal has had different labels in different models of psychology and illness despite the similarities between the models described above. In the self-regulatory theory (Leventhal et al, 1985), illness perception or illness representation denotes the concept of appraisal. The concept of illness perception or illness representation developed as a result of dissatisfaction with the stress model. This has led some

researchers (e.g. Lau, Leventhal etc.) to conceptualise illness as including a series of cognitive processes which are both content and context dependent. They argued that models such as the stress model or social learning theory are insufficiently specific for how individuals conceptualise and respond to their illness (Leventhal & Nerenze, 1985). In addition, the stress model or social learning theory does not explain why individuals present for help with a particular set of symptoms at a particular time (Mechanic, 1986).

Research using the framework of the self-regulatory model hypothesised that perceptions or attributions of illness may mediate between illness experience and illness behaviour (Lau & Ware, 1981). Identification of these perceptions has led to descriptions of the self-regulatory model as a 'commonsense' model of illness (Lau & Hartman, 1983; Lau et al, 1989; Leventhal & Nerenze, 1985). 'Commonsense' models of illness have three stages: problem representations, action plan, and evaluation of progress. The model is not prospective in that it focuses on general perceptions of illness that are in the present. This model forms part of the self-regulation theory of Leventhal et al (1980) that describes the influence of knowledge and beliefs on the appraisal of health-related information. Early work by Lazarus & Folkman (see Lazarus & Folkman, 1984) postulated a general appraisal process which could be applied in a range of situations, whereas work by Leventhal and his colleagues (Leventhal et al, 1980, 1992; Leventhal & Nerenze, 1985) focused on attributions of illness or illness perceptions.

Appraisal and illness perception overlap as concepts in 'commonsense' models of illness, where the three stages: problem representations, action plan, and evaluation of progress, relate to primary and secondary appraisal in the stress appraisal model (see Table 2.1). Problem representations correspond in part to primary appraisal (identification of the current situation as stressful, positive or irrelevant), with action plan and evaluation of progress corresponding to secondary appraisal (what can be done?).

The main difference between 'commonsense' models and the stress and appraisal model is in their structure. In Leventhal's model, illness perception is said to precede appraisal, suggesting that individual perceptions of an illness are present and provide context for appraisal. This factor is not present in the stress and appraisal model of Lazarus & Folkman (1984). Furthermore, the development of these two models differed in that the stress and appraisal model was derived

theoretically, whereas the structure of the illness perception construct has been generated empirically.

Appraisal and illness perception are used widely in the health psychology literature, and will be included in this literature review.

2.3.2 Ways of conceptualising what older people do about their illness

Coping has been defined as 'behavioural and cognitive responses to stressful events that tax the person's capacity to adjust' (Manne & Zautra, 1994). It forms part of the model defined by Lazarus and Folkman (1984), its focus is on the individual's responses to the situation.

A range of coping strategies and styles has been described which have been divided into two main types: problem-focused coping and emotion-focused coping (e.g. Lazarus & DeLongis, 1993; Carver et al, 1989). Problem-focused coping means doing something actively to cope with the situation, whereas emotion-focused coping is the managing of emotional distress associated with the stressor (Carver et al, 1989). Other dichotomous typologies have included active coping versus passive coping (ibid.).

Coping styles have been measured using a range of tools. The most commonly used instruments include the Ways of Coping scale (WoC) (Lazarus & Folkman, 1984), Pain Coping Strategies Questionnaire (Pain CSQ) (Rosenstiel, 1981; Rosenstiel & Keefe, 1983), and the COPE Inventory (COPE) (Carver et al, 1989). The scales include the dichotomous typologies described above, i.e. problem-focused vs. emotion-focused and active vs. passive. They also include other descriptions of coping strategies which do not easily fit into these typologies. For example, turning to religion could be regarded as either problem or emotion focused. Researchers assign different statements to different types of coping strategies. For example, Lazarus & Folkman's WoC scale (Lazarus & Folkman, 1984) includes 'looked for the silver lining, tried to look on the bright side of things' under emotion-focused coping; however Carver et al's (1989) COPE scale includes 'I look for something good in what is happening' under Positive Reinterpretation and Growth, which forms part of the cognitive coping factor in the COPE. Despite the differences in language, these two statements are similar in their meaning. This suggests that different researchers have identified similar coping strategies in their

measurement scales but do not agree on categorisation. This points to some conceptual difficulties in assigning typologies.

The concept of self-efficacy is found in both social learning theory and the health belief model. Self-efficacy was described by Bandura et al (1987) as 'an individual's judgement of their capabilities to execute given levels of performance and to exercise control over events'. It forms part of a model comprising three components: situation-outcome expectancy; action-outcome expectancy; and perceived self-efficacy. The first two components represent beliefs about the consequences of a situation or a behaviour respectively, whereas self-efficacy represents a belief about an individuals' capability (Conner & Norman, 1996).

Self-efficacy has been described as either illness or situation specific, or as a general concept influencing how an individual copes with their everyday life. This is reflected in the development of different questionnaires; the General Self-Efficacy Scale (GSES) which does not focus on specific events compared to the Arthritis Self-Efficacy Scale (ASES), which includes questions on how confident an individual feels in coping with arthritis pain. This form of question focuses specifically on a particular illness related situation.

Self-efficacy has been described as an appraisal of one's resources and is also involved in the forming of behavioural intentions (Schwarzer, 1992). In addition to this, cognitive and behavioural coping have also been described as components of self-efficacy (McCarthy & Newcomb, 1992) which suggests that self-efficacy is synonymous with coping. Self-efficacy has been described as both an appraisal and as including coping (Toshima et al, 1992). In the present context, the concept is therefore ambiguous. Nevertheless, both coping and self-efficacy have been used widely in the literature and will be included in the review to assess their practical utility as concepts to understand the impact of patients' ways of responding to their illness.

2.3.3 Social support

It is known that the social network in which individuals live contribute to their psychological well-being and functioning (e.g. Radley, 1994). Furthermore, the presence or absence of social networks will influence the management of stressors (Lazarus & Folkman, 1984). Thus the context in which people live clearly influences their psychological health. Social networks are defined as an individual's range of

social relationships. Merely establishing the numbers of friends, family or relationships that an individual can access tells us little about what these social relationships provide. Therefore, the concept of social support has been expanded to include the range and type of interactions that have been found to be supportive (Lazarus & Folkman, 1984). The literature has generally distinguished between active or instrumental support and emotional or expressive support (Langford et al, 1997; Salmon, 2000; Schaefer et al, 1982; Wallsten et al, 1999). Instrumental support includes providing material goods, physical assistance, and information (Hogan et al, 2002). Emotional support includes the disclosure of feelings, communication of concern and caring (ibid., Wallsten et al, 1999).

It is known that social support influences the response of an individual to a stressor, in conjunction with appraisal and coping mechanisms (Lazarus & Folkman, 1984). Measurement of the types or amount of social support has not generally been found to relate unambiguously to psychological or physical functioning. Individuals vary in how they perceive their social support and this will influence their response to a stressor. Depressed individuals often perceive their social support negatively but when not depressed would not hold this view. Therefore, the concept of perceived social support is important in describing how individuals respond to a stressor

In reviewing the literature, it is important to examine how social support contributes to psychological and physical functioning in chronic illness. Both the type and amount of social support and how it is perceived will be important.

2.3.4 Choosing psychological search terms for the literature review

As argued above, within the appraisal literature, two terms are widely used and reflect the different models of living with chronic illness. These are appraisal and illness perception. Similarly, both coping and self-efficacy are widely used in describing strategies used by people to cope with chronic illness. Perceived social support is as important as the type or amount of social support and both terms will be included in the review. Cognitive-behavioural models in osteoarthritis were described in chapter one and are included in this chapter only where they are linked to these concepts.

2.4 Reviewing the literature

Three questions have been posed to structure this review. These are: how do older people think about their illness; what do they do about it; and how does social support affect the impact of illness in older people? These three questions will be used in discussing the literature reviewed on the psychological factors associated with chronic illness in older people.

2.4.1 Selection of the literature to be reviewed

2.4.1.1 Osteoarthritis in older adults

Much of the research addressing appraisal or cognition, coping or behaviour, and perceptions of social support has focused on the experiences of working age adults. This has meant the neglect of the experiences of older people (aged 65 years and above) who are becoming an increasingly larger proportion of the population. Furthermore, ill health is more likely to affect older people with most suffering from at least one to two illnesses at any one time (see chapter one for details). The literature on chronic illness encompasses a wide range of conditions and settings, however the focus of this literature review is on older people with osteoarthritis. In identifying relevant experimental work, all the literature on older adults with osteoarthritis is included under each of the relevant sections. As the knowledge base is limited in this area, wider research on older adults with other chronic illnesses has also been surveyed.

2.4.1.2 Other chronic illnesses

The approach taken has been to include a range of chronic illnesses commonly affecting older people: COPD, hypertension and angina, and rheumatoid arthritis. All these illnesses share a number of features: they are chronic incurable conditions, treatment is focused on symptom management and they are more common in older people. The symptomatology of these illnesses also shares similarities, in particular, pain is a common feature. COPD and angina also share features such as breathlessness despite differing aetiologies. Similarly, both osteoarthritis and rheumatoid arthritis have stiffness as a symptom.

Much of the health psychology literature describes the psychological factors which affect individuals with chronic illness. The CBT literature focuses on intervention work with specific psychological disorders sometimes in the context of concurrent

chronic illness. In this review, both non-treatment and treatment studies which focus on the relevant chronic illnesses identified will be included.

2.4.1.3 Older adults

Given the limited health psychology literature on older adults with chronic illness, additional research relevant to older adults has been included. A study was defined as relevant if it included older adults, defined as aged 65 years and above and included the search terms for the review. Using this method, studies which included older adults without chronic illness were selected, and old age specific health related behaviours were surveyed.

2.4.2 Method of literature review and further modifications to the search strategy

Four databases (Medline, PsycLit, Science Citation Index & Social Sciences Citation Index) were used in the literature search. The literature search strategy was to pair each psychology term with each chronic illness. The initial focus of the search was to select only those articles which only included older people, this approach produced very few articles. Consequently, the focus was widened further to include younger adults (but not children) who suffered from the chronic illnesses included in the search strategy. This produced variation in the amount of relevant literature identified in the search. For example, only 9 articles were found relating the COPD and the aforementioned psychology terms compared to over 40 relating to rheumatoid arthritis. In addition, the search strategy also identified studies where participants were identified on the basis of symptoms, e.g. pain, but suffered from a range of chronic conditions which were not always clearly delineated but included the chronic illnesses in the search criteria. Given the limited published work on older adults with chronic illness, the search strategy also paired ageing and older adults with the psychology terms in an effort to identify more studies. Few additional studies were identified using this approach. Not all the studies identified in the literature search proved relevant. Studies were included in the review if they provided clear evidence of using the identified key factors: illness perception, appraisal, coping, self-efficacy, perception of social support, cognitive behavioural model (only if present with a health psychology term) in explaining cognitions and/or behaviour within the context of a chronic illness and/or ageing. Details of the studies cited in this chapter can be found in Appendix 2.

2.5 Research evidence

Within this section, each concept will be reviewed separately. The evidence will be structured to present a review of work in osteoarthritis, followed by a review of the relevant chronic illness (excluding osteoarthritis) literature, and then the relevant research in ageing. In some sections, there is limited evidence available and thus comment is necessarily limited and may point to either conceptual difficulties in the field, or where psychological studies have not been undertaken in a particular area.

2.5.1 How do older people think about their illness?

2.5.1.1 Appraisal: research evidence

2.5.1.1.1 Osteoarthritis

Only one study focused on osteoarthritis in older people (see Appendix 1.2, table 1.1 for details of studies in this section). This study focused solely on women with osteoarthritis with a mean age of 80 years (range 65 – 97 years) (Downe-Wamboldt, 1991). Using the Lazarus & Folkman's Stress Questionnaire, three types of primary appraisal were assessed: challenge, harm and threat. Challenge appraisals were positively related to reductions in illness related stress but harm and threat appraisals were not. Illness related stress was measured using six (of nine) subscales of the Arthritis Impact Measurement Scales (AIMS) (Meenan et al, 1980). The scales included were: the ability to move around the community, limitations in physical activities, routine household tasks and activities of daily living, pain and alterations in social activities. The challenge appraisals were also positively related to the three specific coping strategies measured by the Jalowiec Coping Scale (Jalowiec & Powers, 1981). These were reported as 'confrontive' [sic], 'emotive' and 'palliative' coping. 'Confrontive' coping included recognising that there was a problem and taking steps to address it. 'Emotive' coping was characterised by affect related strategies and 'palliative' coping by seeking pain relief. No relationship was found between the harm and threat appraisals and these three coping strategies. Levels of illness related stress were not found to be related to the three coping strategies measured. The conclusions from this study are limited as only the challenge appraisals related to specific coping strategies, and neither appraisal nor coping related to illness related stress. Challenge appraisals (as defined by Lazarus & Folkman) are appraisals of anticipated events that include the potential for growth. A reduction in illness related stress is a positive outcome in managing chronic

illness. Therefore, a positive relationship between challenge and lowered illness related stress is consistent with the stress and appraisal model.

2.5.1.1.2 Other chronic illnesses

Within the chronic illness literature, few studies on appraisal were identified. Only one study in the rheumatoid arthritis literature focused on appraisal (Giorgino et al, 1994). This study included a wide age range (16 to 89 years) with a mean age of 52 years. Differences in appraisal and coping strategies were found between pain management and household or leisure activities. Participants also appraised their ability to control pain as more important than their ability to complete household tasks or leisure activities. This finding is perhaps obvious, as most individuals would wish to control their pain. This study also found that participants used more avoidance coping strategies for pain compared to leisure activities. Avoidance coping strategies were characterised by wishing or hoping for the situation or the individual to change. By definition, leisure activities are enjoyable so avoidance coping in this context is unlikely as individuals would not be likely to wish that their leisure activities to change. Consequently, this study does not contribute new information on appraisal in chronic illness.

Two studies were identified that included older adult participants with chronic illnesses (Bombardier et al, 1990; Kalfoss, 1993). These two studies included age ranges from 18 to 81 years (mean = 45) and 50 to 98 (mean = 73) respectively. Participants were hospital inpatients with a range of chronic illnesses including COPD and arthritis. Detailed information was not provided about the nature of the illnesses. Participants were included in these studies if they had been admitted to hospital with a chronic illness within four weeks of the start of the studies. These two studies found associations between depression and appraisals of powerlessness and helplessness. Appraisals of powerlessness and helplessness are common cognitions in depression, and thus these appraisals do not add to our understanding of appraisal in chronic illness.

2.5.1.1.3 Older adults

Two studies sought to examine age-related differences in appraisal (Aldwin, 1991; Aldwin, 1996). The Ways of Coping scale (WoC) (Lazarus & Folkman, 1985) was used in both studies with a sample of older men (average age 65 years, range 48 to 91 years) (Aldwin, 1996), and with a sample of both sexes (average age 42 years, range 18 – 78). These two studies did not find differences in appraisal in the older

age group compared to the younger ones suggesting that appraisal is not influenced by age.

2.5.1.1.4 Conclusions

Within this section, only six relevant studies have been identified. Studies of people with arthritis (rheumatoid or osteoarthritis) have told us that appraisal of pain and appraisal of control over pain is important, and pain appraisal is associated with avoidance coping. Unfortunately, the relationship of appraisal with psychological well-being was not clearly described. Two studies in chronic illness did not contribute new knowledge. Within the ageing literature, no evidence for age related differences was found. Thus there is limited evidence that the concept of appraisal helps to explain how illness is conceptualised by older people. The work by Lazarus & Folkman (ibid.) did not explicitly focus on illness as the stressor. A model that focuses more explicitly on illness and how an individual perceives their illness may provide better evidence.

2.5.1.2 Illness perception

Illness perception forms part of the Health Belief Model. Initial work focused on the development of tools to measure illness perception. Further developments have sought to use these tools to explain illness perception of different illnesses. In this section, the measurement of illness perception will be discussed separately from the research on illness perception in osteoarthritis, other chronic illnesses and older adults.

2.5.1.2.1 Measurement of illness perception

Much research has gone into investigating the concept of illness perception. Some researchers have adopted a theoretically driven view based on semi-structured interview approaches (e.g. Leventhal, Weinman, Lau) to define illness perception with four to five main components, viz. Identity, Consequence, Cause, Time line, Cure. This corresponds to work by Turk et al (1986) which identified a four dimensional structure of illness comprising: Seriousness, Personal Responsibility, Changeability, Controllability. Other researchers (Ahern et al, 1995; Bishop, 1987; Gray, 1993; Prohaska, 1985; Salmon et al, 1996; Schiaffino & Cea, 1995) have utilised symptom and belief checklists and factor analysis to generate specific illness representations which are disease specific (for details of cited studies, see Appendix 2, table 2.2).

2.5.1.2.1.1 Osteoarthritis

Only one study focused on older people with osteoarthritis (Ahern et al, 1995). This study compared perceptions of illness in participants with osteoarthritis or rheumatoid arthritis. The osteoarthritis group had an average age of 70 years making the findings relevant to older adults. This study found that there was a difference between the osteoarthritis and rheumatoid participants in that the former were more preoccupied with somatic symptoms and their severity.

2.5.1.2.1.2 Other chronic illnesses

Disease specific illness perceptions have been found in rheumatoid arthritis (mean age 53 years) with ratings of greater variability of symptoms and curability than other chronic diseases (multiple sclerosis and HIV infection) (Schiaffino & Cea, 1995). Research on identifying disease specific illness perception clusters has used general practice populations who were younger in age (mean age 37 years) (Bishop, 1987; Gray, 1993; Salmon et al, 1996). The findings indicated that different symptoms were attributed to different processes and swollen wrists and backache were attributed to musculoskeletal problems and the body 'wearing out' (Bishop, 1987; Salmon, 1996). These studies did not include older adults and further work is necessary to determine if these findings are generaliseable to older adults.

2.5.1.2.1.3 Older adults

A study comparing older adults (mean age 70 years) with young and middle aged adults found that older people considered themselves more vulnerable to disease compared to the younger group (Prohaska, 1985). This is unsurprising given that older people are more likely to suffer from illnesses (Bradbury, 1985). Symptom checklists to indicate specific illnesses were completed consistently across all age groups. In all age groups the perceptions of illness were disease-specific; for example, cancers were represented as a greater health threat than high blood pressure. Therefore, these two studies (Ahern et al, 1995; Prohaska, 1985) provide evidence that illness perceptions are disease-specific and consistent across the age range.

2.5.1.2.2 Explaing the impact of illness perception

Since the development of tools to measure perceptions of illness, studies have sought to look at a range of illnesses (or symptoms) in an effort to explain how illness perception affects illness behaviour or functioning. Studies of COPD,

hypertension and cardiovascular problems as well as rheumatoid arthritis and osteoarthritis have been included in this review.

2.5.1.2.2.1 Osteoarthritis

Only two studies focusing on illness perception and illness behaviour have been identified in the osteoarthritis literature (Hampson et al, 1994; McDonald-Miszczak et al, 2001). These two studies found that osteoarthritis sufferers conceptualised their disease as being serious, partially controllable but incurable. Higher ratings of seriousness and lower ratings of health status were associated with higher levels of self-care activity (e.g. exercise, diet, rest), and higher levels of health care use (GP appointments, medication, hospital admission). The mean ages reported (72 and 69 years respectively) are within the older adult range which makes them relevant to an older population. These two studies show that the seriousness with which an illness is perceived is linked with an increase in the range and extent of management approaches undertaken. Both studies note that their participants use pain as a measure of severity of illness. Pain in osteoarthritis does not always correlate with radiographic evidence (Dekker et al, 1992). In addition, they do not report whether the self-care activities undertaken or the use of health care ameliorate the severity of the illness as indicated by reported pain. Consequently, further work is required to identify which illness perceptions in osteoarthritis are associated with better psychological well-being and functioning.

2.5.1.2.2.2 Other chronic illnesses

In the COPD and hypertension literature, cross-sectional studies have demonstrated that poorer functioning (psychological and physical) is associated with beliefs in the greater severity of the illness (mean ages where reported were 47 years and 64 years respectively) (Baumann & Leventhal, 1985; Meyer et al, 1985; Scharloo et al, 1998). Similar results in cross-sectional studies are found in the rheumatoid arthritis literature. Patients who believed in long-term or severe consequences of their illness were more likely to be depressed (mean age 60 years) (Murphy et al, 1999) or have poorer physical functioning (mean age 64 years) (Scharloo et al, 1998). These results merely point out the association between negative cognitions and depression and thus do not contribute to understanding the impact of illness perceptions in chronic illness. Cross-sectional studies do not allow causal inferences to be made. Consequently, when variables are found to be correlated, it is important to ensure they are not measures of the same factor; depression in these examples.

Longitudinal studies provide greater scope to determine causal relationships. Two studies, in rheumatoid arthritis and COPD respectively, (Sharpe et al, 2001; Scharloo et al, 2000) utilised a longitudinal design. Both found that higher levels of depression at the start of the study predicted increased depressive symptoms at follow up either 12 or 21 months later. Only one study (Sharpe et al, 2001) used a mental health mood measure at each assessment point. Thus, there is only one study utilising a longitudinal design that has demonstrated that pain, illness and illness perception and initial level of depression predicted levels of depression at the subsequent assessment point. This study is relevant to older adults in that the mean age was 70 years, but due to the small sample size (n=22), the results have limited general application.

2.5.1.2.2.3 Older Adults

There has been only limited research on illness perception in the general older adult population. Greater perceived vulnerability to disease amongst older adults (mean age 70 years) compared to younger adults (2 groups; 20 – 39 years, 40 – 59 years) has been found (Leventhal & Prohaska, 1986; Prohaska, 1985). In addition, an increase in externally related beliefs about health (belief in chance or powerful others) has been associated with age in older people (range 65 – 94 years, mean age 75 years) (Perrig-Chiello et al, 1999). These three studies were cross-sectional in design and their findings are unsurprising given that older people are more likely to suffer from physical health problems and thus pay more attention to their symptoms than a younger, healthier cohort. In a longitudinal design, the number of symptoms experienced and their perceived seriousness predicted identification of an illness symptom and care-seeking in older adults over a nine month period (mean age 75 years) (Haug et al, 1998). This study concluded that an increase in the number and frequency of symptoms predicts perceiving them as indicating a particular illness (e.g. cancer, heart disease, osteoarthritis). This suggests that the number of symptoms experienced determines their representation as an illness. This is consistent with the initial studies cited where illness perceptions were found to be disease specific and associated with clusters of symptoms (e.g. Prohaska, 1985).

2.5.1.2.3 Conclusions

From this review, studies have found that perceptions of illness are disease-specific in that clusters of symptoms are perceived as indicating particular illnesses and their seriousness. These disease-specific illness perceptions have been studied in older

adults and similar clusters of symptoms found as in younger age groups. There has been little research with older people with osteoarthritis (only two studies). Associations with self-care activities and health care seeking have been found but the longitudinal work explaining how illness perception affects, and is affected by behaviour, is limited. Again, there have been few studies with older adults with osteoarthritis, these have not addressed psychological well-being. Further work should be undertaken to address these gaps.

2.5.2 What do older people do about their illness?

2.5.2.1 Coping

2.5.2.1.1 Osteoarthritis

The literature on coping with osteoarthritis is limited, however the age range of the participants is within the older adult range, with a mean age of between 60 and 70 years. Positive mood has been associated with active coping styles in cross-sectional, correlational studies (Burke & Flaherty, 1993; Gignac et al, 2000) (details in Appendix 2, table 2.3). Active coping styles include seeking information and support rather than deny the problem or trying to ignore it. Longitudinal studies of osteoarthritis of the knee (Keefe et al, 1987, 1990, 1997; Blalock et al, 1995) demonstrated that cognitive coping strategies, including rational thinking, information seeking and cognitive restructuring (defined as 'finding positive aspects of the illness experience, such as regarding the illness as an opportunity for inner growth' (Bradley, 1985)) were associated with lower levels of pain and psychological distress. In contrast, wishful thinking, catastrophising and self-blame were associated with higher disability and poorer psychological functioning. Unfortunately initial levels of psychological functioning were not controlled for and mood may therefore have acted as a confounding variable.

In longitudinal studies, including hip and knee osteoarthritis, active coping styles (rational thinking, information seeking, cognitive restructuring) were also associated with positive affect (Hampson et al, 1996; Steultjens et al, 2001). Passive coping styles (disengagement, denial) were associated with greater comparative disability and pain, but again potentially confounding mood variables were not controlled for.

The coping studies cited (whilst few in number) do demonstrate a degree of consistency in the association between particular coping styles and psychological and physical functioning in their samples of osteoarthritis sufferers. These findings

are limited in that the active cognitive coping strategies are characterised by positive self-statements such as 'I try to grow as a person as a result of the experience' or 'I will take direct action to get around the problem'. Positive self-statements are more likely to be associated with better psychological well being. Conversely, catastrophising, which includes statements such as 'I worry all the time about whether it will end', 'I won't be able to carry on', is more likely to be associated with low mood. Without controlling for mood, these findings may be merely indicative of the participants' mood related cognitions. Consequently, future research should measure mood at the outset in order to avoid its potential confounding effects.

2.5.2.1.2 Other chronic illnesses

Research in rheumatoid arthritis has shown that cognitive strategies (rational thinking, information seeking) in coping with pain have been associated with positive mood states (Beckham et al, 1991, 1994; Revenson & Felton, 1989). These studies included older adults as ages ranged from 29 to 89 years with means being 55 years, 59 years and 61 years respectively. These studies were cross-sectional in their methodology and mood state was not controlled for. A review on coping with chronic pain in osteoarthritis and rheumatoid arthritis (Jensen et al, 1991) identified three strategies associated with better functioning. These were: belief in control over pain, avoidance of catastrophising and belief in not being severely disabled. These correlational findings are limited to the identification that the absence of depressive symptoms is associated with more positive cognitions. Longitudinal studies in rheumatoid arthritis (Keefe, 1989, 2000a; Griffin et al, 2001; Sinclair, 2001) have found that more emotion-focused strategies, including venting emotions and catastrophising, predicted greater severity of disease as measured by self-report scales, but these studies did not control for levels of depression at time 1. This suggests that negative cognitions at time 1 are likely to influence functioning at time 2. It is known that depression, if untreated, has significantly increased morbidity in over 50% of sufferers (Cole et al, 1999) and that the rates of depression are higher in those with physical illness (Kisely & Goldberg, 1996). Not controlling for depression allows it to be a confounding factor in this research. Consequently, these longitudinal studies do not contribute to the understanding of coping in chronic illness.

In hypertension and angina, studies confirmed that cognitive coping strategies such as problem-focused coping and information seeking were associated with positive affect, whereas denial, disengagement, helplessness and venting emotions were

associated with reduced mental health (Rosenstiel & Keefe, 1983; Felton et al, 1984; Ax et al, 2001; Endler et al, 2001). Studies in COPD have shown that emotive coping is associated with poorer psychosocial outcomes and greater duration of hospitalisation (Yuet et al, 2002; Scharloo et al 1998). Again, these findings are unsurprising because participants with low mood are more likely to present with symptoms of negative affect, which will include disengagement and helplessness whereas those without low mood will not. Participants reporting positive mood states are more likely to use positive coping strategies. Again, most of these studies did not use measures of depression and therefore would not be able to differentiate between participants with low mood and those without. Consequently, these studies cannot explain the relationship between coping and functioning independently of affect. Those studies that used mood measures found (unsurprisingly) correlations between the mood measure and measures of helplessness. In addition, all these studies were cross-sectional in nature thus further limiting their contribution to understanding the relationship between coping and mental health.

2.5.2.1.3 Conclusions

In reviewing the coping literature, it appears that most studies have restricted themselves to identifying the associations between particular coping styles and illness severity and/or mental health. This has clear limitations in that there is no acknowledgement of the potentially confounding presence of negative cognitions in participants with low mood. It is known that individuals with low mood or depression perceive the world in a more negative way (Beck et al, 1979). Thus it is unsurprising that coping strategies in depressed individuals will be more negative, e.g. venting of emotion, catastrophising. The longitudinal studies cited did not control for the presence of low mood at time 1 and thus may merely confirm that low mood and negative coping strategies are associated on more than one occasion, which is unsurprising. Only 50% of older depressed people will recover spontaneously from depression and this is usually over a long period of time (Cole et al, 1999). Therefore, the research has been limited in identifying the effects of coping on illness without analysing the effects of depression. Clearly, there is an association between coping styles, psychological well being and functioning but the nature of the relationship is not clear. This makes it difficult to assess the impact of cognitive behavioural approaches in chronic illness. Identifying and modifying negative cognitions in chronic illness is a means of coping and this requires further study. Further investigation is merited into the use of coping styles in older people with

osteoarthritis but caution must be taken to avoid the potential confounding effects of low mood within the participants.

2.5.2.2 Self-Efficacy

2.5.2.2.1 Osteoarthritis

In the osteoarthritis literature, Rejeski et al (1996, 2001) (details in Appendix 2, table 2.4) investigated the relationships between self-efficacy, pain and disability in older adults with knee osteoarthritis (mean age 69, 72 years respectively) over a period of 30 months at 3 time points (baseline, 15 months, 30 months). They found that low self-efficacy was associated with higher reporting of pain and disability at each time point and that low self-efficacy at baseline was related to greater decline in functioning 30 months later than would be expected over the natural course of the illness. They did not collect data on psychological functioning and thus the presence of depressive symptoms in their sample may have been a confounding factor that was not controlled for.

Much of the self-efficacy intervention work in arthritis has not been specific to the type of arthritis and has included participants with osteoarthritis, rheumatoid arthritis, spondylosis etc. Much of this work has been conducted by Lorig and her colleagues in their studies of arthritis self-management programmes (e.g. Lorig et al, 1989; O'Leary et al, 1988). Lorig's early work found that health behaviours and health status were not strongly associated but were influenced by self-efficacy (Lorig & Gonzalez, 1992; Lorig & Holman, 1993). The arthritis self-management programmes offered interventions (12 hours duration) aimed at a range of arthritis condition patients and included follow-up data over four years. The arthritis self-management programmes included information about arthritis, exercise, cognitive management techniques (such as distraction and visualisation), nutrition, communication, managing depression and problem-solving. Participants improved on measures of depression, pain and disability (see chapter one, section 1.2.3.9.4 for details). These studies have been replicated in the UK using participants with osteoarthritis or rheumatoid arthritis (Barlow et al, 1998). The age ranges were between 49 and 68 years so there is some limited relevance to the older population. Their studies have demonstrated that outcomes in psychological well-being and reported disability are improved if the participating individuals' sense of self-efficacy was elevated at baseline. This suggests that better psychological well-being is associated with confidence in one's abilities and improved outcome with intervention

over time. It is unsurprising that individuals with better psychological well-being should have confidence in their own abilities, as this is one of the defining features of mental health (Blazer, 2002). It is not clear how this relationship works (Lorig, 1989) and changes in cognitions as a result of the cognitive behavioural parts of the intervention may be a factor (Rhee et al, 2000) or participants being at different stages of change in the Prochaska and DiClimente's stages of change model (Keefe et al, 2000b).

2.5.2.2.2 Other chronic illnesses

Examination of the rheumatoid arthritis literature confirms the association between higher levels of self-efficacy and lower levels of pain, disability, depression (Keefe et al, 1997; Shifren et al, 1999). Longitudinal studies found a reduction in depression, pain, disability and an increase in active coping and psychological well-being (Lefebvre et al, 1999; Schiaffino et al, 1991; Smarr et al 1997; Taal et al, 1993). The participants in these studies were younger with mean ages between 44 and 61 years thus having limited relevance to an older adult population.

In longitudinal studies (Lefebvre et al, 1999; Schiaffino et al, 1991; Smarr et al 1997; Taal et al, 1993), interventions were largely educational or stress management (including relaxation techniques) rather than specifically psychological interventions. They still had an effect on depression, which could be expected as the provision of a supportive intervention can help improve psychological well-being. One study (Schiaffino et al, 1991) found that for participants reporting high levels of pain, higher levels of self-efficacy predicted higher levels of depression 12 months later in their study. It is suggested (ibid.) that in some situations high levels of self-efficacy may not be adaptive, and a high belief in one's ability to cope with a situation may be an unrealistic cognition in depressed individuals who comprised 36% of their study population. Thus the relationship between depressive cognitions and self-efficacy remains unclear over time and may be mediated by other factors e.g. pain.

Studies using participants who have suffered from a range of chronic diseases (including cardiac problems and arthritis), have found that higher levels of self-efficacy are associated with lower levels of depression and disability (Arnstein, 2000; Endler et al, 2001, Kramer et al, 2002; Penninx et al, 1998). The age ranges of the samples were sometimes not specified and, where they were, they ranged from 50 – 85 with means between 60 and 70 years which has some applicability to the older adult population. These studies have used cross-sectional, correlational

approaches and thus causal relationships cannot be identified. Self-efficacy relates to an individual's belief in their own ability so it is unsurprising that higher levels of self-efficacy are associated with lower levels of depression. Symptoms of depression include cognitions such as 'I won't be able to do that', and 'I am useless' which are clearly incompatible with high self-efficacy. Consequently, it is not clear whether researchers have merely measured depressive cognitions in their samples.

2.5.2.2.3 Older adults

Only two studies focusing on older adults not in the context of physical illness were identified in the literature. These concluded that high levels of self-efficacy were associated with good health behaviours (e.g. non-smoking, low alcohol use) (Waller & Bates,1992) and lower levels of depression (Holahan et al, 1984). Both of these studies were cross-sectional and thus causal relationships could not be identified. The participants in these studies ranged in age between 65 and 75 years but were not described in terms of their physical health status.

2.5.2.2.4 Conclusions

There is evidence that self-efficacy is associated with psychological well-being and reported disability in older adults and also in osteoarthritis sufferers. As noted, the relationship between self-efficacy and psychological well-being is not clear, and the relationship may be mediated by other factors such as pain. Intervention studies have demonstrated improvements in self-efficacy, psychological well-being and functioning but it is unclear as to how this operates. Lorig & Gonzalez (1992) noted that their arthritis self-management programmes changed behaviour and health status but did not find that self-efficacy accounted for that change in their analysis.

Thus, the concept of self-efficacy may be of use in understanding cognitions and behaviour in the context of chronic illness but the relationship is not clear. Furthermore, the relationship between self-efficacy and coping style remains unclear and studies investigating this were not found in the literature. Neither is it clear how self-efficacy is differentiated from coping. Therefore, the evidence for the role of self-efficacy, independent of psychological well-being, functioning and coping, is limited. Consequently, self-efficacy will not be included in this study which seeks to describe how people think about and manage their illness.

2.5.3 How does Social Support affect the impact of illness in older people?

2.5.3.1 Osteoarthritis

Within the osteoarthritis literature, there were two studies identified which examined the relationship between social support and psychological well-being, functioning and stress. In an early study, (Weinberger et al, 1987) (details in Appendix 2, table 2.5), participants (average age 66 years) completed the AIMS to assess functioning and psychological well-being, and a Hassles Scale to assess stress. The participants' social network was assessed by interview with questions on the number of relatives and friends, frequency of contacts, and geographic proximity. Total network size was also recorded. To assess perceived social support, participants identified individuals who could help them with a range of needs including housework and psychological well-being. Information was gathered at baseline and six month follow-up. Larger social networks were associated with greater psychological well-being but no relationship between social network and pain or disability were found. Perceived social support was associated with reported pain at follow up, but not with physical functioning or stress. The findings of this study are unclear and do not suggest that social support is a buffer for stress, whether social support is subjective (perceived social support) or objective (social network size) (ibid.).

More recently, a study investigating the relationship between depression and social support (Sherman, 2003) found that the older adult participants (mean age 71 years) reporting high social strain (stress) and the least social support (measured by Medical Outcomes Study (MOS) Social Support survey) had higher levels of depression (measured by CES-D). Lower levels of social strain were associated with lower levels of depression irrespective of the level of social support. Social strain was measured by questions asking about the participant's social networks and strain. These included: 'How often does anyone not understand you?', 'How often does anyone get on your nerves?'. Significant associations between scores on this measure and depression are unsurprising as more negative responses to social strain questions are more likely to be made by depressed individuals. These two studies do not tell us about the role of social support in chronic illness. They do suggest, however, that perceived social support is implicated in psychological mood states.

Five studies that provided social support intervention to an osteoarthritis population were identified (Cronan et al, 1998; Maisiak et al, 1996; Rene et al, 2001; Weinberger et al, 1989, 1993). In four studies (Maisiak et al, 1996; Rene et al, 2001; Weinberger et al, 1989, 1993) professional telephone contact (provided by heath care staff) was made with participants to monitor symptoms and provide counselling. Telephone contact was helpful in improving physical and psychological function as measured by the AIMS. These studies were longitudinal over periods of six to 12 months. This suggests that social contact helps the participants but it is not clear how this impacts on perceived social support as this was not measured. Participants were in their early 60s, and were very much at the younger end of the older adult spectrum, limiting these studies' applicability to an older adult population. A group social support intervention (Cronan et al, 1998) compared this intervention with education or a combination of social support and education. The interventions included 10 weekly meetings of two hours each followed by 10 monthly two hour meetings. The social support intervention promoted sharing experiences between group members. No differences were found between the interventions and improvements were found in well-being (as measured by the Quality of Well Being scale (QWBS)). Therefore, social support interventions in groups of osteoarthritis were no better than an educational approach, or a combined approach.

2.5.3.2 Other chronic illnesses

In the rheumatoid arthritis literature, higher levels of perceived social support are associated with better psychological functioning (Affleck et al, 1988; Brown et al, 1989; Doeglas et al, 1994, 1996; Goodenow et al, 1990; Krol et al, 1993; Lambert et al, 1989; Penninx et al, 1998; Revenson et al, 1991; Riemsma et al, 2000; Scharloo et al, 1998). (mean age 50 – 65 years). Only one study was longitudinal (Brown et al, 1989) and found over three data collection points (over 12 months) that higher levels of perceived social support were associated with lower levels of depression, after controlling for initial levels of depression. In addition, higher levels of perceived social support and higher levels of pain had lower levels of depression compared to participants with high levels of pain but lower levels of perceived social support. This study does provide evidence for social support as a buffer in chronic illness.

Studies of hypertensive patients have found that high levels of perceived social support were associated with less depression and better quality of life and lower blood pressure (Carels, 1998; Uchino et al, 1995). Similar findings have been noted in the COPD literature where high levels of perceived social support have been

associated with better quality of life (Anderson, 1995), lower levels of depression (Keele-Card, 1993) and improved physical functioning (Grodner et al, 1996).

In a review of the social support intervention literature (Hogan et al, 2002), it was found that social support interventions improved psychological well-being, although there were marked variations in the types of interventions with some including CBT or health education. Only two cited studies focused on the relevant chronic illnesses (rheumatoid arthritis) in this review. Of these, one study included CBT as part of the intervention (rheumatoid arthritis outpatients, mean age 54 years) (Radojevic et al, 1992), and the other (Shearn & Fireman, 1985) did not find changes in psychological well-being between the support group, stress management group or no treatment controls in a sample of rheumatoid arthritis outpatients (mean age 56 years). A further study in rheumatoid arthritis (Savelkoul et al, 2001) (mean age 51 years) comparing social support group intervention with a coping intervention found no differences in health status (using the Sickness Impact Profile (SIP)). No further social support interventions were identified in the chronic illness literature.

2.5.3.3 Older adults

An early study on older women (mean age 81 years) (Mellor & Edelmann, 1988) did not find an association between perceived social support and psychological well-being. A more recent community based study of older adults (mean age 76 years) examined the relationship between social support and depression (Prince et al, 1997). This cross-sectional study found that lower levels of perceived social support were associated with greater depression but levels of depression were not controlled for. Only one longitudinal study was identified in the literature (Matt & Dean, 1993), this investigated the effect of friend support on depression over a 22 month period. Using measures including CES-D, and a "care and concern scale", the findings showed that greater psychological distress at time 1 was associated with less friend support at time 2 but only for older adults aged 70 years and above. Also, less friend support at time 1 was associated with greater psychological distress at time 2 for the participants aged 70 years and above. The authors (Matt & Dean, 1993) suggest that older adults are more vulnerable to psychological distress and the effects of reduced support from friends but it is not clear whether their 'care and concern' scale measured amount of social support or perceived social support. This lack of clarity limits the generaliseability of the findings.

Within the review on social support cited above (Hogan et al, 2002), there were three studies which focused on older adults. These three studies provided social support intervention in different ways. A group meeting approach which met four times (women with mean age 77 years) was compared with a no treatment control (Anderssen, 1985). The group meetings focused on amenities in the local area and leisure activity opportunities. Participants in the group meetings displayed improved psychological well-being (measured by University of California and Los Angeles (UCLA) Loneliness scale) at the end of the intervention. Telephone contacts were offered over five weeks to older community dwelling women (Heller et al, 1991) but no differences were found between the intervention group and the no treatment control in measures of loneliness or perceived social support. A nursing home based study (mean age 84 years) (Scharlach, 1988) offered paired peer support to new residents and found improvements in social functioning but measures were not specified. No further studies were identified in the literature.

2.5.3.4 Conclusions

Within the literature, most of the cited studies have demonstrated associations between perceived social support and psychological well-being in osteoarthritis and other chronic illnesses. Only two studies (Brown et al, 1989; Matt & Dean, 1993) controlled for mood state and both found that social support was independent of initial levels of depression. These studies did not include osteoarthritic participants and further research is necessary.

Intervention studies have shown that social support interventions improve physical and psychological well-being using a range of methods. The mechanism by which social support improves psychological and physical well-being is unclear. It may be that perception of social support is a cognition that is influenced by the presence or absence of depressive symptoms, rather than being independent. Consequently, changing cognitions about perceived social support may be of more benefit.

From this review, social support is implicated in psychological well-being in chronic illnesses. The evidence is limited and its importance as factor in the management of chronic illness remains unclear. Furthermore, there is limited research in osteoarthritis and further research is needed to clarify the relationships between psychological well-being and perceived social support, while controlling for initial mood states.

2.6 Conclusions

From this review of the literature on chronic illness and how people think about, manage and are supported, a number of issues have emerged.

2.6.1 Osteoarthritis in older people

Osteoarthritis is one of the most prevalent chronic illnesses in the older population and physical treatment approaches are of limited benefit (see chapter one). Medication is not of benefit to all, surgical approaches have a limited lifespan. The availability of physiotherapy and dietary advice is limited and these approaches are often compromised by poor compliance. Psychological interventions have been of benefit but the research in this area is sparse, and further work is necessary.

2.6.2 Key psychological factors relating to living with chronic illness in older people

Within the chronic illness literature, there is evidence that psychological well-being and functioning are associated with how people with chronic illness think, manage and are supported with their illness. These psychological factors have had greater impact than severity of the chronic illness on psychological well-being and functioning. The literature review has described the relevant factors which can explain thinking, management and support in chronic illness. These factors are illness perception, coping and social support (see Table 2.1). There has been some research with older people and osteoarthritis using these factors but little work which has included all these factors in one study.

2.6.3 Explaining how older people think about, manage and are supported with chronic illness

Few studies have linked the development of psychological or education interventions explicitly with the psychological factors in chronic illness. Consequently, much of the intervention work struggles to explain which factors influence psychological well-being and functioning, and how this works.

2.6.4 Addressing limitations in the research evidence

Studies of illness perception, coping and social support have included both correlational and longitudinal approaches. Correlational approaches have demonstrated associations of illness perception, coping or social support with psychological well-being and functioning. Many studies have not routinely controlled for psychological well-being, and therefore the presence of negative mood

states may have had a confounding effect on the results. Future work should measure mood and control for its effects when seeking to explain how illness perception, coping and social support influence psychological well-being and functioning. Longitudinal studies have included psychological or educational intervention approaches but some failed to assess initial mood levels which limits conclusions about the efficacy of these interventions. Nevertheless, the longitudinal approach is essential for assessing whether the modification of psychological factors through intervention can improve psychological well-being and functioning in the chronic illness population.

2.6.5 Implications for future research

In reviewing the literature, it is clear that osteoarthritis in older adults is a neglected area and further research is necessary to understand the impact of osteoarthritis on older people. From the literature review, there is evidence that three key psychological factors: illness perception, coping and social support address the three questions posed: how people think, manage and are supported with chronic illness. A study which could assess the impact of these factors on psychological well-being and functioning in osteoarthritis would address this gap in the literature. A simultaneous analysis of the effect of these factors on psychological well-being and functioning would provide a more comprehensive understanding of the impact of psychological factors in osteoarthritis. Knowledge of the impact of psychological factors in osteoarthritis would allow manipulation of these factors to improve psychological well-being and functioning in older people in osteoarthritis. Longitudinal intervention studies offer a useful method of testing intervention work. Therefore, a study which can assess the utility of a model of psychological factors in osteoarthritis and then test it through carefully designed interventions would contribute to better understanding of what psychological factors are important and how they can be manipulated to improve outcomes in osteoarthritis.

2.7 The two phase study

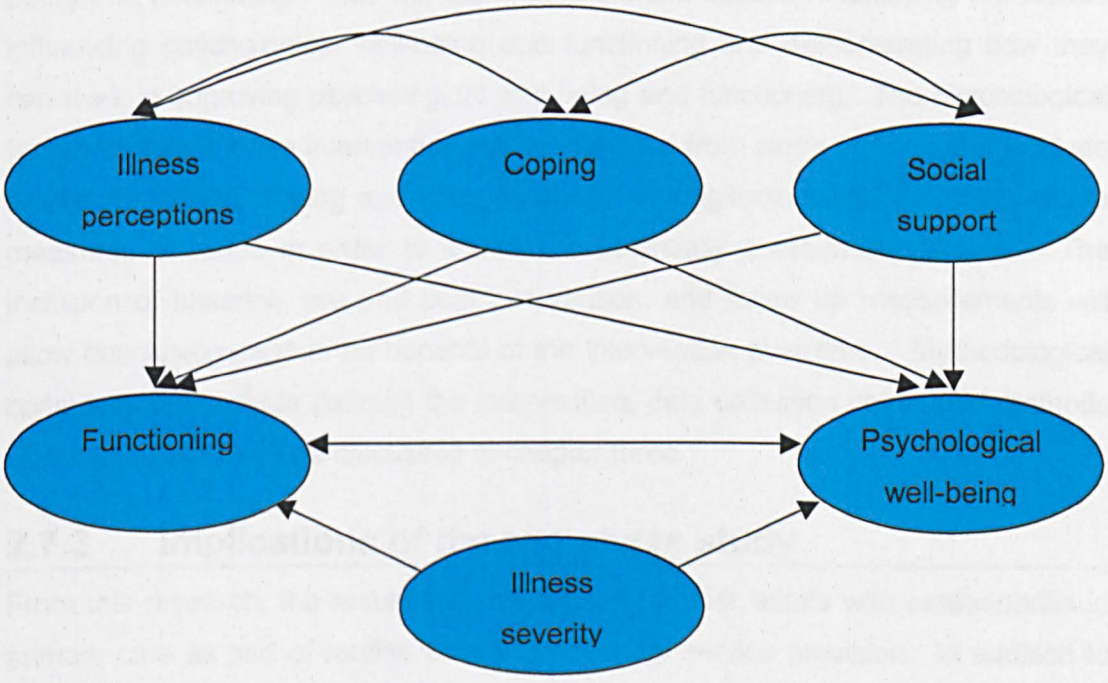
Given these implications for future research, a study in this area must develop a clear theoretical model which can then be tested using an intervention approach in the target population. Consequently, a two phase study will allow a model based approach to be tested through intervention work. The initial study will empirically test a theoretically derived model, this will then provide a structural model which can then be used to develop interventions to improve outcomes (both psychological and functional) in this population. The second study will seek to manipulate those

variables that the first study suggests influence the outcomes in order to improve physical and psychological well-being in this population. This will provide the link between identifying the relevant psychological factors and demonstrating how they can influence change.

2.7.1 Study One: Identification of the model

Illness perception, coping and social support have been shown to influence psychological well-being and functioning in older people with chronic illness independently of illness severity. Inclusion of these into a single model will enable the examination of these factors simultaneously so that common and unique influences can be disentangled. The relationships between these factors can be represented pictorially (see Figure 2.3). An analysis that can examine these factors simultaneously and control for each variable while looking for interrelationships will be used. This will also address the limitations of previous studies where the potential confounding effects of mood (included in psychological well-being) were not controlled for. Chapter three will address the specific methodological issues to be considered in the design of such a study.

Figure 2.3 Hypothesised factors and relationship affecting psychological well-being and functioning in older adults with osteoarthritis.



The model incorporates seven hypotheses for which some evidence has been identified in the literature. These have not been tested simultaneously. These seven hypotheses are:

1. Functioning and psychological well-being will be associated.
2. Illness severity will influence both functioning and psychological well-being
3. Illness perception, coping and social support will be associated
4. Illness perception will influence both functioning and psychological well-being.
5. Coping will influence functioning and psychological well-being.
6. Social support will influence functioning and psychological well-being
7. The influence of the psychological factors (illness perception, coping and social support) on psychological well-being and functioning will be independent of and more important than the influence of illness severity.

2.7.2 Study Two: Testing the model using an intervention approach

The findings of study one will determine the model that best explains the impact of psychological factors on psychological well-being and functioning in osteoarthritis in older people. From these findings, interventions can be designed which include the key psychological factors that should be manipulated to improve psychological well-being and functioning. This will then make the link between identifying the factors influencing psychological well-being and functioning and demonstrating how they can work in improving psychological well-being and functioning. The psychological factors included in the intervention will be identified from study one and may include illness perception, coping and social support. A longitudinal approach will include measures of mood in order to identify its potentially confounding effects. The inclusion of baseline, pre and post intervention, and follow up measurements will allow conclusions about the benefits of the intervention over time. Methodological considerations include defining the intervention, data collection points and methods of analysis; these will be discussed in chapter three.

2.7.3 Implications of the two phase study

From this research, the results can be applied to older adults with osteoarthritis in primary care as part of routine clinical psychology service provision. In addition to this, routine primary care treatment of osteoarthritis can be improved by the provision of specific psychological self-help materials based on the findings of this

research. Thus, this research has important implications in improving treatment approaches in a neglected and under-treated group of older people.

Chapter Three: Methodological considerations in studying psychological factors in osteoarthritis in older adults

3.1 What are the important methodological considerations?

From the literature review in chapter two, several issues were identified which limit the findings of the research into the psychological factors in chronic illness. These include: the limitations of the correlational studies and longitudinal studies in not controlling for the effects of mood, analysis of only a limited number of variables in isolation, not testing them simultaneously and the underpinning of intervention-based approaches by demonstrated relationships between psychological factors and outcomes. There are also general issues relating to validity which include participation, design and analysis factors. These issues will be considered separately in relation to their effects on the validity of the proposed two phase study described in chapter two.

3.2 Why is validity important?

The aim of any research is to reach valid conclusions regarding the factors studied. It also aims to reduce the possibility that the identified relationships are controlled by factors other than those under study (bias). If a study does not address issues of validity then there is a danger that the research undertaken is unable to explain its findings, it would therefore be unethical in its demands on its participants.

The issue of external validity or generaliseability is an important one in quantitative research. This asks the question; to what extent can the results, obtained from the study, apply to a wider group outside the participants in the study? In ensuring the results can be generaliseable to other individuals sharing the same characteristics (older adults with osteoarthritis), the inclusion of sufficient numbers of representative individuals in the study is necessary (power). Ensuring that participants complete all measures (item non-response) and participate at all stages of a study (dropout) is important in reducing the risk to external validity. These issues will be discussed further below in their application to this research.

Statistical validity is important to ensure that valid conclusions are reached from the data obtained. Risks to validity include insufficient power, item non-response, and

dropout. The statistical tools selected should be as robust as possible in answering the questions of the study. The data must be adequate for the type of analysis selected. Non-normal distributions and data not missing at random (NMAR) are particular threats to statistical analysis. The use of parametric tests is preferred due their power but if their criteria for use are not fulfilled (normally distributed interval data); then conclusions based on this type of analysis on inappropriate data will be flawed. The techniques and tools used to improve data quality are described below.

Within both survey and intervention based studies, issues of choosing measurement tools or interventions which accurately represent the concepts under study are important. The study design must take into account threats of competing hypotheses which may explain the findings to a greater degree. The study should have also ensured consistent administration of measures or consistency in interventions provided. The issue of competing hypotheses can be addressed by grounding the experimental work within the body of existing knowledge. Therefore, this research uses factors which have been widely studied in the literature and aims to combine and test them to build a more comprehensive picture of psychological factors in older people with osteoarthritis. Consistent administration of the intervention is addressed by using trained interviewers (for surveys) and trained facilitators using consistent standardised intervention approaches in intervention studies. Ensuring this level of consistency is addressed in detail in chapters four and five.

In the following sections, issues relating to external validity are discussed and statistical considerations in managing threats to generaliseability are described. Finally, the implications for the two-phase study proposed are stated.

3.3 Participants

3.3.1 The sample frame

The focus of the two phase study was to examine psychological concepts in older people with osteoarthritis. The age of 65 years is the threshold age between specialist old age services and general medical services with the National Health Service (NHS). Therefore, the sample frame included older people, defined as aged 65 years and above. Older people were selected on the basis of having osteoarthritis of the hip or knee; these being the most commonly affected joints in

osteoarthritis. Diagnosis is usually undertaken in general practice and is straightforward and by clinical examination (Afable & Ettinger, 1993). Using participants who are representative of the population allows the findings to be generaliseable. Use of a general practice sample will include the maximum number of representative potential participants.

3.3.2 Exclusion and inclusion criteria

The setting of exclusion and inclusion criteria is important in enhancing the selection of representative participants. Too restrictive exclusion criteria can exclude potential participants and limit the generaliseability of the results due to the inclusion of only a small homogeneous sample. Given that the symptoms of hip and knee osteoarthritis are similar, excluding those with knee osteoarthritis and including only those with hip osteoarthritis would limit findings to a smaller group. Limiting the number of participants would unnecessarily limit the potential sample frame and thus the findings would be biased. The exclusion criteria must account for those whom psychological well-being and functioning may be influenced by factors other than osteoarthritis. These factors will include psychological stressors and symptoms which are likely to have greater impact on psychological well-being than osteoarthritis, and mobility problems occurring as a result of other illnesses at the time of investigation.

Too generous inclusion criteria also present difficulties in that a too heterogeneous sample may prevent the identification of the key relationships hypothesised in the model (study one) or the benefits of the intervention (study two). Therefore, in this research the inclusion criteria comprise those aged 65 years and above with osteoarthritis of hip or knee. Exclusion criteria include: terminal illness, recent myocardial infarction, severe mental illness, cognitive impairment or presence of paralysis.

3.3.3 Recruitment of participants

To identify the eligible potential participants in the present studies, older people with osteoarthritis of hip or knee, general practices were approached to enlist their support. General practices were selected on the basis of their likely willingness to cooperate, this is an important pragmatic feature in the setting of any study. In addition, the practices approached were representative of the geographical area (details in chapters four and five).

In approaching participants to take part in a study, there are number of competing factors. The researcher will want to contact all the potential participants; to promote, persuade and convince them to participate. Ethical guidance will seek to protect potentially vulnerable populations from intrusive approaches to seek participation, as well as to prevent over-researching in a population. Consequently, the method of approaching potential participants is by necessity a compromise. Within this study, the ethically approved approach was to send each potential participant a letter of introduction from each person's general practitioner with an information leaflet explaining the study's aims. The letters contained an opt-in slip and prepaid reply envelope which the potential participants were requested to return. Those who chose not to respond were sent a single reminder but no further contacts were made. Those who opted in were contacted by phone and an initial appointment made. This was the process undertaken for each study.

The benefits of this approach include greater efficiency in recruitment with less time spent on non-participants and more time spent on those who have opted in. It can be assumed that the opt-ins will be initially more compliant with the study and thus the dropout rate may be reduced (dropout will be discussed further below). The disadvantages are that the participants are a self-selected convenience sample and may not be fully representative of the population under study. This can be monitored to a degree with comparisons between non-participants and participants on known information, e.g. age and sex. Data to detect differences in severity of osteoarthritis and psychological well-being will not be available due to ethical constraints. It is possible that the more severely affected by osteoarthritis would not take part, due to impact of the illness. This could reduce the generaliseability of the study. Within the continuum of osteoarthritic severity, the severely affected form a smaller proportion than those moderately affected. Consequently, the loss of a few severely affected individuals would not compromise a study seeking to explain psychological factors across a range of osteoarthritic symptoms. Potential participants who have severe psychological distress may not choose to participate. The argument on osteoarthritis severity also applies here, as does the criterion of excluding those with severe mental health problems. In a study seeking to investigate the psychological relationships in osteoarthritis and to improve these through intervention, individuals with severe mental health problems would be a potentially confounding factor. Such individuals may require a more intensive intervention that this study could offer. Where such individuals were identified by the study, they were directed to appropriate help. While a self-selected convenience

sample is not the ideal, it will still include a wide range of older people with osteoarthritis who comprise a relevant population.

3.3.4 Retention

In cross-sectional survey based studies, participants are assessed only at a single time point and the issue of retention over time is not relevant. Ensuring participation in all aspects of the survey is important with regard to item non-response and dropout, this will be discussed further below.

In intervention studies, participants provide data at a number of time points. The minimum is usually two; pre and post intervention. To enhance generaliseability, the completion of data collection from each participant at each time point is important. For a variety of reasons, participants will drop out and if this is associated with the variables under investigation, then this will compromise the results. For example, if participants drop out of an intervention study because they are in too much pain, then the study findings may be limited to those whose osteoarthritis pain is not severe. If, however, participants drop out because they develop another unrelated illness then this is less problematic. Consequently, recruitment and retention rates must be carefully monitored to address these issues and reduce dropouts.

3.3.5 The problem of dropouts

It is clearly important to recruit and retain as many participants as possible but retaining 100% potential participants taking part and providing information at all data collection points is uncommon in studies of people. Dropouts are important as a large number can reduce the viability (power) of a study such that the findings cannot be applied to a wider population. Dropouts may form a particular subgroup of the sample which can again reduce generaliseability. It is important to monitor why participants drop out (Walter, 2000). Furthermore, in intervention studies, dropouts may occur at different time points. Thus, some individuals who were initial participants may become dropouts for some or all subsequent data collection. The greater the number of non-participants at any stage of a study, the more likely bias will be. In reporting results it is important to report how many participants there were, how many refusals, dropouts and numbers excluded. These numbers are used to calculate participation rates but how these are defined, calculated and reported, can be misleading.

3.3.6 Calculating participation rates

In any study, there will be three categories of those selected to be in a sample who do not actually provide data: '(1) those whom the data collection procedures do not reach, thereby not giving them a chance to participate; (2) those asked to provide data who refuse to do so; and (3) those asked to provide data who are unable to perform the task required of them' (Fowler, 1993). The first category can be defined as 'non-contactable', the second as 'refusals', and the third as 'ineligible'. These three categories will have a bearing on the participation rate and how it is calculated. It is important to know 'how the response rate was calculated, how many non-contacts were involved and how many contacts were ineligible' (Wiseman & Billington, 1984) to be able to evaluate the sampling strategy. The sample frame is defined as including all potential eligible participants.

Participation rates can be defined in different ways. Perhaps the most straightforward is dividing the number of completed interviews, questionnaires or data sets by the number of eligible sample members (Kviz, 1977). Thus from the above categories, the equation is:

$$\text{Participation rate (PR1)} = \frac{\text{Participants}}{\text{Participants + Refusals}}$$

This equation gives us no information about the non-contactable and ineligible participants, as they are not included in the equation (Platek & Gray, 1986). An alternative calculation is:

$$\text{Participation rate (PR2)} = \frac{\text{Participants + Refusals}}{\text{Participants + Refusals + Non-contactables.}}$$

Different results are found using both these methods. This is illustrated in table 3.1 using different sample sizes for each of the categories (sample frame, participants, refusals, non-contactable). Participation rates are calculated using the equations above (PR1, PR2). It can be seen that the PR2 equation consistently produces lower values than the PR1 equation but the spread of values can be quite large. Where there are high numbers of non-contactable individuals, the PR2 equation markedly reduces the participation rate (Study B, table 3.1).

Table 3.1 Examples of participation rate calculations using equations PR1, PR2 with different figures

Definition \ Study	A	B	C
Non-contactable	31	195	80
Refusals	12	10	40
Participants	105	240	100
Participation rate (PR1)[1]	0.90	0.96	0.71
Participation rate (PR2)[2]	0.79	0.56	0.64

[1] Participation rate (PR1) = Participants / Participants + Refusals
[2] Participation rate (PR2) = Participants + Refusals / Participants + Refusals + Non contactables

A further complicating factor is that the sample frame may include many thousands of potential participants but they are not included in the calculation of participation rates. One study identified a population including the following criteria: at least 70 years old, community dwelling, high probability of repeated hospital admission calculated from responses to a screening questionnaire (Boult et al, 1998). Questionnaires were sent out to 23,801 potential participants; using participation rate 1 (PR1) as our calculation, 61.1% returned the questionnaire. Only 1806 were found to be eligible which is 13.2% of the original sample frame including non-responders. Out of these 1806, 624 consented to take part which is 34.4% of the eligible screenings not including non-responders. From this 624, a further 102 were lost due to a range of withdrawals, late consent, physician refusal, taking the final participation rate to 522. Table 3.2 illustrates the various calculations used to calculate response rate and it can be seen that there are arguments both against and in favour of calculating response rates at different stages of recruitment.

Table 3.2 Summary of Boult et al (1998) recruitment

Sample frame(s)/ Participation rates	N	Percentage based on Medicare beneficiaries as sample frame	Percentage based community respondents as sample frame	Percentage based eligible subjects as sample frame
Medicare beneficiaries	23,801	100		
Respondents	14,536	61.1		
Community respondents	13,684	57.5	100	
Eligible subjects	1806	7.6	13.2	100
Consenting subjects	624	2.6	4.5	34.3
Participants	522	2.2	3.8	28.9

If only the number of respondents is taken into account then a much higher percentage is obtained compared to that described in the final sample. This would not indicate the lower numbers of eligible subjects which may allow the reader to assess the recruitment method. This study does, however, make clear the recruitment procedure and thus the participation rate allowing the reader to make their own judgement about the merits of the study. Unfortunately, this is not always the case. A review of sampling techniques in research on widowhood found that 33% of the studies they sampled did not even report on the sampling procedures (Gentry & Shulman, 1983). A more recent study (Shaw et al, 1994) investigated predictors of attrition in studies of older adults with arthritis but it was not clear what was meant by non-participants versus participants, as the initial sample frame comprised 3000 but only 364 took part in the intervention programme.

Participation rates in group intervention work are subject to drop out in that individuals may not attend all the sessions of an intervention. Given that individuals may not participate in all data collection points within study, how can the participation rate be calculated? If, for example, a study is conducted which involves attendance at a group intervention and the group intervention includes attendance at 4 meetings, and an individual attends two out of the four meetings, can they be deemed to have participated or not? This question is important in determining whether the intervention has benefit to the population or not. It may be that even partial attendance confers some benefit so attending one out of four possible meetings should mean that that individual could be included as a participant. It may also be that to obtain benefit from the intervention, the individual must attend all four meetings to be a participant. In an example of four sessions comprising an intervention, this could be one, two, three or four out of four sessions. This may also introduce bias into the analysis as the effect of partial attendance may be relevant and may be ignored. In many studies, sample sizes are not large enough to determine the differential effects of partial versus full participation in an intervention. Consequently, pragmatic criteria (e.g. 50% and above attendance required for inclusion as completer) need to be adopted to determine the level of attendance which determines participation.

3.3.7 Participation rates in studies with older people

In research with older adults, studies that have reported on sampling procedures and response rates have reported a range from 30 – 93%. There is, however, a

wide variation in the calculation of these response rates. Many studies utilise a two stage process where wide screenings are sent out but the smaller pool of respondent, eligible subjects is taken as the sample frame for the intervention and the response rate calculated from there. Older adult examples include recruitment to medication trials (Silagy et al, 1991; Vogt et al, 1986) (details of studies in Appendix 1.3, table 3.1), to studies aimed at increasing physical activity (Halbert et al, 1999; Mills et al, 1996), or non-pharmacological approaches to reducing hypertension (Whelton et al, 1997). Psychological studies have included epidemiological studies of older people with medical and psychological problems. (Boult et al, Breckenridge et al, 1985; Christensen et al, 1992; Heun et al, 1997). If peer reviewed journal publication is taken as a standard, it would appear that this approach (using equation PR1) is acceptable.

Participation rates have been found to be lower amongst older adults participating in research (Carter et al, 1991; Dodge et al, 1993; Herzog & Rodgers, 1988). A review of surveys including older adults (Herzog & Rodgers, 1988) found 68% participation rate for age group 65-74 years; 65% for age group 75-84 years; and 51% for the 85 years and above group. This is consistent with a further review which found participation rates between 50% to 73% in screening for chronic illness in older adults, and between 52% and 71% for participation in health promotion programmes (Carter et al, 1991). A study of heart disease patients including angina participating in a health promotion programme found that non-participants were more likely to be older (Dodge et al, 1993).

In intervention studies, dropout rates in the literature on chronic illness in older people have ranged from 5 to 21% over the duration of the intervention (Calfas et al 1982 (5%); Currie et al, 2000 (15%); Sumathipala et al, 2000 (15 - 21%)). In addition, further dropouts occur when follow up data are collected over time with one study on CBT in osteoarthritis reporting 15% drop out at two month follow up and increasing to 25% by six months (Calfas et al, 1982).

Some studies of older adults have examined their non-participants in an effort to characterise them (Boult et al, 1998; Dodge et al, 1993; Hardie et al, 2003; Koval et al, 1992; Launer, et al, 1994; Norris, 1985). These have concurred on the following: ethnic minority (usually non-white), unmarried, low educational level, poor health and cognitive impairment were factors which differentiated non-responders from

Covariance structural modelling (CSM) allows the study of relationships between more than one independent variable or factor and more than one dependent variable or factor. This phase of the study includes four independent factors (illness perception, coping, social support, illness severity), and two dependent factors (psychological well-being and functioning). Thus, this approach lends itself to the first phase of this study. Consideration of specific statistical issues will be discussed further below.

3.4.2 Intervention studies

Intervention studies generally are characterised by the identification of participants, their recruitment and admission into the intervention programme. The specific components of the intervention in this study will not be discussed here, as the findings of study one will determine what is included. From the literature review of intervention work in chronic illness and osteoarthritis described in chapters one and two, interventions which use psychological and educational techniques are of benefit but have been limited in their findings where potentially confounding mood states were not controlled for. Therefore, this intervention study should incorporate methods of controlling for mood state. This can be done by the use of baseline measures at a preset period of time before the start of the intervention. Further measures of mood state can then be taken at the start of the intervention, and post intervention. Follow-up data collected at specified times post intervention can also determine the intervention's long-term benefits.

Much intervention research relies on the traditional comparison between the experimental intervention(s) and a no treatment control group. This allows the analysis of the benefit of the intervention against its absence and can thus provide a clear indication of how much, if any treatment effect is present. Treatment effect is based on the difference between the outcome measures in the no treatment control and the experimental intervention (this will be discussed further in relation to statistical analysis). From chapters one and two, it is known that psychological and educational interventions do improve psychological well-being and functioning in older people with osteoarthritis. What is not known is which factors in the interventions have a significant effect on the outcomes. Therefore, maximising the number of participants who receive the intervention would improve the opportunity for statistical analysis of more than one factor which may influence the outcomes. With a osteoarthritic population, spontaneous improvement is also unlikely. There is also a further ethical attraction of not including a no treatment control, whereby no

participants are denied or delayed from receiving psychological and educational interventions of known benefit.

This phase of the study will use a baseline control design with all participants being included in the intervention(s).

3.5 Statistical issues

This section will address the issues relevant to this two phase study. Issues of power, missing data (item non-response and dropouts) will be addressed, followed by a description of the analysis plan for the two phase study undertaken.

3.5.1 Power

Power can be defined as the 'probability that a study of a given size would detect as statistically significant a real difference of given magnitude' (Altman, 1991). One of the most common difficulties found in research is being unable to identify significant differences or effects because the sample size is too small. It is important that the sample size be large enough to be able to accept or reject the experimental hypotheses. If it is not, the study conducted cannot answer the experimental questions. This would be an unethical use of participants where meaningful conclusions cannot be made. Thus, it is important to establish the power of the study early to ensure that an adequate sample is available.

In studies involving group comparisons, power calculations are relatively straightforward using appropriate software. There are, however, difficulties in calculating power where effect sizes are not specified in advance. Specifying effect sizes in advance can be difficult when a new measure is used, or an existing measure is used with a new population. Furthermore, many researchers will use a range of measures expecting changes in these and selecting one measure, as the principal outcome measure may be unsatisfactory.

Researchers also study samples with particular characteristics (e.g. older people with osteoarthritis) in an effort to generate a model of a particular aspect of them e.g. health behaviours. Correlational methods are limited to the analysis of relationships between the variables included in the analysis and cannot tell us about predictive relationships. Power software has not kept up with complex correlational designs. In addition, power calculations for studies incorporating multiple data collection points of multiple measures are also limited. Thus, straightforward tools

for the calculation of power for more complex designs are limited. Consequently, the calculation of power is limited by the tools available, and researchers must adopt 'best-guess' approaches to calculate power in complex study designs and those using more complex forms of statistical analysis.

3.5.1.1 Implications for this study

In this two-phase study, power calculations will be used but based on the most similar designs available. For the survey in study one, a correlational design power calculation will be made, and for study two, analysis of variance (ANOVA) is the clearest comparison. The power of a study can be set a different levels but acceptable levels range between 80% to 100%. It is unlikely and undesirable that a power of 100% be selected due to the risk of over-powering a model and thus not allowing for random effects. Therefore, in this study, a power level of 80% will be selected with $\alpha = 0.05$. Effect sizes will be set at 0.3 as clinically significant effects can be detected with this level and it falls within the medium effect range ($0.25 <$ medium effect < 0.4) (Cohen, 1988).

3.5.2 Missing data

Despite the best efforts of researchers, data can be missing in a study. This may be as a result of item non-response where a participant omits to complete a part of the assessment, e.g. missing answers in a questionnaire. A further problem occurs when participants drop out of a study. This is an important issue in intervention work where participants may drop out at some data points but not all, thus limiting the number of data overall. These two potential problems and possible solutions are discussed below.

3.5.2.1 Item non-response

3.5.2.1.1 Why is item non-response important?

Individuals who provide data may not always provide all the data required. This can occur with 'any survey, whatever its type and method of data collection, will suffer from missing data due to non-response' (Platek & Gray, 1986). This can due to a number of reasons: the question may not have been asked of individuals, they may be unwilling to respond to a particular question, they may not understand a particular question. In self-report measures, an individual may simply have missed out an item by accident. Physical and cognitive functioning may have an effect on non-completion of a measure. A participant may be too frail to carry out a particular physical procedure or they may not understand the instructions or a particular

question. Careful on-the-spot checking can minimise some of these problems but they may not always be entirely alleviated. It is important to assess the amount of missing information, as high levels will affect the generaliseability. Furthermore, where one item has high levels of non-response, this may point to individuals being unwilling or unable to answer, or difficulties with the question structure or format. This is also likely to bias the results as only those willing or able to answer provide information. From the outset it is important to be aware of the potential amount of item non-response and whether it may relate to the aims of the study.

3.5.2.1.2 Item non-response and ageing

It has been found that the non-response rate does increase with age (Colsher & Wallace, 1989; Garrard et al, 1990; Guadagnoli & Cleary, 1992; Slymen et al, 1994). The effects of age are related to physical and cognitive functioning as expected. Item non-response ranged from 2% to 27% depending on the question (Slymen et al, 1994). The amount of item non-response will have an effect on how data are treated. Furthermore, if the data are not missing at random then there are limitations as to how this can be managed and the data analysed.

3.5.2.1.3 Item non-response conclusions

The 'relationship between bias and size of non-response ... depends on both the magnitude of non-response and the differences in the characteristics between respondents and non-respondents' (Platek & Gray, 1986). If there are high levels of non-response then techniques for statistical missing data analyses may not be appropriate. With non-response rates of less than 10%, missing data analyses can establish if the patterns of missing data found are statistically significant or not (Little & Rubin, 1987). This analysis is important when considering methods to interpolate data to enhance the robustness of the analysis.

3.5.2.1.4 Methods for managing item non-response

One method of managing missing data is to exclude it from the analysis and analyse only the complete data sets. This is a simple approach but it is inefficient as it effectively discards potentially relevant data which can then lead to bias (Carpenter et al, 2002; Kenward & Molenberghs, 1999; Little & Rubin, 1987; Twisk & de Vente, 2002). Alternative methods rely on replacing the missing observations with plausible values and subsequently conducting the analysis on the 'completed' data set (Carpenter et al, 2002). There are a number of imputation based procedures which include: hot deck imputation, mean imputation and regression imputation. The first substitutes values on the basis of the researcher's plausible estimates for

the missing value, or by inserting values from similar participants who have provided responses for the values. The second uses means from sets of recorded values in the substitution. Regression imputation uses estimates of missing values which are predicted from the observed values using other variables to write a regression equation for the variable with missing values. All these are reported to perform poorly (Little & Rubin, 1987). In Multivariate Analysis of Variance (MANOVA), cross-sectional techniques (where the missing observation is replaced by the average of available observations at the same time from other subjects with the same characteristics) may underestimate within-subjects effects (Twisk & de Vente, 2002).

Furthermore, auxiliary variables can be included to expand the amount of information available to improve the performance of the missing data procedure. Restrictive or inclusive strategies may be used. An inclusive strategy would use a wide range of auxiliary variables. There are advantages with model based approaches in that they enhance flexibility and avoid ad hoc approaches (Little & Rubin, 1987). The EM (Expectation-Maximisation) algorithm found in SPSS program is an example of this. The algorithm functions as an iterative process with two steps; missing values are replaced by estimated values and the parameters estimated in a covariance matrix. These steps can be repeated until convergence or correlation between the observed and imputed missing data is reached. The E (Expectation) step finds the conditional expectation of the 'missing data' in relation to observed data and current estimated parameters. The M (Maximisation) step corresponds to the maximum likelihood estimates where higher probabilities are assigned to data present within the data set. It has been shown to converge reliably and has been found to be acceptable for small data sets ($n<250$) (Little & Rubin, 1987).

The use of missing data methods will depend on how the data is missing. Missing data may be Missing At Random (MAR), Missing Completely At Random (MCAR) or Not Missing At Random (NMAR). Data missing completely at random means that the missing data is independent of the variables in the study e.g. missing responses on a depression questionnaire are not related to the severity of depression. If the data are missing at random, then the missing values may be missing for certain categories or sets e.g. missing responses on a depression questionnaire for those who completed it on a Wednesday (assuming the day of the week was not related to the study questions). If the missing data are not missing completely at random e.g.

non-response on a depression questionnaire by severely depressed participants, then the analysis procedure would need to account for this. There are tests available to assess for MCAR. These usually rely on the data being normally distributed, and preliminary data analysis would include tests of normality and transformations to improve variable distribution. An often used test is Little's MCAR test, and this compares the information on complete cases with incomplete cases to determine whether the former are plausibly a random sample of the original sample. A significant difference indicates that the missing data are not missing completely at random (Little & Rubin, 1987).

3.5.2.2 Dropouts and intention to treat analyses

In spite of the best efforts of researchers to contact, maintain contact and collect further data from participants, there will still be those participants who drop out of studies. Any dropout can have a detrimental effect on a study, and it is important to monitor the reasons for dropout. Researchers use a range of statistical options to maximise the available data for analysis and reduce the effects of dropout.

3.5.2.2.1 Analysis of study completers

There are a number of mechanisms to manage the effects of dropouts which rest on certain assumptions. One of the simplest ways of managing statistically the consequences of dropouts is to assume that all the experimental dropouts did poorly and the control group do well. This method can lead to bias in that the assumption that participants are performing poorly may be inaccurate and can lead to underestimating the effects of the experimental intervention (Streiner & Geddes, 2001). Alternatively, the dropouts in the experimental condition could be reallocated to the control group, as they do not receive the experimental intervention. This 'as treated' analysis becomes problematic when participants attend one or two and not all of the sessions, as partial effects of the intervention cannot be assessed. In addition, randomisation is likely to be compromised by reallocation based on outcome (Sheiner & Rubin, 1995). Consequently, these approaches are rather limited.

Perhaps the simplest approach is to analyse only the data available and exclude data on participants who do not provide data at a data collection point. This type of analysis is described as a per-protocol analysis (Sheiner & Rubin, 1995). Where there is progressive attrition of participants over a period of time, ignoring any viable data at earlier stages could seriously compromise the power for at least some of the

stages of the study. Consequently, using the maximum available data for different phases could allow some meaningful conclusion about the effects of intervention over time, if not over the whole time period of the study. A modified approach where initial analyses use the initial complete data, and subsequent analyses use complete data at each data collection point would maximise the amount of data available for analysis.

Analyses of completed data allows estimates of the benefits of the intervention to be calculated but does not allow estimates of what happens to those who dropout. This can be open to bias and therefore intention to treat analyses have been developed to address this.

3.5.2.2.2 Intention to treat analyses

Intention to treat analyses involve evaluating the outcome for all the participants at the point where they were included or randomised into the study. Intention to treat analyses have been widely used (e.g. Dunn, 2002; Fransen et al, 2001; Lewin, 1997; Little & Yau, 1996; Savelkoul et al, 2001) as a means of including as many individuals within the analysis in order to make the results relevant to the population under study. The intention to treat analysis, in essence, keeps all the participants in the trial as they were randomised to each intervention. There are a number of methods of undertaking intention to treat analyses and they rely on the design of the study.

One method is to substitute the initial score on a variable at the end data collection point. This assumes that there is no effect of the intervention on those who do not comply, i.e. they will not get better or worse (Savelkoul et al, 2001). This is problematic in that physical functioning participants with a chronic physical health problem will probably decline over time.

An alternative suggestion has been to use the method of 'last observation carried forward'. Thus, if data are collected at five time points and the individual drops out after the third time point, then the observation(s) or value(s) for the third time point are assumed to be the score for the subsequent time points i.e. time point 4 and time point 5. This has the benefit of increasing the data available for analysis. This is important in studies assessing the effects of an intervention over time. Two assumptions are made in using the last observation carried forward approach. The first is that there will be no improvement in the individual or benefit to them occurring

outside the intervention. In clinical psychological research this may not be the case, as the psychological problem may improve spontaneously or the individual decides they have gained enough from the intervention and may carry on aspects of the intervention themselves (Streiner & Geddes, 2001). Secondly, some interventions do not demonstrate their greatest benefits until after the completion of the intervention. An example of this could be the effects of certain medication (e.g. statins for high cholesterol) (Laupacis et al, 1988). Therefore, in using the 'last observation carried forward', the analysis would not take into account the potential improvement in an individual which may have been demonstrated by the increase in a particular variable value over a number of previous data collection points. The 'last observation carried forward' assumes that the participants' scores or responses would have remained constant which is seldom the case (Mallinckrodt et al, 2003). Therefore, the use of the last observation carried forward has limited utility.

In assessing treatment or intervention effects, mean scores on one outcome measure are usually compared. This can give an estimate of treatment effect. In a simple example, participants are randomised into two groups, intervention or placebo. The intervention effect can be calculated (Angrist et al, 1996; Dunn et al, 2003) as follows:

$$\text{Intervention effect} = \frac{\text{Intervention improvers}}{\text{Number in intervention}} - \frac{\text{Placebo improvers}}{\text{Number in placebo}}$$

If seven out of 10 improve in the intervention and five out of 10 in the placebo group, the intervention effect is: 7/10 - 5/10 = 0.2. This type of analysis answers the question 'what is the effect of offering treatment?' as it compares the outcomes according to the participants' initial randomisation into the intervention or placebo (Dunn et al, 2002; Sheiner & Rubin, 1995). It does not take into account how many may have dropped out, therefore the treatment effect may be under or overestimated depending on how many dropouts are included in the denominator.

In order to conduct intent to treat analysis taking dropouts into account, a further method is to compare the outcomes for those who completed the intervention taking into account those who dropped out according to the initial randomisation. If, for example, there are dropouts in both groups; the number of improvers (and non-improvers) who completed the intervention is known. What is also known is the number of improvers and non-improvers in the placebo. From this, proportions of

improvers can be estimated to determine intervention effect. From the example above, if two participants dropped out of the intervention (out of the original 10), there would be 7/8 improvers who had complied. If three participants dropped out of the placebo (out of the original 10), the improvers who complied would be 5/7. This would give an intervention effect of 0.16 (equal to 7/8 – 5/7) (Dunn et al, 2003). This type of estimate can answer the question 'what is the effect of receiving treatment?' (ibid.). It provides a different estimate of treatment effect as the number of dropouts is removed from the denominator. Treatment effects are calculated on those who actually completed treatment. The difficulty with this type of analysis is it relies on one outcome measure and the comparison of an intervention against a placebo. The effects of interventions on more than one measure or factor cannot be assessed.

Consequently, intention to treat analyses either use methods of data interpolation based on anticipating no change in participants or conduct analyses based on treatment effects. This is problematic when including participants with chronic physical conditions where decline in physical performance is more likely. Comparisons on the basis of one outcome measure can be made but this cannot be easily applied in a study with two outcome factors indicated by more than one variable. Where psychological well-being and functioning are the outcomes, they are indicated by more than one measure and estimates of treatment effects using a range of measures may produce confusing or conflicting results.

Partial intention to treat analyses can be conducted. In a partial intention to treat analysis, participants can be compared with non-participants on data provided at an earlier time point. This has the advantage of comparing the participants and non-participants on data provided and differences can be examined for possible bias. Also, it avoids the difficulty of imputing a large amount of data where there are large numbers of dropouts. Therefore, this approach will be adopted in this study.

3.5.2.3 Implications for this study

In this study, tests for missing data will be undertaken to determine if data are missing completely at random. Subsequently, data interpolation will be undertaken using the EM method described above. Partial intent to treat analyses will be conducted in study two to compare participants and dropouts on data available for comparison at each data collection time point. Analysis of the effects of the

intervention will use the maximum complete data available at each data collection point to retain as much power as possible.

3.5.3 Statistical analysis

3.5.3.1 Survey studies

Covariance Structural Modelling (CSM) is a set of statistical techniques which allows questions to be answered that involve multiple regression analyses of factors. It is also described as Confirmatory Factor Analysis (CFA) as it tests hypotheses (relations between variables) using a multivariate approach (Tabachnik & Fidell, 1996). There are a number of features of CFA which will be highlighted to explain its benefits as an analysis tool.

The hypotheses are represented by a series of regression equations. These can be modelled pictorially which can aid clarity (Bollen & Long, 1993; Byrne, 1994). CFA allows factors and variables to be included in the model. Factors are described in the CFA literature as latent variables and represent theoretical constructs that cannot be directly observed, e.g. coping. In order that these factors are indicated in the model, measures of them are obtained indirectly by linking the measured indicator variables to the factor. These measured variables (also referred to as observed variables) are indicators of the latent variable or factor. Selection of the variables or measurements to be indicators must naturally include consideration of their psychometric properties. This is particularly important where a range of variables or measures may be used to indicate a factor such as psychological well-being because the analysis procedure relies on normally distributed data (ibid).

Variables indicating the latent variable can be analysed. Their factor loadings can be determined as to how much these measures relate to the latent variables or factors (CFA). This relationship between a factor and observed variables is termed a measurement model. A model that displays the relationship between the latent variables is described as a structural model (CSM). The combination of both is described as the full latent variable model.

Within the CFA notation, measured variables are normally depicted in square or rectangular boxes, and latent variables in ellipses or circles. The relationship between these is determined by arrows, one way arrows representing structural regression coefficients. Where factors point to the variables, this shows that the

measures represented by the variables indicate that factor. Two way arrows represent correlations between variables or factors. Single arrows with an E beside them pointing to variables indicate random measurement error. Small circles with a D inside indicate residual error (disturbance) in prediction of the observed factor. Figure 2.3 in chapter two is depicted in CFA notation without the arrows representing measurement or residual error. A simplified version of part of Figure 2.3 is depicted in Figure 3.1 to describe a measurement model of psychological well-being that is indicated by scores on three questionnaires with their associated random measurement error (E1, E2, E3) (Byrne, 1994; Schumacker & Lomax, 1996). The figures on the lines from psychological well-being to Questionnaires 1 to 3 represent path coefficients for regression of the observed variable onto the factor. The numbers at E1, E2 and E3 represent the measurement error for each questionnaire as well as the variance r^2. Disturbances (represented by D in a circle, see Figure 3.2) are displayed in the same way. A regression equation can be written as follows:

Questionnaire 1	=	0.78 Psychological well-being + 0.63 E1

The symbols and nomenclature associated with CSM are described in Table 3.3 (after Byrne, 1994 page 10).

Table 3.3 Symbols and nomenclature used in CSM with EQS

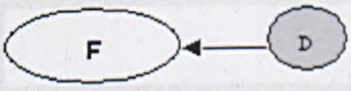
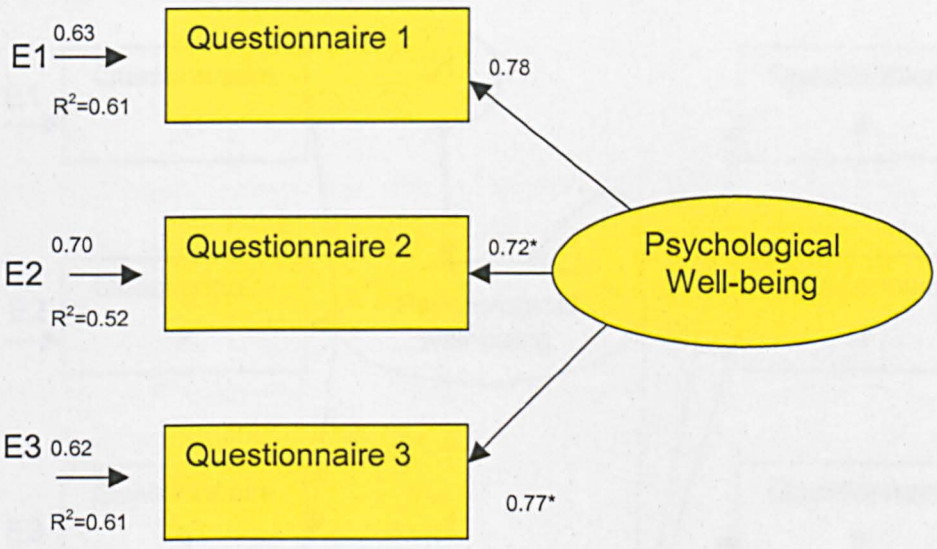
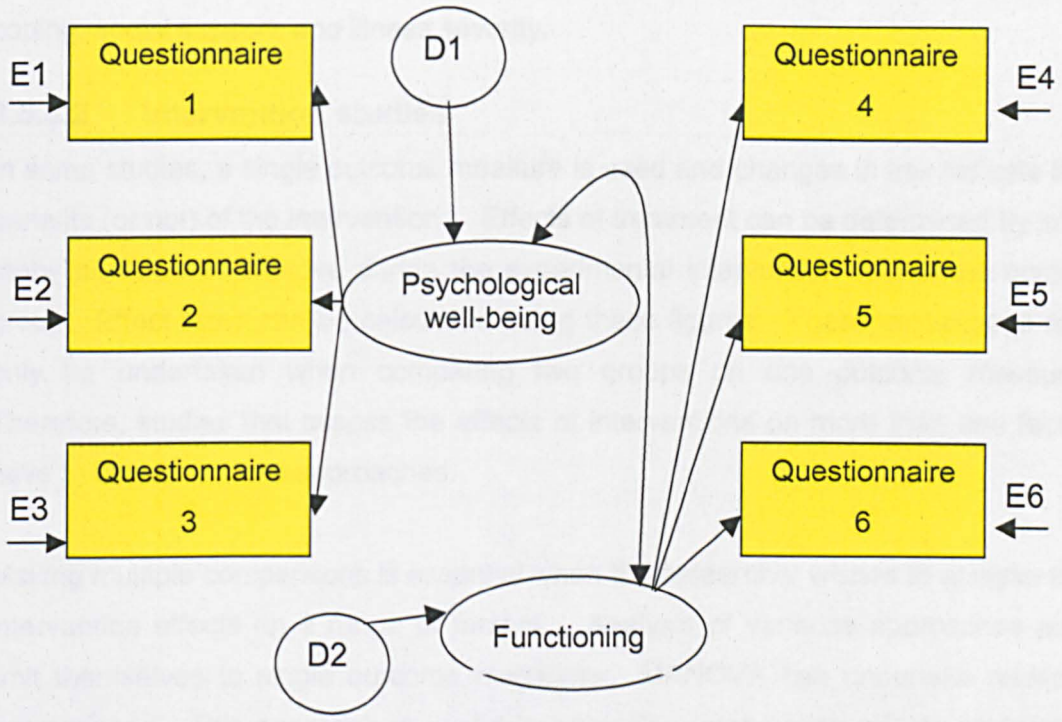
Symbol	Meaning
	Unobserved or latent factor
	Observed variable
	Path coefficient for regression of observed variable onto unobserved factor
	Path coefficient for regression of one factor onto another
	Residual error (disturbance) in prediction of unobserved factor
	Measurement error associated with observed variable

Figure 3.1 Hypothetical measurement model of psychological well-being



The measurement model in Figure 3.1 can be developed into a full latent variable model by including relationships between the latent variable of Psychological well-being and another feature of the model in Figure 2.3. This is displayed pictorially in Figure 3.2 which adds the latent variable Functioning with its three indicators and measurement errors and the two way curved arrow showing the hypothesised correlation between psychological well-being and functioning and the disturbances D1 and D2. This model with two factors is defined as a structural model.

Figure 3.2 Hypothesised full latent variable model for psychological well-being and functioning



From Figure 3.2, the model can be further developed using CFA to confirm measurement models of additional latent variables. The measurement models can be incorporated into full latent variable models incorporating the structural relationships between the latent variables.

Within CFA, there are a number of steps involved before the researcher can determine whether the model is the one that best fits the data (statistical identification) These are: model specification (the theoretical model formulated by the researcher), identification and estimation (undertaken statistically to determine a range of indices which the researcher can use), assessment of fit of the theoretical model to the data collected (using the indices obtained). There are a range of goodness of fit indices available and no one index of fit is adequate. Consequently, researchers should report a range of indices in their findings. Discussion of the specific indices reported in study one are described in chapter four. If the model fit is poor, then the model may be respecified, by removing some of the poorly loading variables to see if this improves fit. Respecification should be undertaken with the hypotheses of the study in mind and not as a means to improve statistical fit by any means (Bentler 1992; Hu & Bentler, 1999; Byrne, 1994).

Within study one, the model described in chapter two, figure 2.3 includes the latent variables or factors of psychological well-being, functioning, illness perception, coping, social support, and illness severity.

3.5.3.2 Intervention studies

In some studies, a single outcome measure is used and changes in this indicate the benefits (or not) of the intervention. Effects of treatment can be determined by how many participants improve during the experimental intervention and in the control group. Effect sizes can be calculated using these figures. These calculations can only be undertaken when comparing two groups on one outcome measure. Therefore, studies that assess the effects of interventions on more than one factor have to use alternative approaches.

Making multiple comparisons is essential when the researcher wishes to analyse the intervention effects on a range of factors. Analysis of variance approaches also limit themselves to single outcome measures. MANOVA can undertake multiple comparisons. This approach is useful in assessing intervention effects on factors which are indicated by a number of variables (as described in section 3.5.1). The effects of the intervention over time are also an important area of investigation. Repeated measures analyses can assess these effects. MANOVA allows the analysis of multiple dependent measures (the outcomes of psychological well-being and functioning) with both a between subjects factor (intervention), and a within subjects factor (time). In addition effect sizes can be calculated using sums of squares of effect and error. Consequently, MANOVA provides the most useful way of analysing intervention data with multiple outcome measures over time.

3.5.3.3 Implications for this study

Confirmatory factor analysis will determine the best model fit for the theoretical model specified in Figure 2.3. This will be the main analysis tool in study one. The relationships found will be used to determine the intervention approach in study two. Data in study two will be collected at multiple time points and be repeated measures. Analysis using MANOVA will determine the effects of the intervention on the outcome variables over time.

3.6 Conclusions

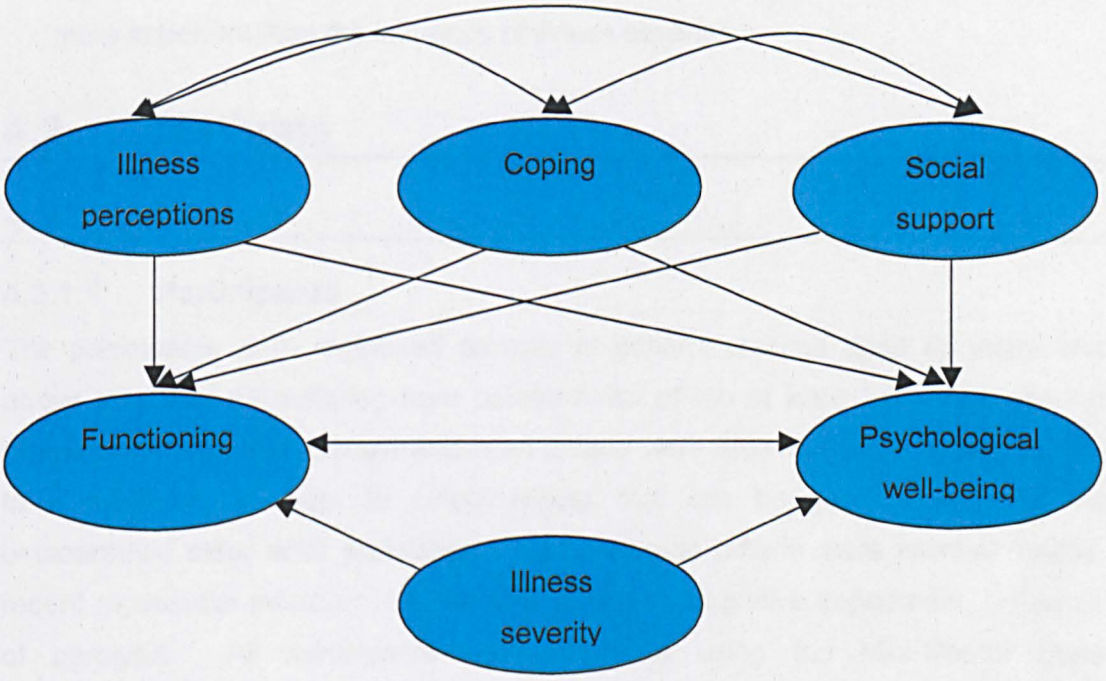
Chapters four and five describe studies one and two in detail and how they addressed the methodological issues discussed in this chapter.

Chapter Four: Study One: Model specification

4.1 Introduction

From the literature review (chapter two), three psychological factors have been shown to influence psychological well-being and functioning in chronic illness independently of illness severity. Combining these into a single model will allow simultaneous analysis of the effects of, and relationships between these factors. The aim of this study is to assess the utility of such a model of psychological factors in older people with osteoarthritis. The model is displayed in Figure 4.1.

Figure 4.1 Hypothesised factors and relationships affecting psychological well-being and functioning in older adults with osteoarthritis.



Key

factors

one-way relationships

associations

To test this model, a survey approach was taken with participants completing a range of measures selected to indicate the factors above. The use of a covariance structural modelling (CSM) approach allows latent variables to be indicated by a range of observed variables, and the model to be tested.

4.1.1 Hypotheses

From the literature review in chapter two, the testing of seven hypotheses simultaneously was proposed. These were represented in pictorial form in Figure 4.1 and the seven hypotheses are listed below.

1. Functioning and psychological well-being will be associated.
2. Illness severity will influence both functioning and psychological well-being
3. Illness perception, coping and social support will be associated
4. Illness perception will influence both functioning and psychological well-being.
5. Coping will influence functioning and psychological well-being.
6. Social support will influence functioning and psychological well-being
7. The influence of the psychological factors (illness perception, coping and social support) on psychological well-being and functioning will be independent of and more important than the influence of illness severity.

4.2 Methods

4.2.1 Design

4.2.1.1 Participants

The participants were registered patients in general practice aged 65 years and above identified as suffering from osteoarthritis of hip or knee from their general practice (GP) records. Certain exclusion criteria were also applied, these were kept to a minimum, in order to obtain results that can be generaliseable to the osteoarthritic older adult population. The exclusion criteria were terminal illness, recent myocardial infarction, severe mental illness, cognitive impairment, presence of paralysis. All participants were screened using the Mini-Mental State Examination (MMSE) (Folstein et al, 1975) in order to exclude the cognitively impaired.

4.2.1.2 Interviewers

The interviewers were all clinical psychologists or assistant psychologists. Each was provided with an induction to the study and measures by the principal researcher. Administration and scoring were undertaken by the prinicipal researcher.

4.2.1.3 Power

Power analysis was conducted (Nquery 5.0) for a correlational approach, as no methods for power calculation for covariance structural modelling currently exist. Alpha was set at 0.05, effect size at 0.3 and the power was set at 90% which indicated that the minimum sample size should be 113. Power was set at 90% for analyses with several variables. Therefore, recommended sample sizes in CSM were examined. The CSM literature recommends a minimum sample size of 100 – 150 (Schumaker & Lomax, 1996). To be consistent with the CSM approach, a sample size of 150 was selected. Participation rates are known to be lower in older adults, ranging from 50 to 70% (Carter et al, 1991; Herzog & Rodgers, 1988). Therefore, the number of potential participants approached exceeded this to include all those within the sample frame from each general practice.

4.2.1.4 Procedure

4.2.1.4.1 Recruitment of general practices

Five general practices participated in this study. They comprised both fundholding and non-fundholding practice although all the practices are now part of a primary care trust. They were selected pragmatically, based on their willingness to participate and to facilitate the study. The locations selected encompassed wide socio-economic variation. The areas include local authority estates, private residential housing, sheltered housing and a small suburban 'fringe'. Jarman indices for the wards in which the general practices and their patients were situated ranged from 24.65 to –0.78 (the higher number indicates higher levels of deprivation (Jarman, 1983) with the mean equal to 13.07. The mean number of general practitioners per practice was 3.2, mean list size per GP was 1926, and mean number aged 65 years and above was 361 (18.7%) of the GP list. The average list size is consistent with the English average of 1838 (ONS, 2002) but the percentage of older people on the GP lists was slightly higher than the 16% of older people in the population (ONS, 2002). Table 4.1 has the details of the general practices in this study.

Table 4.1 GP practice details

General Practice	No of GPs	List size	Number aged 65 years and above	%65 years and above	Jarman index scores[1]
1	4	7873	1668	21.2	-0.78 – 14.01
2	5	9365	1766	18.9	15.84 – 24.65
3	2	4446	783	17.6	-0.78 – 14.01
4	3	6141	1119	18.2	3.25 – 21.29
5	2	3005	445	14.8	10.11 – 11.97

[1]Jarman indices indicate levels of deprivation within the GP catchment areas

4.2.1.4.2 Recruitment of participants and data collection

The potential pool of subjects suffering from osteoarthritis of hip or knee was identified by the GPs and their staff. This pool was sent an information leaflet explaining the study and a letter from their GP that asked them to opt-in by post if they were willing to participate. Those who did not respond to the initial letter were sent a reminder after three weeks. No further efforts to contact those who did not opt in were made after this. This procedure was approved by the Local Research Ethics Committee (Salford and Trafford Health Authority, Project No: 97106)(see Appendix 6 for copy of ethics committee approval letter).

The participants, who opted in, were contacted by telephone or letter where necessary to arrange an appointment. At the initial appointment, further information about the study was given and the subject's written consent to participate was obtained. Two appointments of approximately one hour each were normally sufficient to complete the data collection and questionnaire administration.

4.2.2 Measures

Basic demographic information was collected including age, sex, marital status and living arrangements. Participants were assessed for the presence of cognitive impairment using the MMSE (Folstein et al, 1975), participants were excluded if scores were 23 or below.

The majority of the measures described below have been widely used in studies in psychology and chronic illness. Under each heading, two measures have normally been included to provide estimates of both illness specific and non-illness specific factors. The measures were administered in their original format to avoid effects on validity of changing the administration procedure. Therefore, for some measures,

additional subscales were included which did not contribute to the statistical analysis. As no one questionnaire is likely to provide a completely accurate measure of a particular dimension, the inclusion of multiple measures will facilitate the identification of the factors relevant to the model in Figure 4.1. In the sections below, the origin, scoring, validity and reliability of the scales is described. Copies of the measures are included in Appendix 2.

4.2.2.1 Functioning

Three measures were used to indicate the Functioning factor. These were the Functional Limitations Profile (FLP), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and the Functioning charts from the Dartmouth COOP charts.

4.2.2.1.1 Functional Limitations Profile (FLP)

The FLP (Charlton et al, 1983) is the British version of the Sickness Impact Profile (SIP) (Bergner et al, 1981). The FLP has two dimensions: physical and psychosocial. There are twelve categories: Ambulation, Body Care and Movement, Mobility, Household Management, Recreation and Pastime, Social Interaction, Emotion, Alertness, Sleep and Rest, Eating, Communication, Work. It uses a checklist approach to identify difficulties with different activities of daily living. These items have been weighted and they contribute to the category scores which can then be combined into the two dimensions, and an overall score. It was originally developed for use with arthritis patients (Bowling, 1995). Internal consistency correlations ranged from 0.63 to 0.83 for the categories contributing to the two dimensions (Eating, Communication, Work do not contribute to the physical and psychosocial dimensions), and the FLP identified 84 to 89% of people with physical disabilities (Bowling, 1995). Test-retest reliability found little change in scores on the physical dimension (1.5%) but markedly higher on the psychosocial dimension (15.3%) (ibid.). The FLP has been used in studies of angina (O'Neill et al, 1996) and pain management (Collins et al, 1998).

4.2.2.1.2 Western Ontario and McMaster Universities Osteoarthritis index (WOMAC)

Self-report measures of pain, stiffness and level of physical functioning in activities of daily living were obtained using the WOMAC (Western Ontario and McMaster Universities Osteoarthritis Index) (Bellamy et al, 1988). This measure comprises three dimensions: Pain (5 items), Stiffness (2 items), Physical Function (17 items) with each item measured on a five point Likert type scale. The scale has been

devised for use in evaluative research in osteoarthritis clinical trials and is regarded as a sufficient measure of functioning in osteoarthritis (Silman, personal communication). Internal consistency of the WOMAC exceeded 0.80, and test-retest coefficients ranged from 0.48 to 0.72 for the three subscales (Bellamy et al, 1988). The validity of the three domains was assessed using comparisons with other health questionnaires (e.g. McMaster Health Index, Bradburn Index of Well Being) and joint tenderness measures and higher correlations were found between pain indices of the relevant scales indicating good construct validity. This was repeated for the remaining two indices (Bellamy et al, 1988). A further analysis of the WOMAC domains confirmed the three domain structure (Ryser et al, 1999). The WOMAC has been used in studies of arthroplasty (Gittell et al, 2000), exercise and physiotherapy (Campbell et al, 2001; Mangione et al, 199; Thomas et al, 2002), and medication (Davies et al, 1999;Silverfield et al, 2002; Williams & Lord, 1995. This measure was also tested as an indicator of illness severity because it aims to measure pain and stiffness.

4.2.2.1.3 Dartmouth COOP charts

The Dartmouth Primary Care Cooperative Information Project (COOP) charts comprise nine pictorial charts with a five point scale: three of these focus on functioning (Physical Condition, Daily Work, Social Activity), two on symptoms (Pain and Emotional condition), three on perceptions (Change in Health, Overall Health and Quality of Life), and one on Social Support (Nelson, 1983, 1987). Eight of the charts have cartoons plus a description for each of the five items on the scale, the ninth uses plus and minus signs with descriptions to assess change in condition. Higher scores are indicative of greater impairment. Initial validity against the RAND Corporation health scales found correlations of between 0.40 to 0.74 (Nelson, 1987, Landgraf et al, 1990). Further work with the COOP charts used only six of the original measures (the perceptions measures were omitted) and found similar correlations (Bentsen et al, 1999; Landgraf, et al 1992; Wasson et al, 1992; Westbury et al, 1997). Studies comparing the COOP charts with the Medical Outcomes Study 36 Item Short-Form (SF-36) Health Survey, Nottingham Health Profile, Sickness Impact Profile (SIP), General Health Questionnaire (GHQ) indicated moderate validity and reliability (validity ranges 0.4 to 0.60, reliability ranges 0.37 to 0.82)(Coons et al, 2000; Meyboom-DeJong & Smith, 1990). Validation in a UK general practice sample found the COOP charts (six item version) to be sensitive to the presence of acute illness, and reliable over time (Kinnersley et al, 1994). In a study of older adults with depression, moderate levels of agreement

(kappa range 0.41 to 0.55) between the COOP charts and Beck Depression Scale (BDS) and Geriatric Depression Scale (GDS) were found (Doetch et al, 1994). The use of COOP charts with both older adults and in general practice merits their inclusion in this study. The COOP functioning charts (physical condition, daily work, social activity) will provide an indicator of functioning.

4.2.2.2 Psychological well-being

Three measures were used to assess psychological well-being, one assessed for the presence of anxiety and depression (Hospital Anxiety and Depression Scale (HADS)), the second focused on quality of life (Philadelphia Geriatric Center Morale Scale (PGCMS), and the third included scales assessing both (General Well Being Scale (GWBS)).

4.2.2.2.1 Hospital anxiety and depression scale (HADS)

The HADS (Zigmond & Snaith, 1983) comprises two short (seven items each) scales of anxiety and depression. Each item is scored on a four point scale, scores can range from 0 to 21 on each scale). High scores on each scale indicate higher levels of anxiety and depression. Scores are not normally added together (Wilkin et al, 1992). In clinical use, cut-offs have ranged from 8 to 11 on each scale (Bowling, 1997). High correlations with psychiatric assessments were found: 0.70 for depression, 0.74 for anxiety (Zigmond & Snaith, 1983). Correlations with the Beck Depression Inventory (BDI), General Health Questionniare-28 (GHQ-28), State Trait Anxiety Inventory (STAI), the Montgomery-Asberg Depression Rating Scale (MADRS) ranged from 0.50 to 0.83 for the HADS (Bjelland et al, 2002). It has been widely used with a range of physical conditions (Bowling, 1995, 1997; Herrmann, 1997) as well as in screening for anxiety and depression (Watts et al, 2002). Validation of the HADS Depression scale against the Hamilton Depression Rating Scale (HDRS) in a sample of older adults with depression found moderate to good correlations (0.51 to 0.79) (Flint & Rifat, 1996; Kenn et al, 1987; Wattis, 1994).

4.2.2.2.2 Philadelphia Geriatric Center Morale Scale (PGCMS)

The Philadelphia Geriatric Center Morale Scale (PGCMS) is a measure of morale in older people. The three subscales incorporate items on agitation, attitude towards own ageing and lonely dissatisfaction, scored on a dichotomous scale. Internal consistency for the three scales exceeded 0.8 (Cronbach's alpha) (Lawton, 1975), and goodness of fit for the three factor structural model was adequate (Liang & Bollen, 1983). Validity against Neugarten's Life Satisfaction Indexes ranged from 0.57 to 0.79 (Lohmann, 19977). Reliability coefficients have ranged from 0.75 at

three months to 0.91 at five weeks (Lawton, 1975). The scale has been used widely with older adults (Coleman et al, 1995; Espejo et al, 1999; Gardner & Helmes, 1999; Kahana et al, 1995; Meng & Xiang, 1997; Nagamoto et al, 1997; Wenger et al, 1995; Yamashita et al, 1999) and has been described as the instrument of choice in measuring morale (Bowling, 1995).

4.2.2.2.3 General Well Being Schedule (GWBS)

The General Well Being Schedule (GWBS) was developed for the US Health and Nutrition Examination Survey (HANES1) (Bowling, 1997). There are six subscales: Anxiety, Depression, Positive Well-Being, Self Control, Vitality and General Health. These subscales form a total score with scores of 0 to 60 indicating 'severe distress', 61 to 72 'moderate distress', and 73 to 110 'positive well-being'. Internal consistency was found to be high with coefficients (Cronbach alpha) of greater than 0.9 (Fazio, 1977; Ware et al, 1979), and validation against interviewer ratings ranged from 0.65 to 0.90 (Fazio, 1977; Ware et al, 1979). Test-retest reliability coefficients have ranged from 0.68 to 0.85 after three months (Bowling, 1997). The GWBS has been used in studies of hypertension (Jonas & Lando, 2000), rheumatoid arthritis (Callahan et al, 1991), mental health (Frydman, 1981; Wen et al, 2000), older adults (Himmelfarb & Murrell, 1983; Lindstrom, 1995; Siegel & Liefer, 1996).

4.2.2.3 Illness severity

Estimates of severity were obtained by estimating the number of joints affected and the duration of the osteoarthritic symptoms from general practitioner records. The Timed Up and Go (TUAG) task (Mathias et al, 1986) for assessing walking in older people was used. This task requires the participant to rise from sitting and walk a three metre distance away, turn, return and sit down. The subject is timed on this task from rising from sitting to resitting. This multiphase task was used to obtain an objective measure of the illness. Comparison with laboratory based walking assessments, the Berg Balance Scale (BBS), and the Barthel Index of Activities of Daily Living (ADL) found that the TUAG task was valid with correlation coefficients ranging from 0.79 to 0.95 (Mathias et al, 1986; Podsiadlo & Richardson, 1991). Test-retest reliability was assessed over two months with correlation coefficients of 0.99 reported (Podsiadlo & Richardson, 1991). Performing the task in less than 20 seconds is indicative of independent functional mobility (Podsiadlo & Richardson, 1991; Thompson & Medley, 1995). In addition, the WOMAC was assessed as a

possible indicator of the illness severity factor to determine whether it loaded more highly on illness severity or functioning.

4.2.2.4 Psychological factors

The factors described below have been identified as important predictive factors in the psychological well-being of individuals with chronic illness including arthritis. The measures selected have been widely used in studies of chronic illness.

4.2.2.4.1 Illness perception

Two measures of illness perception were included to indicate the illness perception factor. One measure focuses on the five components in the self-regulatory model (Illness Perception Questionnaire (IPQ), Weinmann et al, 1996), and the second measure assesses perceptions of symptoms and their cause in a version focusing on osteoarthritis (Illness Beliefs Questionnaire (IBQ), Salmon et al, 1996).

4.2.2.4.1.1 Illness Perception Questionnaire (IPQ)

The IPQ (Weinmann et al, 1996) comprises five scales (Identity, Cause, Timeline, Consequences, Control/Cure). These scales incorporate five components of illness representations that have been shown to influence coping (e.g. Lau et al, 1989; Leventhal et al, 1980; Turk et al, 1986; Klonoff & Landrine, 1994). The identity component describes patients' ideas about the nature of their condition (Weinmann et al, 1996). The causal component is indicative of the patients' ideas about the likely cause or causes of their illness (ibid). The time-line component is categorised into acute/short-lasting, chronic, cyclical/episodic and is indicative of the patients' perception of the likely duration of their symptoms (ibid). Patients' beliefs about the impact on functioning are described by the Consequences scale (ibid). The final component (Control/Cure) describes how much the patient believes their illness may be curable or controllable (ibid). The identity scale comprises a list of symptoms and a score is obtained by adding together any items occurring 'Occasionally','Frequently' or 'All of the time'. The Cause scale is not summed. The remaining three scales are scored by item on a 1 to 5 scale and a summed score is available for each. Internal consistency for each of the subscales exceeded 0.7 (Cronbach's alpha), and reliability coefficients ranged from 0.34 to 0.84 over a six month interval on all subscales except Identity. The scales have been used in studies in rheumatoid arthritis (Moss-Morris & Chalder, 2003; Murphy et al, 1999), COPD (Scharloo et al, 1998, 2000). For the purposes of this study, the whole scale

was administered but only the three ordinal scales (Timeline, Consequences, Control/Cure) included in the analysis as separate variables.

4.2.2.4.1.2 Illness Beliefs Questionnaire (IBQ)

The IBQ (Salmon et al, 1996) was derived from patients' self-reports of their symptoms on three types of symptoms viz. respiratory, musculoskeletal, gastrointestinal. There are a eight subscales; Stress, Wearing Out, Environment, Internal Structural, Internal Functional, Concern, Life-Style, Weak Constitution. The concern subscale includes five sets of three statements which the participant is asked to indicate with which one they most agree. The five sets focus on cause, reason, duration, seriousness, and contagiousness. The remaining 44 items (on seven subscales) are rated on a three point scale and higher scores indicate greater agreement with particular causes of symptoms. Principal components analysis identified which items loaded on each subscale and discrete clusters of symptoms were found for wearing out, internal-structural, and stress that exceeded 0.40. The musculoskeletal group in the sample study were distinguished by higher mean standardised scores compared to other symptom groups on Wearing Out and Internal Structural. The Stress scale did not distinguish between the symptom groups but added a psychological dimension to the beliefs about symptoms. The subscales theoretically implicated in the model (figure 4.1) were included. These were: Concern, Wearing Out, Internal-Structural, and Stress.

4.2.2.4.2 Coping

Two measures were chosen to provide multiple indicators of the coping latent variable. Both illness specific and general coping measures were chosen to assess the full range of coping styles. The two measures were the COPE Inventory (Carver et al, 1989) and the Pain Coping Strategies Questionnaire (Rosenstiel & Keefe, 1983).

4.2.2.4.2.1 COPE Inventory

The COPE Inventory was used as a non-illness specific measure. The COPE Inventory was developed by Carver et al (1989); it has fifteen subscales each comprising four items: Active Coping, Planning, Seeking Instrumental Social Support, Seeking Emotional Social Support, Suppression of Competing Activities, Turning to Religion, Positive Reinterpretation and Growth, Restraint Coping, Acceptance, Focus on Venting of Emotions, Denial, Mental Disengagement, Behavioural Disengagement, Alcohol / Drug Use, Humour. Internal consistency exceeded 0.6 (Cronbach's alpha) except for the Mental Disengagement scale

(Carver et al, 1989). Validation against personality subscales such as optimism, control, self-esteem, hardiness ranged from 0.20 to 0.32 (Bowling, 1995). Test-retest reliability of the various scales was conducted with two intervals of six weeks and eight weeks, the reliability coefficients ranged from 0.42 to 0.86 indicating a reasonable degree of reliability. The COPE Inventory has been used in a range of studies including studies on: aging (Ben-Zur, 2002), osteoarthritis and rheumatoid arthritis (Affleck et al, 1999) and heart problems (Jakubowska, 2001). Within the literature review (chapter two), coping strategies that had a positive influence on psychological well-being were characterised by problem-focused strategies and scales which measure this will be included as indicators of the coping factor. A recent study reanalysed the factor structure found in the COPE Inventory, and identified four scales which reflected problem-focused strategies (Lyne & Roger, 2000). These were: Active Coping, Planning, Suppression of Competing Activities, and Positive Reinterpretation and Growth.

4.2.2.4.2.2 Pain Coping Strategies Questionnaire (CSQ)

Illness-specific measures were obtained from the Pain Coping Strategies Questionnaire (CSQ) (Rosenstiel & Keefe, 1983) and provided a comparison to coping with general stressors. The subscales are broadly similar to those found in the COPE Inventory. There are three factors or scales. Cognitive coping and suppression includes the following scales: Reinterpreting the pain sensation, Coping self-statements, Ignoring sensations. Helplessness includes: Catatstrophising, increasing activity, Control, Ability to decrease pain. Diverting attention and praying/hoping provide one scale from the two subscales in the label. Internal consistency exceeded 0.70 (Rosestiel & Keefe, 1983), and regression analyses have demonstrated a significant proportion of the variance explained by these three factors (range 19 – 61%) (Rosenstiel & Keefe, 1983). The scales have been used widely in studies of chronic pain in a range of illnesses (Jones et al, 2003; Riley, 1997; Riley et al, 1999; Tan et al, 2001), rheumatoid arthritis (Watkins et al, 1999); arthroplasty (Kendell et al, 2001).

4.2.2.4.3 Social support

Two measures of social support were used: the Medical Outcomes Study (MOS) Social Support Survey and the COOP Social Support chart.

The MOS Social Support Survey (also known as the RAND social support questionnaire) was used (Sherbourne & Stuart, 1991). This measure was developed for use with patients suffering from chronic conditions including hypertension, diabetes, coronary heart disease, depression. The scale comprises 20 items and is scored on a five point scale. It provides an overall index score of perceived social support. Social support is known to be related to an individual's psychological well-being (ibid.). It also provides an estimate of the number of friends or family that are perceived by the individual to be available to provide support. Principal components analysis confirmed that the scale provided an overall index with factor loadings ranging from 0.67 to 0.88. Reliability over one year on the overall support index was 0.78. Whilst this scale has not been widely reported in the literature, it includes more health specific items than other social support scales (Bowling, 1997) which merits its inclusion in this study.

The COOP Social Support chart will also provide a subjective rating of social support on a five point scale (Nelson, 1987). The COOP charts have been described above.

4.2.3 Analysis

4.2.3.1 Software

The data from each participant was entered into an SPSS (Statistical Package for the Social Sciences computer programme) (V9/V10) data file. After modification, this file was then converted into an EQS (EQS Structural Equation Modelling computer programme) data file for the analysis. EQS 5.7b was used for covariance structure modelling. All software used was run using Windows based PCs.

4.2.3.1.1 Preliminary data analysis

The data were examined for outliers and errors using frequency tables and visual inspection. Errors were corrected and any outliers were checked to see if they were within each questionnaire's expected plausible limits. Missing data were analysed using Little's MCAR test. This test compares the information on complete cases with incomplete cases to determine whether the former are plausibly a random sample of the original sample. A significant difference indicates that the data are not missing completely at random (Little & Rubin, 1987).

Age, gender and living arrangements are then reported.

The data were examined for normality and transformations to improve distribution were completed. All the variables were present at this stage.

Subsequently, the EM (expectation-maximisation) algorithm was used to interpolate the missing values. This algorithm functions by: (1) replacing missing values by estimated values, (2) estimating parameters, (3) re-estimating parameters until iterations reach convergence (Little & Rubin, 1987). The EM method is an iterative process. There are two steps to each iteration. The E step (Expectation step) and M step (Maximisation step). The E step finds the conditional expectation of the 'missing data' in relation to observed data and current estimated parameters. The M step corresponds to the maximum likelihood estimates. It has been shown to converge reliably (ibid.).

The whole data set was used in the interpolation of the missing values to improve the consistency by the inclusion of auxiliary variables. After interpolation of missing values, the subscales not contributing to the next stage of the analysis were discarded. This included the Illness Identification scale on the IPQ, eight scales on the COPE (Seeking Instrumental Social Support, Seeking Emotional Social Support, Restraint coping, Acceptance, Denial, Mental Disengagement, Behavioural Disengagement, Alcohol/Drug Use, Focus on Venting Emotion, Humour) and two scales from the Dartmouth COOP charts (Feelings, Perceptions). The variables remaining in the raw data set are described in Table 4.2.

Table 4.2 Variables in the raw data set

Factor	Variable
Psychological well-being	HADS Anxiety
	HADS Depression
	General Well-Being Schedule
	Philadelphia Geriatric Center Morale Scale
Functioning	FLP Physical domain
	FLP Psychosocial domain
	WOMAC
	COOP Function
Illness Severity	Timed Up and Go
	Number of joints affected
	Duration of OA symptoms
Illness Perception	IPQ Time Line

Factor	Variable
	IPQ Consequences
	IPQ Control/Cure
	IBQ Concern
	IBQ Internal structural
	IBQ Wearing Out
	IBQ Stress
Coping	COPE Active Coping
	COPE Planning
	COPE Suppress Competing Activities
	COPE Positive reinterpretation and growth
	Pain CSQ Cognitive Coping & Suppression
	Pain CSQ Helplessness
	Pain CSQ Diverting attention & praying
Social Support	MOS – Social Support no of friends/relatives
	MOS – Social Support Total
	COOP Social Support

4.2.3.2 Covariance Structural Modelling (CSM)

Analysis of the data used a CSM approach to allow evaluation of Figure 4.1. It includes CFA and structural equations. There are four main steps in CSM: Model specification, Identification, Estimation, Testing fit and Respecification if necessary. Typically, the process involves pictorial representation of the theory or hypotheses under study (see Figure 4.1) which correspond to a series of regression equations (Bollen & Long, 1993; Byrne, 1994). From this, the model can then be tested statistically. This is done in a simultaneous analysis of all the variables to ascertain the level of consistency with the data. The covariance matrix generated is analysed using the maximum likelihood procedure.

Several indicators of model fit are necessary as no one index is adequate. The output allows examination of chi-square and associated p-values, Confirmatory Fit Indices (CFI), Root Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Squared Residual (SRMR). Acceptance of the model requires acceptable values on each of the above indices. In principle, chi-square should be non-significant as it tests whether the model differs significantly from the data set but this can be compromised by small data sets where chi-square is often

found to be significant. Therefore, alternative indices are selected to assess model fit. CFIs have been regarded as acceptable at values of 0.90 and above (Bentler & Stein, 1992, Byrne, 1994) and are insensitive to sample size. RMSEA describes the degree of lack of fit relative to the degrees of freedom in the model. Values of RMSEA should be less than 0.05. The SRMR describes the difference between the observed matrix and the covariance matrix and can be defined by the researcher (Shumacker & Lomax, 1996). Apart from chi-square, indices should range between 0 and 1.

Hu & Bentler (1999) have suggested revised values for some indices. These should be CFIs 0.95, RMSEA 0.06 and SRMR 0.08. These values are less preferable for small sample sizes i.e. less than 250. A cut-off value of <0.08 for SRMR tended to over reject true population models at small sample sizes (ibid.). A two index presentation strategy using CFI and RMSEA or SRMR is suggested as being the best way of avoiding Type I and Type II error rates (Hu & Bentler, 1999). The SRMR index can be regarded as the most sensitive measure of model fit (ibid.). Therefore, a CFI 0.90 and SRMR 0.08 will be acceptable to conclude model fit. All these indices will be reported.

In terms of respecification of the model, the analysis also provides loadings or standardised coefficients of each observed variable on each latent variable and the Lagrange Multiplier (LM) test. These can be examined to exclude non-significant loadings. Similarly, the LM test can allow evaluation of the effect of freeing a set of fixed parameters in the subsequent model. It compares the fit of the restricted model with less restricted models given the same sample variance-covariance matrix. The LM test indicates parameters that may need to be included in the model (Shumacker & Lomax, 1996) and Byrne (1994) also stresses that because the LM test is a statistical test and thus virtually any fixed parameter is eligible for testing, then any alterations suggested by the LM statistics must be substantiated by 'sound theoretical rationale' (ibid.).

The aim of this analysis was to assess the model displayed in figure 4.1. Initially, confirmatory factor analysis was used to determine the best indicators of each latent variable (the measurement model). There were five measurement models: psychological well-being, functioning, illness perception, coping, and illness severity. Following this, the relationships (the structural model) between the measurement models were assessed. A relationship was hypothesised between psychological

well-being and functioning and CSM was used to confirm this. Then the association between the psychological factors (illness perception, coping and social support) was assessed. The next stage examined the influence of illness severity on psychological well-being and functioning. The influence of the psychological factors on psychological well-being and functioning was then assessed. Finally, the structural model in Figure 4.1 was assessed and respecification undertaken to improve the fit.

The models were constructed with each latent variable having fixed variance which thus allowed the observed variables to vary and thus provided a loading for each observed variable on each latent variable. The loadings of each observed variable on the latent variable were examined to determine their acceptability as an indicator. Non-significant loadings resulted in that particular variable being discarded. The fit was assessed using the CFI and SRMR indices and acceptable results were as follows: CFIs 0.90 and SRMR 0.08. In addition, the LM test was used to identify parameters that could be modified to improve fit but modifications were only made if there were theoretical reasons to do so. Respecification was undertaken to improve fit based on the findings of the LM test and their link to the model in Figure 4.1. The maximum number of respecifications undertaken was four.

4.3 Results

4.3.1 Sample characteristics

4.3.1.1 Participation rates

The total pool from the five general practices in this study comprised 358 individuals. Of these 358, 16 were excluded. There were 46 refusals: those who agreed to initial interview but then changed their minds, and those who returned the opt-in slip refusing to participate. No contact was made after two mailings with 139 potential participants. Data were collected on 157 participants thus exceeding the minimum required by the power analysis (see table 4.3 for summary). The participation rate was calculated using equation PR1: PR1 = Participants / Participants + Refusals (see chapter three for details). This gave a participation rate of 77.3% (157/203).

Table 4.3 Numbers of participants, refusals, exclusions and non-contactable individuals

Definition	n
Non-contactable	139
Exclusions	16
Refusals	46
Participants	157
Total	358

4.3.1.2 Interviewers

A total of seven interviewers completed 157 interviews with the participants. The majority of interviews(n=136, 86.6%) were undertaken by assistant psychologists of whom there were three. The remaining interviews (n=21, 13.4%) were undertaken by qualified clinical psychologists of whom there were four with the principal researcher undertaking 11 of these (Table 4.4)

Table 4.4 Interviewer details

Interviewer	Profession	Number of interviews	% of interviews
GB (principal researcher)	Clinical psychologist	11	7.0
ES	Clinical psychologist	5	3.2
SG	Clinical psychologist	4	2.5
SE	Clinical psychologist	1	0.6
AK	Assistant psychologist	97	61.8
JC	Assistant psychologist	31	19.7
LW	Assistant psychologist	8	5.1
Total		157	100.0

4.3.1.3 Comparing the participants and non-participants

The participants and refusals were compared on age and gender. No significant difference was found between the participants on age ($t = -1.61$, $p>0.05$) or gender (chi-square=0.29, $p>0.05$).

4.3.1.4 Demographic characteristics of the participants

They comprised 61 males and 96 females. Mean age was 74.8 years (sd=6.5, range 65 – 90). The study population distribution is displayed in Table 4.5. Marital

Status and Living Arrangements are displayed in Table 4.6 and are similar to UK population figures.

Table 4.5 Age and Gender Distribution of the Study participants

Gender	Percentage of participants in each age range		
	65-74 years	75-84 years	85+ years
Males	21.0	12.1	5.7
Females	36.9	17.8	6.4

Table 4.6 Marital Status and Living Arrangements

Marital Status	%	Living Arrangements	%
Single	2.5	Lone Female	31.8
Married / Co-habiting	49.0	Lone Male	10.2
Widowed	43.3	With Spouse or Partner	47.8
Divorced /Separated	5.1	Other (including 2 in residential care)	10.2
Total	100	Total	100

4.3.2 Missing data

There were few missing data. On the majority of measures, the missing data did not exceed 6% but on the PGCMS, missing data reached 15.3%. Similarly on estimates of duration and joints affected, missing data exceeded 10%. This was due to missing information in GP records. Little's MCAR test for missing data was carried out and this did not reach significance (Chi-square = 674.789, df = 635, p =0.133) (Table 4.7).

Table 4.7 Missing data summary (n=157 eligible subjects)

Measure	Missing n	Percent
HADS	0	0
General Well-being Schedule	6	3.8
Philadelphia Geriatric Center Morale Scale	24	15.3
Functional Limitations Profile	3	1.9
WOMAC	3	1.9
COOP Charts	5	3.2
Timed Up and Go	13	8.3
No of joints affected	19	12.1
Duration of symptoms	20	12.7
Illness Perception Questionnaire	4	2.5
Illness Beliefs Questionnaire	9	5.7
Pain Coping Strategies Questionnaire	2	1.3
COPE	6	3.8
MOS Social Support Scale	6	3.8

4.3.3 Normality tests and transformations

Using frequency tables and scatter plots, the data were screened for outliers but no data were removed as they were deemed to be within expected plausible limits. The data were then examined for normality using both visual inspection of histograms and Kolmogorov-Smirnov tests. The data were transformed as necessary in order to improve the distribution which was again assessed using visual inspection of histograms and Kolmogorov-Smirnov tests. Where the transformation did not improve data distribution on a particular variable, the raw untransformed data remained in the data set. Out of 42 variables: six were not transformed as their distribution was normal, 13 variables were transformed to improve the distribution, and the remaining 23 variables were not improved by transformation and the raw data was included the data set. The variables with Kolmogorov-Smirnov statistic and significance, and transformations made are detailed in Table 4.8.

Table 4.8 Tests of Normality for all variables and transformations undertaken for the variables

Variable	Kolmogorov-Smirnov			Transformation
	Statistic	df	Sig.	
HADS - Anxiety	.081	157	.013	
HADS-Depression	.088	157	.005	Square root
General Well-Being Schedule Total	.049	151	.200	
PGMS - Total (not other)	.072	133	.085	
IPQ-Illness Identification	.149	153	.000	
IPQ-Time Line	.208	154	.000	
IPQ-Consequences	.053	154	.200	
IPQ-Control/Cure	.108	155	.000	
IBQ-Concern	.204	150	.000	
IBQ-Internal structural	.106	149	.000	Reflect & square root
IBQ-Lifestyle	.138	148	.000	
IBQ-Stress	.092	149	.004	
IBQ-Wearing Out	.146	149	.000	Reflect & square root
Pain CSQ Cognitive Coping & Suppression	.051	155	.200	
Pain CSQ Helplessness	.055	155	.200	
Pain CSQ Diverting attention & praying	.070	155	.061	
COPE Active Coping	.100	151	.001	
COPE Planning	.125	151	.000	
COPE Seeking Instrumental Social Support	.099	151	.001	
COPE Seeking emotional social support	.090	151	.004	Square root
COPE Suppress Competing Activities	.097	151	.001	
COPE Positive reinterpretation and growth	.103	151	.000	
COPE Restraint coping	.105	151	.000	
COPE Acceptance	.100	151	.001	
COPE Denial	.143	151	.000	
COPE Mental disengagement	.120	150	.000	
COPE Behavioural disengagement	.135	151	.000	
COPE Alcohol/Drug Use	.440	150	.000	
COPE Focus on Venting Emotion	.108	151	.000	Square root
COPE Humour	.098	151	.001	Square root
MOS - n friends/relatives	.086	151	.008	Logarithm

Variable	Kolmogorov-Smirnov			Transformation
	Statistic	df	Sig.	
MOS - Total	.081	151	.016	Reflect & square root
COOP Social Support	.246	152	.000	
COOP Feelings	.110	152	.000	
COOP Perceptions	.145	152	.000	
COOP Function	.094	152	.002	
FLP - Physical domain	.063	154	.200	Square root
FLP - Psychosocial domain	.063	154	.200	Square root
WOMAC - Total	.063	154	.200	Reflect & square root
Timed Up and Go	.080	144	.024	Logarithm (Logarithm)
No of joints affected	.217	138	.000	
Duration of OA symptom	.074	137	.064	Square root

Then the EM (Expectation-Maximisation) method of missing data for maximum likelihood estimation was used to impute the data set. After the data set was generated a number of variables were discarded as they did not contribute to the model in Figure 4.1. Variables used in the CSM part of the analysis are detailed in Table 4.9.

Table 4.9 Variables included in covariance structural modelling

Factor	Variable
Functioning	COOP Function
	FLP - Physical domain
	FLP - Psychosocial domain
	WOMAC – Total
Psychological well-being	HADS – Anxiety
	HADS-Depression
	General Well-Being Schedule Total
	PGMS - Total (not other)
Illness Severity	Timed Up and Go
	No of joints affected
	Duration of OA symptoms
Illness Perception	IPQ-Time Line
	IPQ-Consequences

Factor	Variable
	IPQ-Control/Cure
	IBQ-Concern
Coping	Pain CSQ Cognitive Coping & Suppression
	Pain CSQ Helplessness
	Pain CSQ Diverting attention & praying
	COPE Active Coping
	COPE Planning
	COPE Suppress Competing Activities
	COPE Positive reinterpretation and growth
Social Support	MOS - n friends/relatives
	MOS - Total
	COOP Social Support

4.3.4 Covariance structural modelling (CSM)

There were seven stages to this analysis: (1) confirmatory factor analysis of the measurement models of illness severity, psychological well-being, functioning, illness perception and coping, (2) Covariance structural modelling of the structural components of the model in Figure 4.1, (3) Confirming the association between psychological well-being and functioning, (4) Confirming the association between, and the integrity and distinctness of the psychological factors, (5) Assessing the influence of illness severity on psychological well-being and functioning, (6) Assessing the influence of the psychological factors on psychological well-being and functioning, (7) Combining the structural components to assess the model in Figure 4.1. These steps were undertaken to confirm that the components of the model were of adequate fit prior to the assessing the model in its entirety.

The measurement and structural models follow the nomenclature described in chapter three. Each figure will use the nomenclature described in chapter three. Table 3.3 is reproduced below for reference. Briefly, path coefficients indicate the regression of an observed variable onto an unobserved factor. The numbers beside the Es indicate measurement error and the variance associated with the observed variable or measure. From this a regression equation can be written as follows:

Questionnaire 1 = a Factor + b E1.

Table 4.10 Reproduction of table 3.3 Symbols and nomenclature used in CSM with EQS

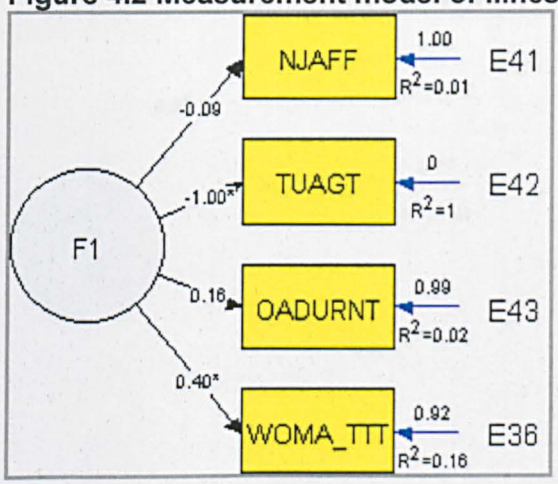
Symbol	Meaning
	Unobserved or latent factor
	Observed variable
	Path coefficient for regression of observed variable onto unobserved factor
	Path coefficient for regression of one factor onto another
	Residual error (disturbance) in prediction of unobserved factor
	Measurement error associated with observed variable

4.3.4.1 Measurement models

4.3.4.1.1 Is Illness Severity indicated by Number of Joints Affected, Duration of Symptoms, Timed Up and Go (TUAG), and the WOMAC total?

The variables in this measurement model comprised TUAG, Number of joints affected, Duration of symptoms and the WOMAC total. The fit of the initial model was poor (CFI=0.878, RMSEA=0.11, SRMR=0.06). Therefore, the loadings of each selected variable on the factor were examined (see Figure 4.2). Negative loadings indicate that the illness severity factor is scored so that higher scores indicate lower severity. The loadings were: TUAG (-1.00), Number of joints affected (-0.09), Duration of symptoms (0.16) and the WOMAC total (0.40). From this, the TUAG was the best indicator of Illness severity. The Number of joints affected and the Duration of symptoms were not good indicators and were thus dropped from the analysis. The WOMAC total was also assessed as an indicator of functioning and proved to have a higher loading in that model (see below). Therefore, the TUAG variable was accepted as the sole indicator of Illness severity and this variable used alone.

Figure 4.2 Measurement model of illness severity



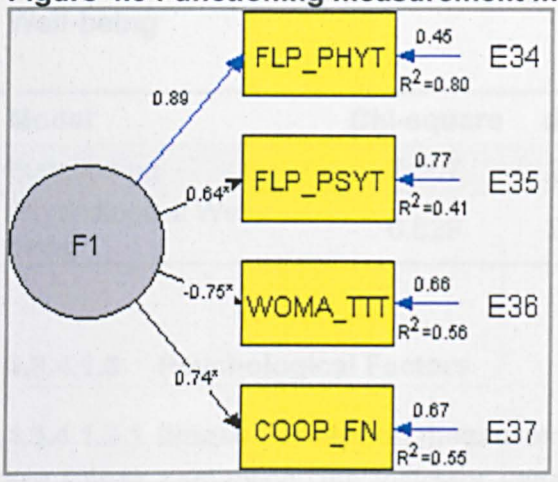
Key	F1	severity of illness
	WOMA_TTT	WOMAC Total
	NJAFF	Number of joints affected
	TUAGT	Timed Up and Go
	OADURNT	Osteoarthritis duration
	For nomenclature details see Table 4.10	

4.3.4.1.2 Do the indicators of functioning and well-being identify two separate latent variables as assumed in the model and are these associated?

The Functioning model included the variables (factor loadings in brackets): Functional Limitations Profile (FLP) Physical dimension (0.89), FLP Psychosocial dimension (0.64), WOMAC Total (-0.75) and COOP Functioning (0.74). The analysis indicated an acceptable degree of fit (see Table 4.11) although the loading of FLP Psychosocial dimension was markedly less than the other variables (see Figure 4.3).

The Psychological Well-being model included the following variables (factor loadings in brackets) HADS Anxiety (0.78), HADS Depression (0.72), GWBS (-0.78), PGCMS (-0.77). The analysis indicated an acceptable degree of fit (see Figure 4.4). The findings are detailed in Table 4.11

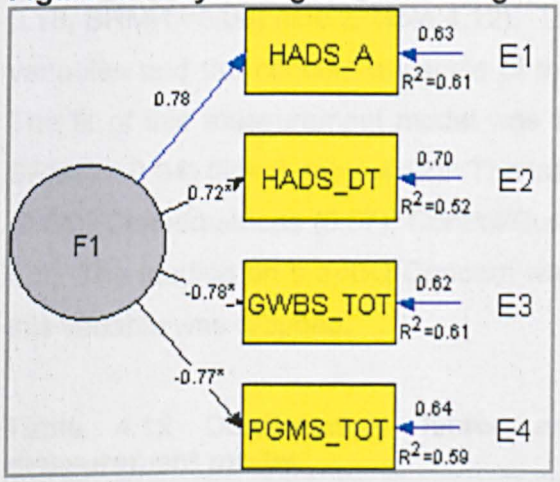
Figure 4.3 Functioning measurement model



Key		
	F1	Functioning
	WOMA_TTT	WOMAC Total
	FLP_PHYT	FLP Physical Dimension
	FLP_PSYT	FLP Psychosocial Dimension
	COOP_FN	COOP Physical Function

For nomenclature details see Table 4.10

Figure 4.4 Psychological well-being measurement model



Key		
	F1	Psychological well-being
	HADS_A	HADS Anxiety
	HADS_DT	HADS Depression
	GWBS_TOT	General Well Being Schedule Total
	PGMS_TOT	Philadelphia Geriatric Center Morale Scale

For nomenclature details see Table 4.10

Table 4.11 Confirmatory factor analyses for Functioning and Psychological Well-being

Model	Chi-square	df	p	CFI	RMSEA	SRMR
Functioning	7.507	2	0.023	0.979	0.13	0.03
Psychological Well-being	0.629	2	0.730	1.00	0.00	0.01

4.3.4.1.3 Psychological Factors

4.3.4.1.3.1 Illness Perception measurement model

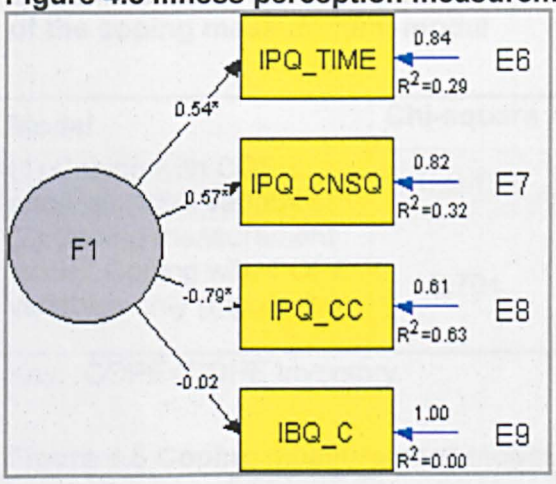
For illness perception, the indicator variables were the three subscales from the Illness Perception Questionnaire (IPQ) (Timeline, Consequences, Control/Cure) and the four subscales from the Illness Beliefs Questionnaire (IBQ) (Concern, Wearing out, Internal-structural, and Stress). Higher scores are indicative of higher perceived severity of osteoarthritis. The Concern subscale of the IBQ was also used. The initial model including all the variables had very poor fit (CFI = 0.366, RMSEA = 0.18, SRMR = 0.14)(see line 1, table 4.12). The IBQ variables were then assessed as indicators of Illness Perception; model fit was still poor (CFI = 0.747, RMSEA = 0.18, SRMR =0.08) (line 2, table 4.12). The next stage of the analysis used the IPQ variables and the concern subscale of the IPQ as indicators of Illness Perception. The fit of this measurement model was acceptable (CFI = 0.980, RMSEA = 0.07, SRMR = 0.04) (line 3, table 4.12). The loadings of each the variables were Timeline (0.54), Consequences (0.57), Control/Cure (-0.79) and Concern (-0.02) (see Figure 4.5). The loading on the IBQ Concern was very low, and for subsequent analyses, this variable was dropped.

Table 4.12 Confirmatory factor analyses for the Illness Perception measurement model

Model	Chi-square	df	p	CFI	RMSEA	SRMR
(1) IPQ + IBQ	87.46	14	0.000	0.366	0.18	0.14
(2) IBQ	11.91	2	0.000	0.747	0.18	0.08
(3) Illness perception measurement model: (IPQ, IBQ concern) (Figure 4.5)	3.354	2	0.187	0.980	0.07	0.04

Key: IPQ=Illness Perception Questionnaire, IBQ=Illness Beliefs Questionnaire, IBQ Concern subscale

Figure 4.5 Illness perception measurement model



Key		
	F1	Illness Perception factor
	IPQ_TIME	Illness Perception Questionnaire Timeline subscale
	IPQ_CNSQ	Illness Perception Questionnaire Consequences subscale
	IPQ_CC	Illness Perception Questionnaire Control/Cure subscale
	IBQ_C	Illness Beliefs Questionnaire Control subscale

For nomenclature details see Table 4.10

4.3.4.1.3.2 Coping

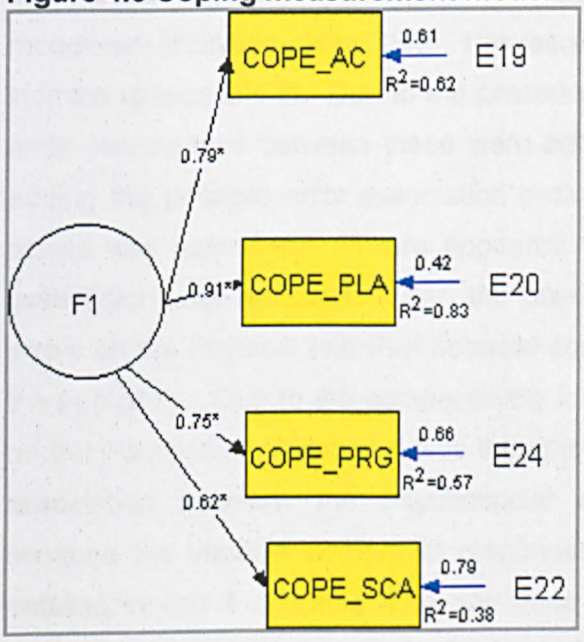
The Coping factor incorporated subscale scores from the COPE questionnaire. These had been selected as the most representative of the concept of coping and included Active Coping, Planning, Positive Reinterpretation and Growth and Suppressing Competing Activities. The Pain CSQ subscales: Cognitive coping and suppression, Helplessness, and Diverting attention and Praying/Hoping were also included as part of the initial measurement model. The loadings of each of these variables are detailed below: Active Coping (0.80), Planning (0.89), Positive Reinterpretation and Growth (0.78), Suppressing Competing Activities (0.60), Cognitive coping and suppression (0.49), Helplessness (0.21), Diverting attention and praying/hoping (0.30). The positive loadings indicate that higher scores on these subscales are indicative of greater use of the coping strategy and thus the factor includes problem-solving and cognitive behavioural coping strategies. The fit of the model was poor (see line 1, Table 4.13) and as the loadings of the Pain CSQ subscales were substantially lower than those of the COPE, the former were dropped from the analysis. Refitting the model using only the COPE variables improved the fit substantially (see line 2, Table 4.13). Therefore, this model was accepted (see Figure 4.6).

Table 4.13 Confirmatory factor analyses for selected latent variable structures of the coping measurement model

Model	Chi-square	df	p	CFI	RMSEA	SRMR
(1) Coping with COPE and Pain CSQ variables	132.125	14	0.001	0.733	0.23	0.15
(2) Coping measurement model: Coping with COPE variables only (Figure 4.6)	2.701	2	0.259	0.997	0.05	0.02

Key: COPE=COPE Inventory

Figure 4.6 Coping measurement model



Key:

F1	Coping
COPE_AC	COPE Active Coping
COPE_PLA	COPE Planning
COPE_PRG	COPE Positive Reinterpretation and Growth
COPE_SCA	COPE Suppress Competing Activities

For nomenclature details see Table 4.10

4.3.4.1.3.3 Social support

Social support was not analysed as a measurement model as only three variables were used to measure support, and this is insufficient for a measurement model to be tested in isolation. Therefore the validity of this measurement model will be examined in the full analysis subsequently.

4.3.4.1.3.4 Summary of measurement models

Measurement models were confirmed for psychological well-being, functioning, illness perception, and coping. The best measure of illness severity was the TUAG variable. While social support was not assessed separately, it will be assessed in the structural models described below.

4.3.4.2 Structural Models

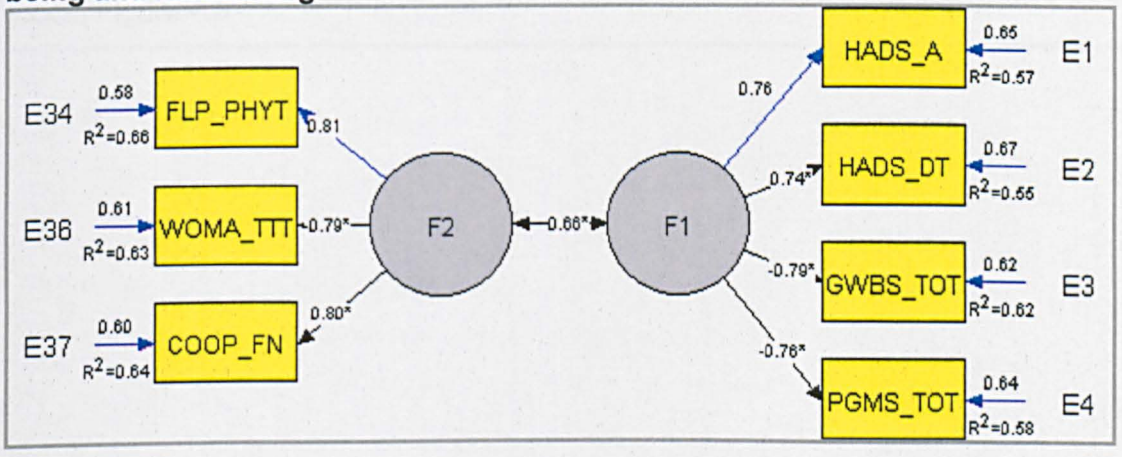
4.3.4.2.1 Are psychological well-being and functioning associated?

The Functioning and Psychological well-being models were linked and this structural model was analysed using CSM. The results are detailed in Table 4.14, line 1, they indicate reasonable fit. Due to the presence of scales from the same measure, the error associations between these were added. In Table 4.14, line 2 the effect of adding the possible error association between the HADS Anxiety and Depression scales was assessed. There appeared to be little effect on the model so this association was removed. Then the possible association between measurement errors on the Physical and Psychosocial domains (FLP) was added. This improved the fit slightly. Due to the comparatively lower loading of the Psychosocial domain on the Functioning variable, it was thought that improved fit might be gained by an association between the Psychosocial domain and Psychological well-being because the variable comprised responses to psychological statements. This is detailed in line 4 of Table 4.14 and does represent an improvement in fit. The Psychosocial domain variable had substantially lower loadings on Functioning (0.68) and Psychological Well-being (0.58) compared to the other indicator variables. Therefore, the next stage of analysis assessed the effect of removing the variable from the model. Fit remained the same (see Line 5, Table 4.14) and this model was accepted as the respecified structural model as the presence or absence of the psychosocial domain had no real impact on the model (see Figure 4.7).

Table 4.14 Confirmatory factor analyses for the association between Functioning and Psychological Well-being

Model	Chi-square	df	p	CFI	RMSEA	SRMR
(1) Psychological well-being (PWB) and Functioning (Function)	59.609	19	0.001	0.933	0.12	0.06
(2) PWB and Function + error association between HADS Anxiety & Depression	59.971	18	0.001	0.931	0.12	0.06
(3) PWB and Function error association between FLP Physical domain & FLP Psychosocial domain	54.274	18	0.001	0.940	0.11	0.06
(4) PWB and Function as (3) but with FLP Psychosocial domain indicated by Functioning and Psychological Well-being	34.477	17	0.007	0.971	0.08	0.04
(5) Structural model of PWB and Functioning: PWB and Function removing FLP Psychosocial domain (Figure 4.7)	29.206	13	0.006	0.968	0.09	0.04

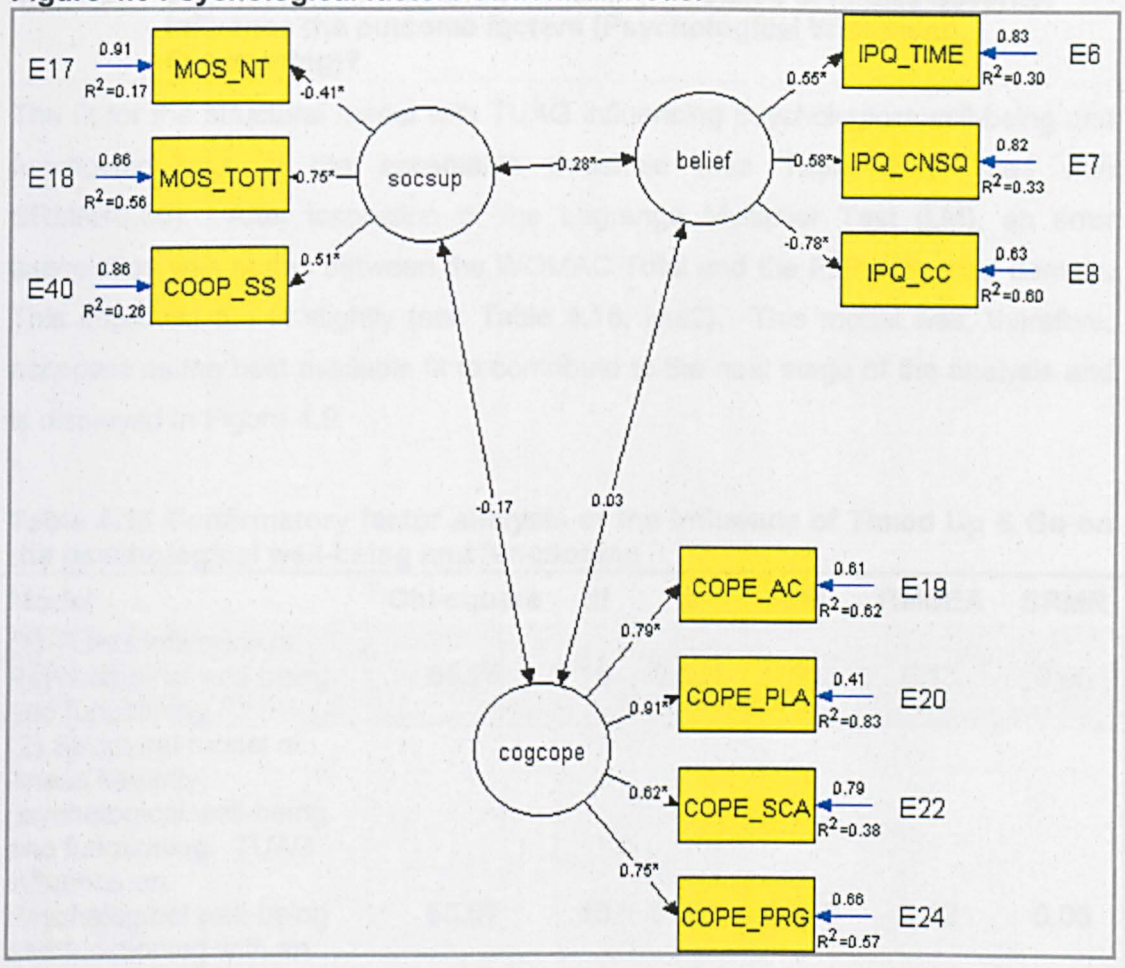
Figure 4.7 Structural model of the association between psychological well-being and functioning



Key:

F1	Psychological Well-being
F2	Functioning
FLP_PHYT	FLP Physical Domain
WOMA_TTT	WOMAC Total
COOP_FN	COOP Function charts
HADS_A	HADS Anxiety Scale

Figure 4.8 Psychological factors structural model



Key:

socsup	Social support factor
belief	Illness Perception factor
cogcope	Coping factor
MOS_NT	MOS Social Support Survey Total number of friends/relatives available
MOS_TOTT	MOS Social Support Survey Total
COOP_SS	COOP Social Support
IPQ_TIME	Illness Perception Questionnaire Timeline subscale
IPQ_CNSQ	Illness Perception Questionnaire Consequences subscale
IPQ_CC	Illness Perception Questionnaire Control/Cure subscale
COPE_AC	COPE Active Coping
COPE_PLA	COPE Planning
COPE_PRG	COPE Positive Reinterpretation and Growth
COPE_SCA	Suppress Competing Activities

For nomenclature details see Table 4.10

HADS_D	HADS Depression Scale
GWBS_TOT	General Well Being Schedule
PGMS_TOT	Philadelphia Geriatric Center Morale Scale

For nomenclature details see Table 4.10

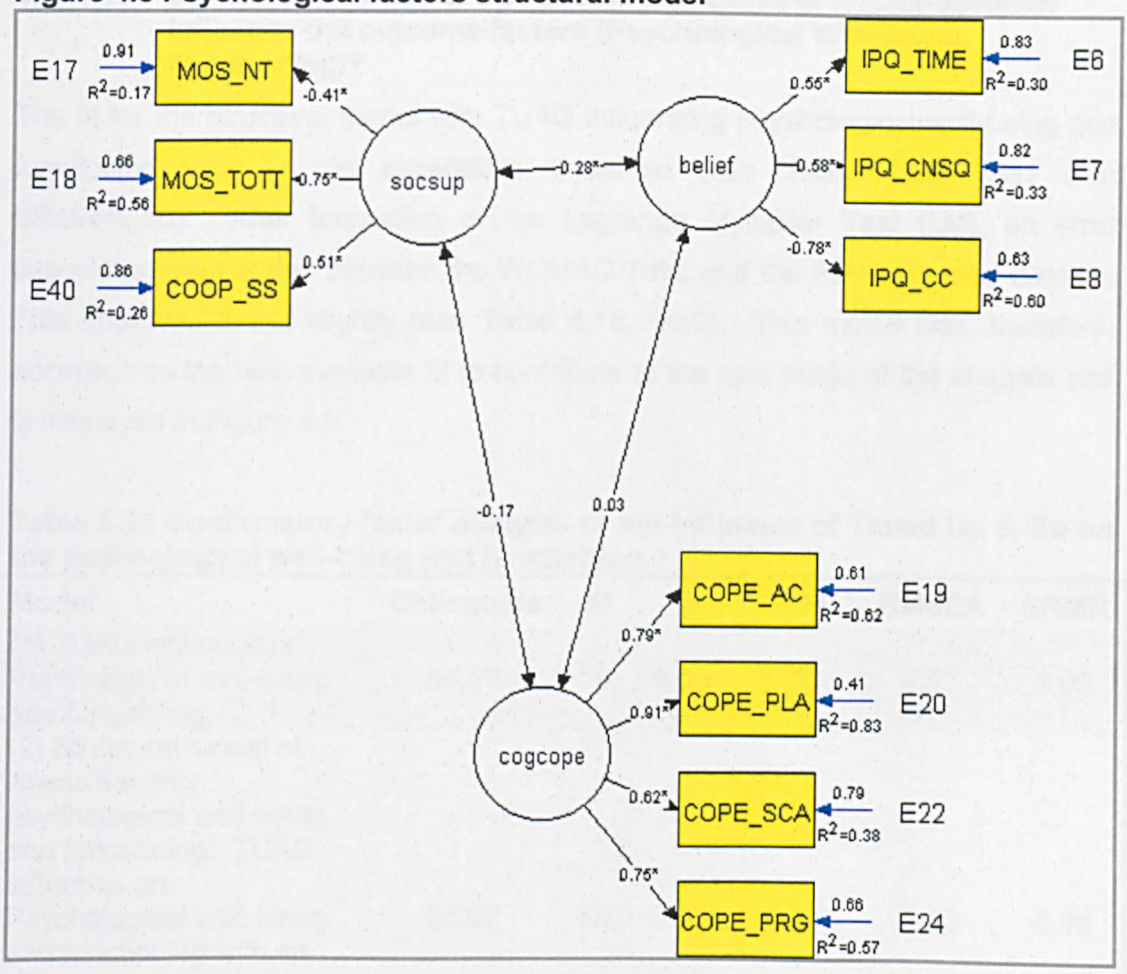
4.3.4.2.2 Are the Psychological Factors (Illness Perception, Coping and Social Support associated?

The next stage involved examining the associations between illness perception, coping and social support in a structural model. This stage was undertaken to establish whether the separate models hold when they are combined. The structural model confirmed the association between the three measurement models. The covariances were as follows: Illness Perception and Social Support (0.28), Illness Perception and Coping (0.03) and Social Support and Coping (-0.17) (see Figure 4.8). This suggests that while the model is acceptable, the most significant covariance was between Illness Perception and Social Support. This was noted for the purposes of later analyses.

Table 4.15 CSM for the association between illness perception, coping and social support

Model	Chi-square	df	p	CFI	RMSEA	SRMR
Psychological factors model Figure 4.8	41.037	32	0.13	0.977	0.04	0.05

Figure 4.8 Psychological factors structural model



Key:

socsup	Social support factor
belief	Illness Perception factor
cogcope	Coping factor
MOS_NT	MOS Social Support Survey Total number of friends/relatives available
MOS_TOTT	MOS Social Support Survey Total
COOP_SS	COOP Social Support
IPQ_TIME	Illness Perception Questionnaire Timeline subscale
IPQ_CNSQ	Illness Perception Questionnaire Consequences subscale
IPQ_CC	Illness Perception Questionnaire Control/Cure subscale
COPE_AC	COPE Active Coping
COPE_PLA	COPE Planning
COPE_PRG	COPE Positive Reinterpretation and Growth
COPE_SCA	Suppress Competing Activities

For nomenclature details see Table 4.10

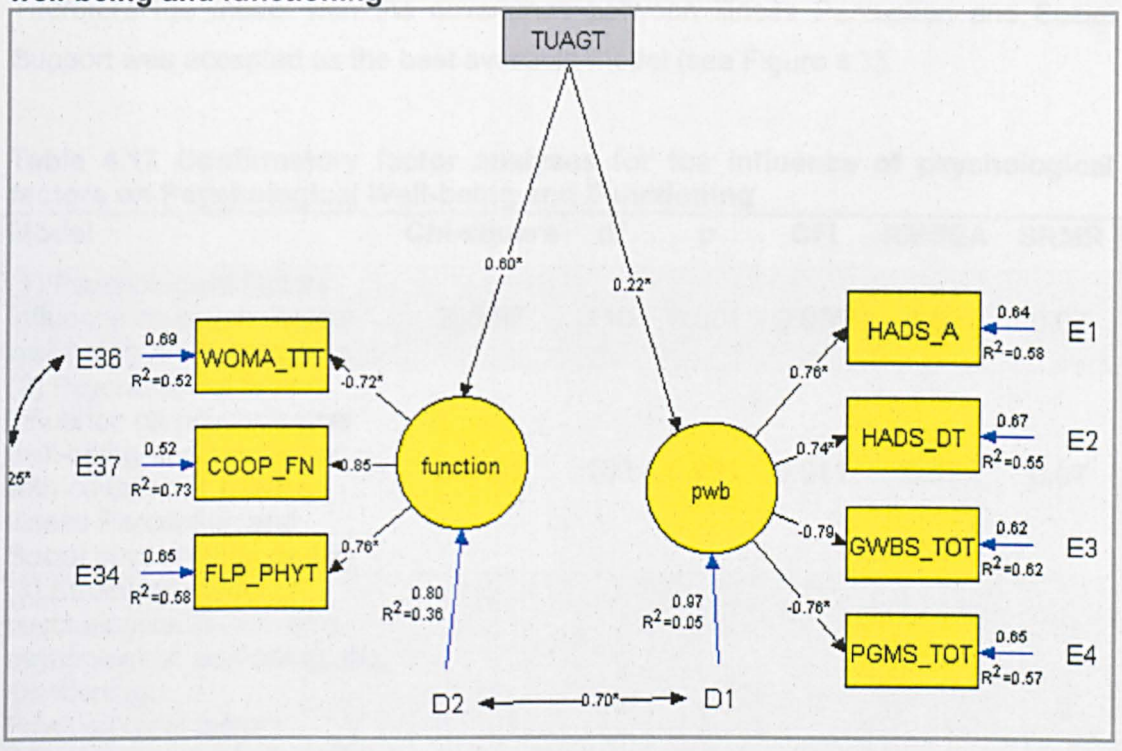
4.3.4.2.3 Does the Timed Up & Go variable (indicative of Illness Severity) influence the outcome factors (Psychological Well-being, Functioning)?

The fit for the structural model with TUAG influencing psychological well-being and functioning was at the acceptable threshold (see Table 4.16, line1 with SRMR<0.06). After inspection of the Lagrange Multiplier Test (LM), an error association was added between the WOMAC Total and the FLP– Physical domain. This improved the fit slightly (see Table 4.16, line2). This model was, therefore, accepted as the best available fit to contribute to the next stage of the analysis and is displayed in Figure 4.9.

Table 4.16 Confirmatory factor analysis of the influence of Timed Up & Go on the psychological well-being and functioning

Model	Chi-square	df	p	CFI	RMSEA	SRMR
(1) TUAG influence on Psychological well-being and functioning	55.26	16	0.001	0.933	0.13	0.05
(2) Structural model of illness severity, psychological well-being and functioning: TUAG influence on Psychological well-being and functioning with an error association between WOMAC Total and FLP – Physical Domain (Figure 4.6)	50.07	15	0.001	0.940	0.12	0.05

Figure 4.9 Structural model of Timed Up & Go task influence on psychological well-being and functioning



Key:

TUAGT	Timed Up & Go task
function	Functioning factor
pwb	Psychological well-being
FLP_PHYT	FLP Physical Domain
WOMA_TTT	WOMAC Total
COOP_FN	COOP Function charts
HADS_A	HADS Anxiety Scale
HADS_D	HADS Depression Scale
GWBS_TOT	General Well Being Schedule
PGMS_TOT	Philadelphia Geriatric Center Morale Scale

For nomenclature details see Table 4.10

4.3.4.2.4 Do the psychological factors (illness perception, coping, social support,) influence the outcome factors (Psychological Well-being, Functioning)?

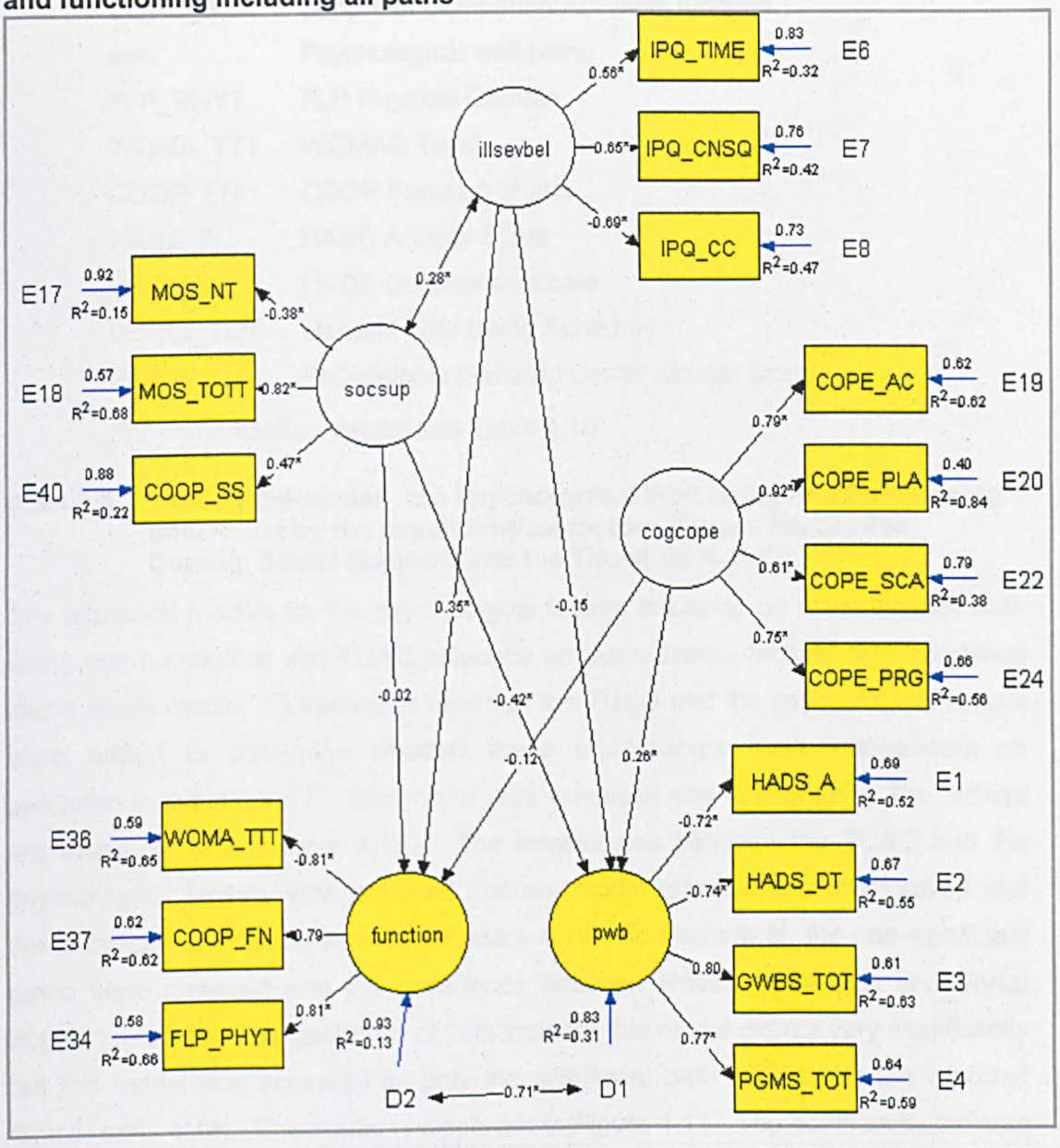
The initial structural model conforms to the top half of Figure 4.1 where the psychological factors are hypothesised to influence the psychological well-being and functioning factors. This initial model did not display good fit in that the CFI was slightly greater than 0.90. The RMSEA was greater than 0.05 but the SRMR was below 0.06. These results are displayed in Table 4.17, line 1. The model was then refined to add the significant covariance between illness perception and social support. Fit improved only slightly (Table 4.17, line 2) and removing the non-

significant loadings of the outcome variables had little effect (Table 4.17, line 3). Therefore the model with the covariance between Illness Perception and Social Support was accepted as the best available model (see Figure 4.7).

Table 4.17 Confirmatory factor analyses for the influence of psychological factors on Psychological Well-being and Functioning

Model	Chi-square	df	p	CFI	RMSEA	SRMR
(1) Psychological factors influence on psychological well-being and functioning	205.97	110	0.001	0.906	0.07	0.07
(2) Psychological factors influence on psychological well-being and functioning with covariance between Illness Perception and Social support (Figure 4.7)	200.01	109	0.001	0.911	0.07	0.07
(3) Structural model of psychological factors and psychological well-being and functioning. Psychological factors influence on psychological well-being and functioning with covariance between Illness Perception and Social support and removing the non-significant loadings for Function and Psychological Well-being	203.21	112	0.001	0.909	0.07	0.08

Figure 4.10 Influence of psychological factors on psychological well-being and functioning including all paths



Key:		
	socsup	Social support factor
	belief	Illness Perception factor
	cogcope	Coping factor
	MOS_NT	MOS Social Support Survey Total number of friends/relatives available
	MOS_TOTT	MOS Social Support Survey Total
	COOP_SS	COOP Social Support
	IPQ_TIME	Illness Perception Questionnaire Timeline subscale
	IPQ_CNSQ	Illness Perception Questionnaire Consequences subscale
	IPQ_CC	Illness Perception Questionnaire Control/Cure subscale
	COPE_AC	COPE Active Coping
	COPE_PLA	COPE Planning

Key:		
	COPE_PRG	COPE Positive Reinterpretation and Growth
	COPE_SCA	Suppress Competing Activities function
	pwb	Psychological well-being
	FLP_PHYT	FLP Physical Domain
	WOMA_TTT	WOMAC Total
	COOP_FN	COOP Function charts
	HADS_A	HADS Anxiety Scale
	HADS_D	HADS Depression Scale
	GWBS_TOT	General Well Being Schedule
	PGMS_TOT	Philadelphia Geriatric Center Morale Scale

For nomenclature details see Table 4.10

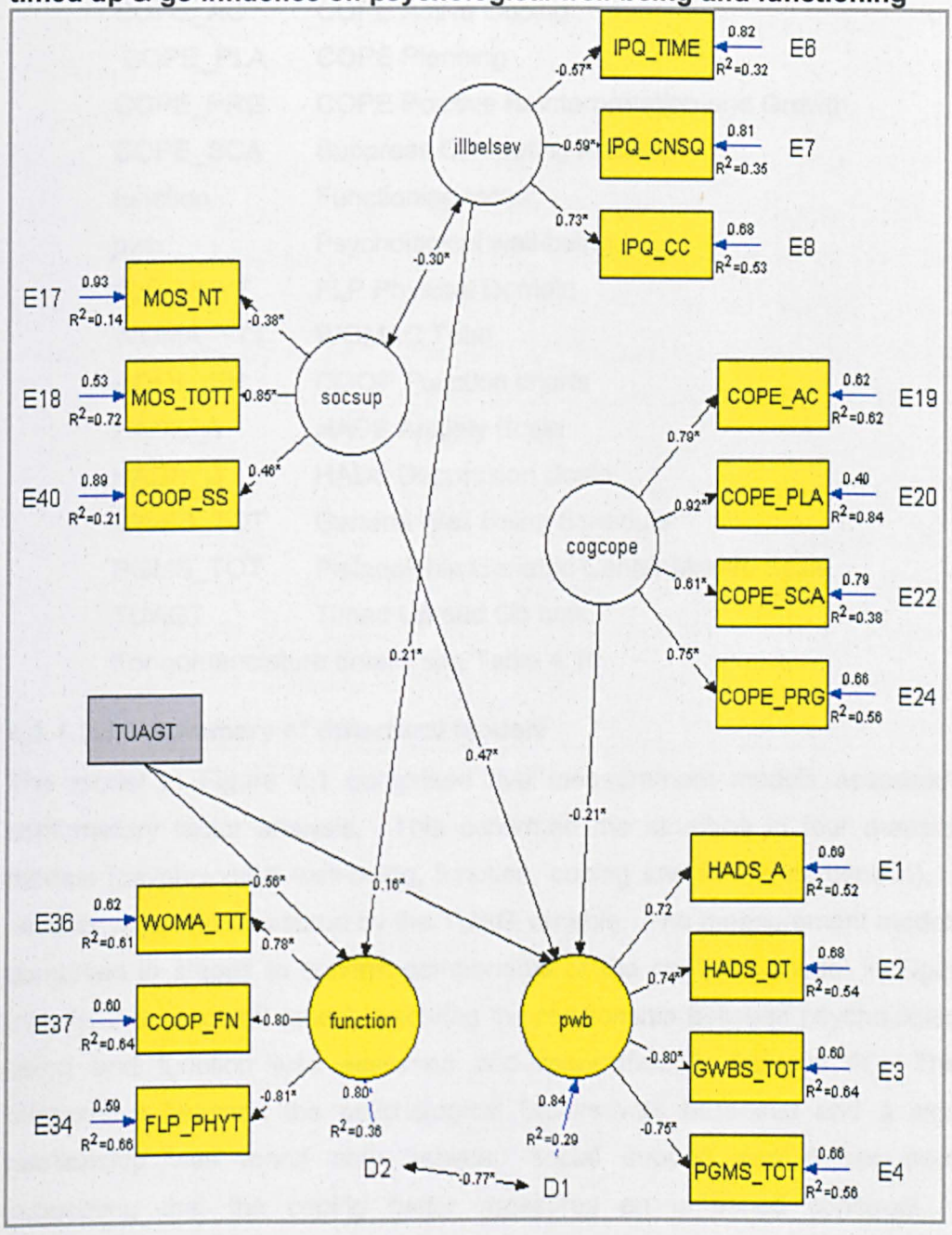
4.3.4.2.5 Testing the model: are Psychological Well-being and Functioning influenced by the psychological factors (Illness Perception, Coping, Social Support) and the Timed Up & Go?

The structural models for the psychological factors influence on psychological well-being and functioning and TUAG influence on the outcome factors were combined into a single model. Covariances between the TUAG and the psychological factors were added to determine whether these relationships were independent as predicted in hypothesis 7. This model was assessed and fit was poor. The indices are displayed line 1, table 4.18. The covariances between the TUAG and the psychological factors were removed and the model retested, the fit improved and the fit indices are displayed in line 2, table 4.18. To improve fit, the non-significant paths were removed and the covariance between Illness Perception and Social Support retained. The goodness of fit indices for this model did not vary significantly but this model was accepted as only the significant path coefficients are reported (line 3, table 4.18). The model is displayed in Figure 4.11. The coefficients indicate that higher levels of social support and greater use of coping strategies influence better psychological well-being. The illness perception influences better functioning. Illness severity has a negative effect on both psychological well-being and functioning.

Table 4.18 Confirmatory factor analysis of the influence of Timed Up & Go and the psychological factors on the outcome factors

Model	Chi-square	df	p	CFI	RMSEA	SRMR
(1) Psychological factors, Timed Up & Go influence on Psychological well-being and Functioning with covariances between psychological factors and Timed Up and Go	412.08	153	0.001	0.737	0.12	0.14
(2) Psychological factors, Timed Up & Go influence on Psychological well-being and Functioning with disturbance between Social Support and Illness Perception	226.30	119	0.001	0.901	0.08	0.07
(3) Structural model of Psychological factors, Timed Up & Go. Psychological factors, Timed Up & Go influence on Psychological well-being and Functioning with covariance between Social Support and Illness Perception and non-significant paths removed (Fig 4.11)	235.00	127	0.001	0.900	0.07	0.08

Figure 4.11 Structural model of illness perception, coping, social support, timed up & go influence on psychological well-being and functioning



Key:

Socsup	Social support factor
belief	Illness Perception factor
Cogcope	Coping factor
MOS_NT	MOS Social Support Survey Total number of friends/relatives available
MOS_TOTT	MOS Social Support Survey Total
COOP_SS	COOP Social Support
IPQ_TIME	Illness Perception Questionnaire Timeline subscale
IPQ_CNSQ	Illness Perception Questionnaire Consequences subscale

Key:		
	IPQ_CC	Illness Perception Questionnaire Control/Cure subscale,
	COPE_AC	COPE Active Coping
	COPE_PLA	COPE Planning
	COPE_PRG	COPE Positive Reinterpretation and Growth
	COPE_SCA	Suppress Competing Activities
	function	Functioning factor,
	pwb	Psychological well-being
	FLP_PHYT	FLP Physical Domain
	WOMA_TTT	WOMAC Total
	COOP_FN	COOP Function charts
	HADS_A	HADS Anxiety Scale
	HADS_D	HADS Depression Scale
	GWBS_TOT	General Well Being Schedule
	PGMS_TOT	Philadelphia Geriatric Center Morale Scale
	TUAGT	Timed Up and Go task

For nomenclature details see Table 4.10

4.3.4.2.6 Summary of Structural Models

The model in Figure 4.1 comprised five measurement models assessed using confirmatory factor analysis. This confirmed the structure in four measurement models (psychological well-being, function, coping and illness perception). Illness severity was best measured by the TUAG variable. The measurement models were combined in stages to confirm components of the complete model in Figure 4.1. Initially, the structural model indicating the relationship between psychological well-being and function was assessed and respecified to improve fit. Then the relationship between the psychological factors was assessed and a significant relationship was found only between social support and illness perception suggesting that the coping factor measures an unrelated construct. Then components of Figure 4.1 were assessed to confirm their relationships. The model including illness severity, psychological well-being and functioning was analysed and the fit was acceptable. The influence of the psychological factors on psychological well-being and functioning was assessed and the fit was acceptable. Finally, the model in Figure 4.1 with relationships between illness severity and the psychological factors was assessed using CSM and the fit was poor. Removal of the covariances improved the fit, removal of the non-significant path coefficients clarified the model and this model was accepted as the best fitting model for the data.

4.4 Summary of findings

The final structural model (Figure 4.8) adequately fits the data. Functioning and psychological well-being (hypothesis 1) are associated. Illness severity has an influence on both functioning and psychological well-being (hypothesis 2). The structural model of the psychological factors demonstrated an adequate fit but significant covariance was found only between illness perception and social support (hypothesis 3). The psychological factors were found to influence functioning and psychological well-being but not as predicted. Illness perception influenced functioning but not psychological well-being, partially upholding hypothesis 4. Coping and social support influenced psychological well-being but not functioning, partially upholding hypotheses 5 and 6. The final hypothesis (hypothesis 7) stated that the influence of the psychological factors (illness perception, coping and social support) on psychological well-being and functioning will be independent of and more important than the influence of illness severity. No relationship was found between illness severity and the psychological factors but the loading of illness severity (0.56) on functioning was greater than the illness perception loading (0.16). The loadings on psychological well-being of coping (0.21) and social support (0.47) were greater than the loading of illness severity (0.16). Therefore, hypothesis 7 is partially upheld in that the factors are independent but not that the psychological factors are more important.

4.5 Preliminary Discussion

There were no significant differences found in age or gender between those who participated and those who did not, suggesting that the results are generaliseable to the wider older adult osteoarthritic population in primary care. Data were missing completely at random as required by covariance structural modelling and data could therefore be analysed using covariance structural modelling. The study was adequately powered from estimates using correlational work and the recommendations in the CSM literature.

The covariance structural modelling approach included the development of measurement models and structural models. Measurement models were identified for the factors of psychological well-being, functioning, coping and illness perception. The measurement models resulted in a reduction in the number of variables needed to adequately indicate the factors, except in the psychological well-being factor. Structural models that represented partial aspects of the model in

Figure 4.1 were constructed. This approach allowed the assessment of the integrity of, and relationships between, different components of the model. The structural model comprising psychological well-being and functioning had adequate fit, and the impact of illness severity on these two factors confirmed in a structural model. The predicted relationships between the psychological factors were only partially confirmed with a significant relationship found between illness perception and social support. These factors were then included in a structural model with the psychological well-being and functioning model and this model was adequately identified. Coping, social support and illness perception did not have an equal influence on psychological well-being and functioning. Illness perception had a significant influence on functioning but not psychological well-being; in contrast, social support and coping had a significant influence on psychological well-being. Relationships between illness severity and the psychological factors were not found.

The final model, therefore, included some of the predicted relationships but not all. The final model just reached the threshold to conclude model fit with a CFI of 0.90 and SRMR of 0.08. The model identified (figure 4.8) is the one that best explains the impact of psychological factors on psychological well-being and functioning. Therefore, this model will form the basis for exploring how psychological factors can work in influencing psychological well-being and functioning. Interventions which can manipulate these psychological factors to improve psychological well-being and functioning will be developed and offered to older people with osteoarthritis. The benefits of the intervention approach will be assessed in terms of their effects on the participants' psychological well-being and functioning. This is described further in chapter five.

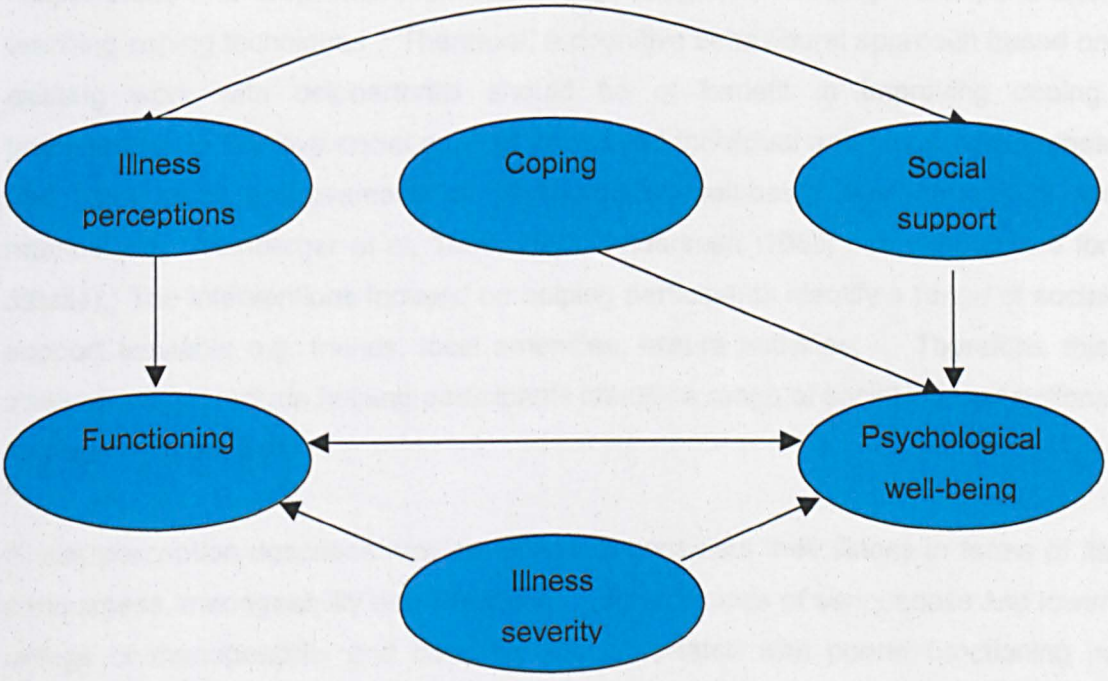
Discussion of these findings in relation to the literature will be described in chapter six in conjunction with the findings of chapter five.

Chapter Five: Study Two: Testing the model using an intervention approach

5.1 Introduction

The results of study one partially confirmed the model proposed (Figure 2.3, chapter two). Both psychological well-being and functioning were negatively influenced by illness severity. Greater use of coping strategies and more social support had a positive effect on psychological well-being. Illness perception (as being manageable, curable and controllable) positively influenced functioning. The revised model is displayed in Figure 5.1.

Figure 5.1 Revised model of the influence of psychological factors and illness severity on psychological well-being and functioning



If improvements are to be made in patients' psychological well-being and functioning, then the factors to be manipulated will be illness perception, coping and social support. From the findings of study one (figure 5.1), the factors have different influences on psychological well-being and functioning. Changes in social support and coping will influence psychological well-being, and changes in illness perception will influence functioning. Illness severity has an influence on both functioning and psychological well-being but was not found to be associated with illness perception, coping and social support. Therefore, changes in the psychological factors will not influence illness severity. The social support factor measures the type and amount

of social support available to an individual. The coping factor includes focusing on the difficulty, formulating a plan of action and reappraisal of the stressor. Illness perception is characterised by beliefs about the seriousness, manageability and curability of an illness. Therefore, the intervention must include methods of manipulating these factors in order to improve patients' psychological well-being and functioning.

5.2 What methods of manipulating the psychological factors should be used?

Changes in coping and social support will influence psychological well-being. Work to change individual's coping strategies with osteoarthritis has been undertaken using cognitive behavioural techniques (Calfas et al, 1992; Hampson et al, 1996; Keefe et al, 1987a, b, 1990 a, b, Keefe & Caldwell, 1997, details in chapters one and two). Improvements in psychological well-being were found after teaching coping techniques. Therefore, a cognitive behavioural approach based on existing work with osteoarthritis should be of benefit in improving coping. Interventions to improve social support have used individual and group approaches and have found improvements in psychological well-being over periods of six months (e.g. Weinberger et al, 1989, 1993; Anderssen, 1985; see chapter two for details). The interventions focused on helping participants identify a range of social support available e.g. friends, local amenities, leisure activities. Therefore, this intervention will include helping participants identify a range of social support options available to them locally.

Illness perception describes how an individual considers their illness in terms of its seriousness, manageability and curability. Higher ratings of seriousness and lower ratings of manageability and curability are associated with poorer functioning in osteoarthritis (Hampson et al, 1996; McDonald-Miszczak et al, 2001, see chapter two for details), Chronic Obstructive Pulmonary Disease (COPD) and rheumatoid arthritis (Scharloo et al, 1998) but interventions to change illness perceptions have not been reported. Given that an individual's view of their illness influences their functioning, changing how individuals view their illness will have an impact. Osteoarthritis patients are known to want more information about the illness (Bradley, 2000). Merely providing information that osteoarthritis is a chronic condition with no cure would be unlikely to improve functioning. Education approaches providing information about the disease combined with exercise training have been shown to improve functioning in people with osteoarthritis (Allegrante et

al, 1993; Ettinger et al, 1997; Kovar et al, 1992; Minor & Brown, 1993; Sullivan et al, 1998, see chapter one). This approach can be hypothesised to influence illness perception although no studies have yet explicitly focused on this.

Psychological well-being and functioning are associated in the model so interventions targeted at one will also have an impact on the other. From the model a cognitive behavioural approach to improve coping and an intervention to improve social support would have a greater effect on psychological well-being than functioning. Similarly, an education and exercise approach should improve functioning more than psychological well-being. Therefore, to determine the impact of the proposed approaches on psychological well-being and functioning by delivering the cognitive behavioural and social support intervention separately from the education and exercise approach would allow for this analysis.

5.3 How should the interventions be delivered?

There are a number of methods of delivering cognitive behavioural, social support, educational and exercise interventions to patients. Individual work on a one to one basis is common in the cognitive behavioural field, particularly in the psychological treatment of common mental health problems such as anxiety and depression. An advantage of working in this way is that it allows an individualised approach to each person and their difficulties. In evaluating the impact of the interventions, this method would be a labour intensive, time-consuming and costly way of collecting sufficient data. A completely individualised approach would also limit generaliseability as each individual could potentially receive a different intervention. An alternative way of delivering the interventions would be the use of bibliotherapy or computer based approaches. This would allow the dissemination of the intervention material widely but would not allow any personalised work with a participant's specific difficulties. Generaliseability would, however, be enhanced as each individual would receive an identical approach. With this method, it would not be possible to determine how much each individual complies with a computerised or bibliographic approach, and the findings would be limited by this.

Providing the interventions in a group format would allow scope to address participants' specific difficulties within the framework of the standardised intervention, as well as disseminating the material more widely than an individual approach. There would also be more scope to engage participants in a group intervention. This approach is less labour-intensive and less time-consuming and

thus less costly. In addition, groupwork would have greater generaliseability with more participants receiving the same intervention. Therefore, a two group intervention format will be adopted where one group of participants receive the education and exercise intervention, and one group receive the cognitive behavioural and social support intervention.

5.4 How should the group interventions be structured?

From chapter one, there is evidence that psychological interventions are of benefit in improving psychological well-being and functioning but the range of methods used varied. Group approaches have been used in intervention studies in osteoarthritis, chronic illness and with older people (see chapters one and two for studies). These studies have utilised different methods and structures in the delivery of the intervention. To determine the most effective structure of the group intervention, a further literature review was undertaken. This review utilised the same methodology as chapter two in that the literature on osteoarthritis was examined, and the literature on the same selected chronic illnesses (COPD, hypertension and angina, and rheumatoid arthritis) was surveyed. In addition, ageing and older adults were also used in the search strategy to identify intervention work pertaining specifically to this age group. These terms were paired with terms indicative of intervention approaches. These included; cognitive behaviour therapy (CBT), social support, education, exercise and intervention. Variability in the number of relevant articles found shows that research is limited in particular illnesses. The literature relevant to CBT, social support, education, exercise group work will be reviewed below with discussion of work in osteoarthritis, chronic illness and older adults.

5.4.1 Cognitive Behavioural Interventions in Groups: structure and effects

Group cognitive behavioural interventions have been used widely in the treatment of psychological problems (White & Freeman, 2000). A range of techniques can be found in cognitive behavioural groups including; thought records, challenging thoughts, mood monitoring, arousal hierarchies, activity monitoring, problem solving, relaxation, risk assessment and relapse prevention (White, 2000). These groups have been very effective with the adult population in the treatment of psychological problems (see e.g. Beck et al, 1979; Dowrick et al, 2000; Free, 1999; Padesky & Greenberger, 1995; White & Freeman, 2000). Factors which weaken the efficacy of

group approaches include comorbidity, complex diagnoses, cognitive ability and physical ability to attend the groups (ibid.).

5.4.1.1 Osteoarthritis

There have been few studies on CBT approaches in osteoarthritis. Two studies of osteoarthritis of the knee found that cognitive coping skills training had beneficial effects on pain, psychological well-being and self-efficacy (Keefe et al, 1990; Keefe et al, 1996). Another study comparing CBT and educational approaches in osteoarthritis sufferers found both interventions beneficial in that improvements in quality of life measures were found with both (Calfas et al, 1992). These studies utilised 10 session approaches with only two studies reporting on group sizes (four to six and six to nine) and duration (two hours), baseline assessments were conducted immediately prior to the intervention, and follow up assessment ranged from two to 12 months post intervention (Calfas et al, 1992; Keefe et al, 1990; Keefe et al, 1996). No ratings of consumer satisfaction were taken.

5.4.1.2 Other chronic illnesses

Reviews of group cognitive behavioural interventions in hypertension (Boulware, 2001; Linden & Chambers 1994) have found that stress management techniques and counselling approaches are beneficial in improving mood and improving blood pressure. The counselling approach focused on sharing personal experiences, and the stress management approach included cognitive behavioural techniques such as monitoring thoughts, behavioural activation, and problem-solving. Similar findings are present in the angina literature (Bundy et al, 1994, 1998; Dusseldorp et al, 1999; Gallacher et al, 1997) with improvements in symptoms, reduction in reliance on medication, and improvements in anxiety. The stress management programs included problem solving, and CBT techniques. The duration of the programmes ranged from one session intervention lasting up to 60 minutes to over 50 sessions over a year long period. The average duration was longer in the chronic heart disease groups (28 weeks, 18 sessions (Dussledorp et al, 1999)) compared to shorter programmes in angina and hypertension (reported ranges two 12 weeks, 10 sessions). Group sizes were not routinely reported in the review literature but some studies reported ranges of three to 12 and consumer satisfaction ratings were not reported. Baseline assessments were taken immediately prior to the interventions and follow-up periods ranged from eight weeks to six months.

Within the COPD literature, cognitive behavioural interventions in isolation were not identified except in one study. This one study used a single session two hour CBT group including relaxation training, cognitive interventions. There were weekly telephone contacts for six weeks and the results showed reductions in anxiety and depression but not change in physical functioning but consumer satisfaction ratings were positive (Kunik et al, 2001). The remaining interventions included educational approaches, exercise as well as cognitive behavioural techniques and psychosocial support (Rose et al, 2002; Devine & Pearcy, 1996; Lacasse et al, 1997). The duration of the interventions ranged from four to 20 weeks, 15 minutes to 1 hour (Rose et al, 2002) and group size ranged from six to 10 where it was reported (Kunik et al, 2001). Baseline assessments were immediately pre intervention and follow up assessment took place six weeks post intervention (Kunik et al, 2001).

Group interventions in rheumatoid arthritis have also utilised CBT approaches. Results of CBT interventions have demonstrated improvements in psychological well-being, functioning, improved coping and reduced pain (Leibing et al, 1999; O'Leary et al, 1988; Parker et al, 1988, 1995; Rhee et al, 2000; Sinclair & Wallston, 2001). The duration of the interventions have ranged from four weeks to 10 weeks offering between eight to 18 hours of intervention with group size where stated between five and seven (Leibing et al, 1999). Baselines were immediately prior to the interventions (Leibing et al, 1999; O'Leary et al, 1988; Parker et al, 1988, 1995) or five weeks before (Sinclair & Wallston, 2001) and follow up ranged from three to 15 months (Parker et al, 1988, 1995). One study included ratings of satisfaction and helpfulness and these rated the CBT interventions positively (Sinclair & Wallston, 2001).

5.4.1.3 Older adults

Research on CBT interventions with older adults has tended to focus on depression (Woods & Roth, 1999). In-patient or day-patient studies (Abraham et al, 1991; Clark & Vorst, 1994; Kaas & Lewis, 1999; Pearlman, 1993) have found the provision of CBT or problem-solving skills useful in reducing the symptoms of depression but these studies either used; small samples (11, Kaas & Lewis, 1999), did not provide information on sample size (Clark & Vorst, 1994), intervention details (Pearlman, 1993) or group size (Abraham et al, 1991). Consequently, generaliseability from these studies is limited. Community studies have found that CBT approaches are of benefit in reducing symptoms of depression in their samples (Arean et al, 1993; Dai et al, 1999; Schimmel-Spreeuw et al, 2000; Zausniewski, 1997). Only two of

these studies used comparison groups (Arean et al, 1993; Dai et al, 1999) and sample sizes were not large (75 and 30 respectively). The groups' duration ranged from four weeks to 12 weeks, 1.5 hours to 2 hours. The number per group was ranged six to 20 participants. Baseline assessments where reported were carried out immediately prior to the intervention and follow up assessments took place eight weeks to three months post intervention. No ratings of consumer satisfaction were reported.

Other CBT group intervention work with older adults has focused on: later life insomnia (Morin et al, 1993), fear of falling (Tennstedt et al, 1998), distressed caregivers (Thompson et al, 2000). These interventions showed benefits to their participants in terms of their outcome measures (improved sleep, improved mobility, reduced stress). Group duration was between four and 12 sessions over four to 12 weeks for approximately two hours per session. The number of participants ranged from six to 10. Baseline assessments were conducted immediately prior to the intervention and follow up assessments up to 6 months later.

5.4.1.4 Conclusions

From this brief review, there is evidence that group cognitive behavioural interventions are of benefit in a range of chronic illnesses. The evidence is very limited in the osteoarthritis literature indicating a need for further research in this area. The structure of the groups ranges from one session to over 50 sessions over the period of a year. Fewer sessions are found in outpatient groups but outcomes are still positive. The duration of the sessions ranges from 20 minutes to two hours, and group sizes are between four and 20. Only one study used a baseline assessment some weeks before the intervention. Follow up assessment periods extended up to 15 months post intervention although more common periods were three and six months.

5.4.2 Social Support Interventions in Groups: structure and effects

Only five studies of group social support interventions in the literature on osteoarthritis, chronic illness and older adults were identified.

5.4.2.1 Osteoarthritis

Only one group-based social support intervention was found (Cronan et al, 1998). The social support intervention comprised 10 weekly two hour sessions followed by

10 monthly two hour sessions. The social support intervention included group discussions designed to facilitate the sharing of experiences. The social support intervention was compared with an education intervention and a combined intervention. All interventions improved quality of life (measured by the Quality of Well Being scale) but no differences were found between the interventions. Group size, baseline and follow up were not specified.

5.4.2.2 Other chronic illnesses

Three studies were identified in the literature and they included rheumatoid arthritis outpatients. No differences were found between social support and stress management, coping or no treatment controls on measures of health status (e.g. Sickness Impact Profile) (Shearn & Fireman, 1985; Savelkoul et al, 2001). The interventions lasted for 10 weeks for 1.5 to 2 hours with 10 to 12 participants per group (ibid.). The third study (Radojevic et al, 1992) included CBT as part of its intervention which lasted four weeks for 90 minutes per week. Average number of participants per intervention was nine to 14. The combined CBT and social support approach was found to be more beneficial than the CBT alone on measures of pain, depression and physical functioning. Baseline assessments were undertaken immediately prior to the intervention, follow up periods ranged from two to six months. One study took ratings of helpfulness and acceptability and obtained positive ratings of the CBT intervention (Radojevic et al, 1992).

5.4.2.3 Older adults

One study using a group approach was identified in the literature (Anderssen, 1985). The group met four times with a focus on amenities in the local area and leisure activity opportunities. The number of participants per group ranged from three to five, and participants in the group meetings displayed improved psychological well-being (measured by University of California and Los Angeles (UCLA) Loneliness scale) at the end of the intervention. No information on pre-group assessment, follow up or consumer satisfaction was provided.

5.4.2.4 Conclusions

There is limited evidence of social support intervention conducted in groups reported in the literature. Duration of social support intervention is 10 weeks and above in the osteoarthritis and rheumatoid arthritis studies, for the one older adult study duration was four sessions. The length of each session ranged between 1.5 and 2 hours, and the average number of participants ranged from three to 14. Limited

information was provided on baseline assessments and only one study included ratings of consumer satisfaction, and follow up periods where reported ranged from two to six months. The benefits of social support intervention are no greater than those found in CBT interventions but a combined approach produced greater improvements in psychological well-being but this requires further testing.

5.4.3 Education and Exercise Interventions in Groups: structure and effects

Health education is defined as 'any planned activity which promotes health or illness related learning' (Tones, 1990). Educational interventions in chronic illness tend to focus on the provision of information about the disease, general advice on management strategies including diet, medication, activity and exercise. Exercise interventions include supervised walking, range of motion exercises and aerobic exercise and swimming. Physiotherapy input is recommended to provide expert assessment and advice on specific exercises and joint protection (Hochberg et al, 1995).

5.4.3.1 Osteoarthritis

There were no studies identified in the literature which focused solely on education in osteoarthritis. The studies identified included exercise and education (Allegrante et al, 1993; Ettinger et al, 1997; Kovar et al, 1992; Minor & Brown, 1993; Sullivan et al, 1998). These studies used exercise training including walking as well as education on osteoarthritis. Two studies (Ettinger et al, 1997, Minor & Brown, 1993) reported behavioural approaches also. All studies reported improvements in exercise and walking compared to control groups but one study reported that these were not maintained at 12 month follow-up (Minor & Brown, 1993). The group duration was eight to 12 weeks, 60 to 90 minutes sessions three times per week. Group size ranged from four to 30 participants. Baseline assessments where reported were immediately prior to intervention and follow ups were undertaken over a three to eighteen month period.

5.4.3.2 Other chronic illnesses

There is very little evidence on specific health education in hypertension, angina and coronary heat disease. Much of the work reviewed (Dusseldorp et al, 1999) has found that educational approaches have been combined with stress management and thus the differential effects cannot be evaluated. Similarly, reviews of the COPD literature did not identify studies using educational approaches only; these

were often combined with psychological approaches and/or exercise (Devine & Pearcy, 1996).

Within the rheumatoid arthritis literature, much of the research focuses on arthritis self-management programmes. Arthritis self-management studies also use group formats which combine many features of CBT. These short-term interventions (six weeks, two hour sessions, 10 to 15 participants) have demonstrated improvements in functioning and psychological well-being but they are not exclusively CBT interventions as they also include educational approaches (Barlow et al, 1998; Lorig et al, 1993; Lorig & Holman, 1993). Baselines were immediately prior to the interventions and follow up periods ranged from three months to three years. A review of patient education interventions and their comparison with non-steroidal anti-inflammatory drug (NSAID) treatment (Superio-Cabuslay et al, 1996) found that two-thirds of them included some aspect of behavioural therapy, pain management or coping strategies. They concluded that the addition of patient education interventions provided additional benefits accounting for up to 40% in functional improvements. More recently, a review suggested that the gains were short-lived and further research was needed to clarify which factors positively influence health gains (Riemsma et al, 2002).

5.4.3.3 Older adults

No studies specifically focusing on health education in older adults were identified. This suggests that education as an approach in isolation is rarely used in this group. Exercise programmes for the elderly are widespread with many local authorities and fitness clubs providing exercise and swimming classes for the over 60s. The benefits of exercise in preventing illnesses in the elderly are well known (Bassey, 2000; Greig et al, 1994; Department of Health, 2001).

5.4.3.4 Conclusions

There is some evidence that group educational interventions have been used effectively in rheumatoid arthritis and osteoarthritis. Educational approaches have not been offered in isolation but paired with other approaches such as exercise or psychological approaches. Group sizes ranged from four to 30. The duration of the interventions is between six and 12 weeks with the self-management programmes meeting weekly for two hours and the exercise groups meeting up to three times per week for 60 to 90 minutes. Baseline assessments are taken immediately pre

intervention with follow ups ranging from three months to three years. There were no consumer satisfaction ratings reported.

5.4.4 Interventions in Groups: effects and structure conclusions

This short review shows that group interventions have been widely used with a range of populations and problems and are an effective method of assessing the efficacy of theoretically driven intervention programmes. The size of group and its duration (number and length of sessions) varies considerably in the studies described above. It is difficult to draw firm conclusions from such heterogeneous information but in-patient interventions tend to have longer duration than out-patient interventions. Shorter duration interventions are found in community samples. Within the chronic illness literature, intervention duration is between one to 20 weeks, compared to six to 12 weeks in the educational literature, which indicates a great deal of overlap. Apart from one study using a one-session intervention (Kunik et al, 2001), the most common range is four to eight sessions. It is known that this duration of intervention can be effective in eliciting change (Schimmel-Spreeuw et al, 2000; Hammond et al, 1998) and is more cost-effective due to the reduction in therapist time required to lead and facilitate the group. Similarly, session length is commonly around 90 minutes to 2 hours. The group size ranges from four to 30 with smaller group size found in the CBT literature (four to 10). Most interventions met on a weekly basis apart from the exercise groups which met up to three times per week. The number of participants in the studies ranges from four to 30 but the majority of studies include between six and 15. Only one study utilised a baseline assessment five weeks prior to the intervention. Only three studies included consumer satisfaction ratings which were uniformly positive. Follow up periods ranged from one week to three years but the most common time intervals were six months (8 studies), two months (6 studies), and three months (6 studies).

5.5 Implications for the intervention study

From the literature review, community based studies have used shorter duration group interventions. A four session intervention has demonstrated benefits in the CBT, education and social support literature. Exercise approaches have been more intensive in isolation but duration is shorter if paired with education. Therefore, a four session intervention will be adopted. The duration of session is between 90 minutes to 2 hours in most studies, this study will opt for the two hour slot to ameliorate the potential disadvantages of the four session intervention.

Numbers of participants have ranged from six to 15 and this approach will be followed. Consumer satisfaction ratings provide information about the acceptability of an intervention and this information will be collected in this study.

Many intervention studies have used placebo or control groups against which to compare the impact of the intervention. It is known that CBT, social support, education and exercise are of benefit in improving psychological well-being and functioning. The focus of this study is to examine the impact of influencing psychological factors to improve outcomes. As discussed in chapter three, the benefits of not having a no treatment control are that it does not deny or delay any potential participants from receiving the intervention and increases the numbers available for analysis. It is important to control for potentially confounding factors, and allowing the participants to act as their own control with a pre-group baseline assessment is a means of addressing this. Therefore, participants will be assessed four weeks prior to the commencement of the intervention. Four weeks matches the duration of the intervention and no improvement in psychological well-being or functioning is expected in this time period as osteoarthritis is a chronic disease. Completion of the intervention is defined as attending a minimum of three sessions.

Follow up assessments to the benefits of the intervention over time have been conducted immediately post intervention and most commonly six months after the end of the intervention. This approach will be followed here. In addition, a four week follow up will be included to match the pre-group baseline and intervention duration, and thus assess short term benefits of the intervention.

This study will, in addition, analyse the change in the psychological factors as well as the impact of the intervention on psychological well-being and functioning. This analysis of the psychological variables will explain the processes involved in the intervention.

Missing data analyses and appropriate interpolation for item non-response at each data collection point were conducted. Dropouts are often a problem in intervention work and methods for managing the loss of power from the reduction in available data were discussed in chapter three. A partial intention to treat analysis will be conducted, comparing dropouts with participants at each data collection point to assess the impact of dropout on the generaliseability of the results. Analysis of attendance figures will determine if the type of intervention influenced attendance.

Multivariate analysis of variance (MANOVA) will allow analysis of intervention effects on the outcome factors (psychological well-being and functioning) as well as the manipulated factors (social support, illness perception, coping).

5.6 Aims of the study

The aim of this study is to improve functioning and psychological well-being by changing illness perception, coping and social support. Two interventions are proposed with cognitive behavioural techniques and social support included in one intervention, and education and exercise combined in the second intervention. A group intervention approach will be utilised with participants meeting weekly for two hours over four weeks. The number of participants per group intervention will be between six and 15. The participants will act as their own controls with a four week pre-intervention baseline. There will be an immediately post intervention assessment, and a one month and six month follow-up to ascertain maintenance of benefits from the interventions.

5.6.1 Hypotheses

The model in Figure 5.1 displays the findings of study two indicating the influence of illness severity and psychological factors on psychological well-being and functioning. These influences will be tested by providing a cognitive behavioural and social support and an education and exercise intervention to improve psychological well-being and functioning. The differential effects of the psychological factors will also be assessed. The hypotheses are listed below.

1. The cognitive-behavioural and social support intervention will improve psychological well-being.
2. The education and exercise intervention will improve functioning.
3. The cognitive-behavioural and social support intervention will have a positive impact on social support.
4. The education and exercise intervention will have a positive impact on illness perception
5. The cognitive-behavioural and social support intervention will have a positive impact on coping.
6. Improvements in psychological well-being, functioning will be maintained at one month and six month follow-up.

5.7 Methods

5.7.1 Design

5.7.1.1 Participants

Participants were aged 65 years and above, and suffering from osteoarthritis of the hip or knee in primary care. Exclusion criteria included: terminal illness, cognitive impairment, cerebrovascular accident affecting mobility/functioning, recent myocardial infarction and knee or hip trauma requiring acute treatment.

5.7.1.2 Interviewers and intervention facilitators

The interviewers were a counsellor, two assistant psychologists and a clinical psychologist (principal researcher). Each was provided with an induction to the study and measures by the principal researcher. Initial interviews and one month and six month follow up interviews were undertaken on an individual basis. The end of intervention assessments were were completed by the participants at the end of the final group session. The intervention facilitators undertook administration and timing of the TUAG task but otherwise provided minimal assistance to the participants'. Intervention allocation was undertaken by the principal researcher who was blind to all the participants. The facilitators/follow-up interviewers would have been aware of which intervention each participant attended but each facilitator (except the physiotherapist who did not undertake any interviews) was involved in both types of intervention reducing the risk of bias towards participants in a particular type of intervention.

5.7.1.3 Power

To detect differences in outcomes between the interventions using MANOVA, the power analysis (using Gpower for means in analysis of variance (ANOVA)) indicated a total sample size of 90 when the effect size was set at 0.3, alpha set at 0.05, and power set at 80%. This exceeds the total sample size of 64 obtained using the same values from Cohen (1992). Dropout rates in older adults in the intervention phase are known to range from 5% to 20% (Calfas et al 1982; Currie et al, 2000; Sumathipala et al, 2000) and up to 25% at six month follow-up (Calfas et al, 1992). The sample size was therefore increased by 25% to reduce the impact of dropout on power. This gave a suggested sample size of 112. Participation rates are also lower in older adults (range 50 to 70%)(Carter et al, 1991; Herzog & Rodgers, 1988); therefore, the number of potential participants approached was increased by 40% to allow for this. This gave a selected sample size of 158.

5.7.1.4 Procedure

5.7.1.4.1 Recruitment of general practices

Nine general practices participated in this study. They included practices that had previously participated in study one plus an additional four practices selected pragmatically for their willingness to participate. The practices ranged in size from single-handed general practices to group practices with five GPs (mean number of GPs per practice 3.2). The average list size per GP was 1785; this is line with national trends (ONS, 2002). The mean percentage of those attending the practice aged 65 and above was 16% (range 8% to 22%) in line with population estimates for older adults. The practices served a range of populations from inner city to suburban. The Jarman indices for the relevant local electoral wards were identified for each practice and indicate the level of deprivation for each practice. Higher scores indicate greater deprivation. Full details can be found in table 5.1.

Table 5.1 General practice details

General practice	No of GPs	List size	Number of 65 years and above	% 65 years and above	Jarman index scores[1]
1	5	7537	1385	18.4	14.01
2	4	9680	1439	14.9	3.25 – 21.29
3	2	4756	836	17.6	-22.90 – 36.82
4	3	5770	1059	18.4	21.29 – 35.29
5	1	2136	474	22.2	21.29 – 35.29
6	2	2125	273	12.8	43.66
7	5	10607	818	7.7	35.29
8	3	4072	521	12.8	43.66
9	5	9318	1522	15.7	-22.90 – 43.66

1Jarman indices indicate levels of deprivation within the GP catchment areas

5.7.1.4.2 Recruitment of participants

Participants were identified by their general practitioner records as having osteoarthritis of hip or knee. A letter was sent to them explaining the aims of the study and indicating that the researcher would contact the participant to explain the aims of the study and ask for their consent to participate. An initial interview was arranged which included the measures used in the first study as well as basic demographic information, this lasted no longer than one hour. On completion of the initial interview, each participant was offered a place on either the psychological

intervention or educational intervention. The participant commenced the intervention four weeks after the initial interview. This procedure was approved by the Local Research Ethics Committee (Salford and Trafford Health Authority, Project No: 97106) (see Appendix 6 for copy of ethics committee approval letter).

Participants were allocated to an intervention using a minimisation procedure (Altman, 1991) matching on gender and age (above or below 75 years). The minimisation procedure is a method of allocating participants to interventions or treatments using selected variables to ensure better balance between the interventions. It is particularly recommended for small samples (<250) (Altman, 1991).

For example, if allocation was made on the basis of age (above and below 75 years) and gender, then when the 16th participant was due to be allocated, the age and gender distribution in the two interventions would be examined. If, for example, there are seven participants in the Cognitive Behavioural and Social Support intervention (CB&SS) and eight in the Education and Exercise intervention (E&E). The CB&SS intervention comprised three females and four males. Two females were aged below 75 years and one aged 75 years and above. The males were split equally on age with two aged below 75 years, and two aged 75 years and above. The E&E intervention included eight participants with four females (two aged below 75 years and two aged 75 and above) and four males aged below 75 years. If the 16th participant was a female aged above 75 years, then she would be allocated to the CB&SS intervention to balance the interventions better. There would be equal numbers of males and females in each intervention, and equal numbers of older females in each intervention. The distribution of the hypothetical interventions is described in table 5.2.

Table 5.2 Allocation of participants to interventions based on age and gender

	Intervention	**CB & SS**	**Education and exercise**
Age	<75	4 (2 female, 2 male)	6 (2 female, 4 male)
	75 and above	3 (1 female, 2 male)	2 (female)
Gender	Male	4	4
	Female	3	4

5.7.1.4.3 Intervention procedure

There were two types of intervention: cognitive behavioural with social support (CB&SS) and education with exercise (E&E). They were provided in a group format. Each intervention had four sessions lasting for two hours each. The sessions were provided weekly. The aim for each intervention was to have between six and 15 participants.

Both interventions used didactic and interactive teaching styles. The education and exercise intervention focused on information about osteoarthritis including information on joints, aetiology (session 1), medication (session 2), nutrition (session 2), exercise (session 3) and advice on activities of daily living and useful sources of information (session 4). The CB&SS intervention focused on cognitive behavioural strategies and social support. This included an introduction to the cognitive behavioural model (session 1), identifying, recording and modifying unhelpful automatic thoughts (sessions 2 & 3), techniques of problem-solving including identifying social support and stages of planning (session 4). The facilitators for the interventions included the researcher, assistant psychologist, trainee clinical psychologist, counsellor. The exercise session was provided by a physiotherapist. To ensure consistency across each intervention, detailed treatment manuals were used which provided the format, materials and timing. Both interventions are outlined in Appendix 4.

5.7.1.4.4 Data Collection Procedure

Data were collected at six time points. Complete assessment schedules were carried out at four time points (initial interview, end of intervention, one month follow up and six month follow up). These included the self-report measures (HADS, WOMAC, COPE, MOS, IPQ, COOP, GWBS, PGCMS, FLP; described below) and the observed measure of severity, the Timed Up and Go task (TUAG). Each participant who participated in the initial interview and attended session 1 of an intervention was asked to complete a further HADS and WOMAC at the start of the intervention. This was done to assess change between the baseline interview (four weeks previously) and the start of the intervention.

In addition, at the beginning of the first session of the intervention participants completed ratings of how enjoyable and helpful they expected the intervention to be. At the end of the first session and at the end of the final session, participants

completed ratings of helpfulness, enjoyment and understanding. Table 5.3 provides details of which data were collected at each data collection time point.

Table 5.3 Timing of data collection with tick marks (✓) indicating when collected

Scale/Time point	Baseline	Start of intervention session 1	End of session 1	End of intervention	One month follow up	Six month follow up
HADS	✓	✓		✓	✓	✓
GWBS	✓	✓		✓	✓	✓
PGCMS	✓			✓	✓	✓
TUAG	✓			✓	✓	✓
FLP	✓			✓	✓	✓
WOMAC	✓			✓	✓	✓
COOP	✓			✓	✓	✓
IPQ	✓			✓	✓	✓
COPE	✓			✓	✓	✓
MOS	✓			✓	✓	✓
Enjoyment		✓	✓	✓		
Helpfulness		✓	✓	✓		
Understanding			✓	✓		

5.7.2 Measures

Basic demographic information was collected including age, sex, marital status and living arrangements. The initial interview measures included all the variables found to specify the model in study one (details in chapter four). For Psychological Well-being, these were the Hospital Anxiety and Depression Scale (HADS), General Well Being Schedule (GWBS), and the Philadelphia Geriatric Center Morale Scale (PGMS). For Functioning, this included the WOMAC Total, COOP charts (subset), and the Functional Limitations Profile. The key outcome indicators were identified as the HADS for Psychological Well-being and the WOMAC Total for Functioning. These two variables are widely used and have been validated on either the elderly or osteoarthritic population (Bellamy et al, 1988; Flint & Rifat, 1996; Kenn et al, 1987; Ryser et al, 1999; Wolfe, 1999). The TUAG task was the best indicator of illness severity in study one, and was included as a measure of physical ability. The Illness Perception factor was indicated by three subscales from the Illness Perception Questionnaire: Time-line, Consequences, Control/Cure. Social Support was indicated by the Medical Outcomes Study (MOS) Social Support Survey, and the COOP Social Function. Coping comprised a subset from the COPE of the following subscales: Active Coping, Positive Reinterpretation and Growth, Planning, Suppression of Competing Activities.

In addition to these, participants were asked to rate their perceptions of the interventions' helpfulness, clarity, enjoyment on Likert type scales (see Appendix 2). At the start of the group, each participant was asked to rate their expectations on the group's helpfulness and enjoyment. At the end of session 1 and session 4, participants were asked to rate helpfulness, enjoyment, and understanding. This was done on a four point scale scored 1 to 4 with higher scores indicating greater helpfulness, enjoyment and understanding.

5.7.3 Analysis

5.7.3.1 Software

The data were entered into an SPSS data file. All analysis was done using SPSS (V10/V11). All software used was run using Windows based PCs.

5.7.3.2 Analysis plan

There were eight stages to the analysis. Initially, the demographic details were reported and the data were examined for errors. Comparisons between attenders and refusers on age and gender were conducted using t-tests and chi-square. Comparisons of attendance between the groups were undertaken using the Mann-Whitney test for independent samples. Non-parametric tests (Wilcoxon, Friedman) were used to analyse the consumer satisfaction data.

MANOVA was used for the main part of the analysis. MANOVA was computed to determine whether the type of intervention had an effect on each of the factors (psychological well-being, functioning, coping, illness perception, social support) in the study over time. Each factor was assessed separately with the variables for each factor. The effects of the intervention (between-subjects factor) could be assessed and its interaction with time (within-subjects factor). The within subjects factor time had four levels (the four data collection points: initial, end of intervention, one month follow-up, six month follow-up). Partial eta squared gives the relevant estimate of effect size in MANOVA (Tabachnik & Fidel, 1997). Greenhouse-Geisser corrections were undertaken where appropriate (within-subjects factor > 2) and Mauchly's test of sphericity to check the data were appropriate for MANOVA where the within subjects factor was greater than two. Post hoc univariate analyses were also undertaken to assess specific effects on each variable (Bryman & Cramer, 2001; Dancey & Reidy, 2002).

5.7.3.2.1 Sample characteristics

The sample characteristics of the initial pool identified as having osteoarthritis and the characteristics of the general practices from which they were identified are described. Participation rates are described at each stage of the study.

5.7.3.2.2 Variables in the data set and treatment of missing data

The data were checked for errors and outliers using frequency tables and bar charts. Missing data were examined. The data set with greatest number of participants was the baseline interview data and was thus most representative of the population under study. The data were examined for normality using Kolmogorov-Smirnov tests and visual inspection of histograms. Data were transformed to improve the distribution where necessary, and reassessed using Kolmogorov-Smirnov tests and visual inspection of histograms. Where data distribution was not improved on a particular variable, the raw untransformed data remained in the data set. Missing data were analysed using Little's MCAR test (see Methods section of study one for details) which determines whether the data are missing completely at random (Little & Rubin, 1987).

The transformations carried out on the baseline data set variables were also applied to the variables at other interview points. Visual inspection of the data and transformed data was carried out at each data collection time point. For example, the HADS-Anxiety scale was transformed by square root, therefore the HADS-Anxiety at post intervention, one month follow-up and six month follow-up were also transformed by square root. Visual inspection of the graphed data distribution at each time point was used to confirm improvements in the distribution in each case. Full interview data were collected on three additional occasions: the end of intervention, the one month follow up, and the six month follow up; data were also collected at the beginning and end of the first session of the interventions. Little's MCAR test was conducted on the data collected at each time point including only the participants who provided data. Auxiliary variables were included to improve the performance of the missing data analysis (Collins et al, 2001); these included age, gender, group allocation, participant's general practice. Subsequently, the EM (expectation-maximisation) method was used to interpolate any missing data for each data set (see Methods section of study one for details of this process).

5.7.3.2.3 Differences between participants and refusers or dropouts at each stage of the study

At each stage of the study, participants and non-participants were compared on the available data. Comparisons were made between: participants in the initial interview

and non-participants; participants in the intervention and refusers; completers and non-completers of the intervention; and participants and non-participants at each follow up data collection point (one month and six month). T-tests and chi-square were used to compare the age and gender of participants and non-participants at each stage of the study. MANOVA was used to compare participants and non-participants on the interview variables at each data collection point.

5.7.3.2.4 Comparison of attendance rates between the two interventions

Mann-Whitney test for independent samples was used to compare attendance rates between the two interventions.

5.7.3.2.5 Ratings of participants' satisfaction with the intervention

Non-parametric tests for ordinal data were used to analyse the data from the four point scales. For Helpfulness and Enjoyment, Friedman's analysis of variance was carried out as three ratings were made for these categories. For understanding, the Wilcoxon signed ranks was used as only two ratings were taken.

5.7.3.2.6 Change in outcome variables between initial interview and the start of the intervention

T-tests were used to compare scores on the HADS and WOMAC between the initial interview and the start of the intervention.

5.7.3.2.7 Does the intervention affect the outcome variables at each stage of the study (Hypotheses 1, 2 & 6)?

A MANOVA was conducted on the variables indicating psychological well-being and separately on the variables indicating functioning. The between-subjects factor was assigned as the type of intervention (CB&SS or E&E) and time was the within-subjects factor. There were 2, 3 or 4 levels of the within-subjects factor depending on which time comparisons were made at each stage of the analysis. Initial analysis included data from two occasions: the initial interview and the end of intervention. Then, the one month follow up data set was included and then the six month follow up data set was included. Separate MANOVAs were carried out with each step including the data from the next data collection point. Wilks-Lambdas (F values) are reported as recommended by Tabachnik & Fidell (1997) as well as p levels, and degrees of freedom. Where the multivariate F value is significant, additional post hoc univariate analyses were conducted. For multivariate analyses, p values were adjusted using Greenhouse-Geisser where appropriate and these reported with the F values and degrees of freedom. In addition, the effect size as represented by the partial eta squared was also reported. Line graphs present the significant findings.

5.7.3.2.8 Does the intervention affect the process variables (Hypotheses 3, 4 & 5)?

The process variables described 3 of the latent variables identified in study one: Illness Perception, Coping, Social Support. MANOVA was used to analyse the effects of the intervention with the type of intervention as the between-subjects factor and time as the within-subjects factor. As in the previous stage of the analysis, time had 2, 3 or 4 levels dependent on which data sets were included. Univariate analyses were conducted if the multivariate F value was found to be significant. Line graphs present the significant findings.

5.8 Results

5.8.1 Sample Characteristics

5.8.1.1 Recruitment of participants

The total pool from nine general practices comprised 572 individuals identified from their GP records as having osteoarthritis of the hip and/or knee. Of these 572, 84 were excluded (presence of cognitive impairment, stroke, recent myocardial infarction or serious illness). The remaining 488 were sent a letter and a leaflet explaining the study and inviting them to participate. They were then telephoned to arrange a time for initial interview. Those who were not contactable by telephone were sent appointment letters. Of these 488, 106 were not contactable in that they did not respond to telephone or letters. 212 declined to participate and 170 agreed to participate in an initial interview. Table 5.4 displays the numbers of participants, refusals, non-contactables and exclusions. The participation rate was calculated using equation PR1: PR1 = Participants / Participants + Refusals. This gave a participation rate of 44.5% (170/382). Initial interview participation rates were lowest in the areas with highest Jarman indices, which indicate higher levels of deprivation.

Table 5.4 Numbers of participants, refusals, exclusions and non-contactable

Definition	n
Non-contactable	106
Exclusions	84
Refusals	212
Participants	170
Total	572

5.8.1.2 Participation rates

Participation rates changed at each stage of the study due to non-respondents or dropouts. At initial interview, a percentage refused to participate and thus limited information was available on them. After initial interview, some respondents declined participation in the intervention and were lost to further follow-up. Ten participants were excluded because of serious ill-health. Therefore, of those who had participated at initial interview, 77.5% attended at least one session of the interventions offered. Some participants did not complete the intervention, completion being defined as having attended a minimum of three out of four sessions. In addition, four participants were excluded at the six month data collection point due to serious ill-health or death. Furthermore, some of the participants who completed the intervention did not provide end of intervention interviews but subsequently provided data at the one month follow up (n=4) and six month follow up (n=2). Thus the pattern of non-participation is variable. Participant and dropout information is summarised in Tables 5.5 and Figure 5.2.

Table 5.5 Participant and drop-out information

Data collection point	Interviewed		Refused	
	N	%	N	%
Initial interview	170	44.5	212	55.5
Attended at least one session of intervention	124	77.5	36	22.5
Completed intervention by attending attended at least 3 out 4 sessions	86	69.3	38	30.6
End of intervention interview	83	96.5	3	3.5
1 month follow-up	71	82.6	15	17.4
6 month follow-up	45	54.9	37	45.1

There were 124 initial attenders at the initial intervention which exceeded the ninety needed for adequate power. Completion rates were lower with 81 completers who provided data at both the initial interview and end of the intervention. This gave retrospective power of 76%. Further dropouts at the 1 month follow up (n=15) and 6 month follow up (n=37) reduced the sample size further. Consequently, the analysis of effects of the intervention was conducted on an insufficiently powered sample.

5.8.1.3 Interviewers

A total of four interviewers undertook the initial interviews. The majority were undertaken by a counsellor (n=111, 65.3%) and an assistant psychologist (n=52, 30.5%). Allocation to intervention was undertaken by the principal researcher who

undertook only one initial interview and was blind to the other participants. The majority of the end of intervention assessements (n=81, 96.4%) were completed by the participants at the end of session 4 of the intervention in the group setting. Apart from the administration of the TUAG task, minimal assistance was given to or required by the participants in completion of the measures. Assistance given was usually related to the participants' visual difficulties (participants had not always brought the appropriate spectacles for questionnaire completion). Follow-up assessments were largely undertaken by the counsellor who had been involved as a facilitator in both interventions. Consequently, she would not have been blind to intervention allocation but given the numbers involved and that data entry and analysis were undertaken by the principal researcher, it is unlikely that this would produce bias towards participants who completed one type of intervention over another. Details of the interviews undertaken by each interviewer are provided in Table 5.6 below.

Table 5.6 Interviewer details

Interviewer	Profession	No of initial interviews n (%)	No of end of intervention interviews n (%)	No of one month follw up interviews n (%)	No of six month follw up interviews n (%)
GB (principal reseacher)	Clinical psychologist	1 (0.6)	-	-	-
HH	Counsellor	111 (65.3)	3 (3.6)	54 (76.1)	46 (100.0)
RB	Assistant psychologist	6 (3.5)	-	-	-
LB	Assistant psychologist	52 (30.6)	-	17 (23.9)	-
Done at end of session 4 of intervention	N/A	-	81 (86.4)	-	-
Total		170 (100.0)	84 (100.0)	71 (100.0)	46 (100.0)

5.8.1.4 Demographic characteristics of the participants at the initial interview

The mean age of the participants at initial interview was 75.3 years. There were 46 (27.1%) males and 124 (72.9%) females. The majority of the participants were either married and living with their spouse or widowed and living alone. Tables 5.7 and 5.8 display the age and gender distribution and the living arrangements.

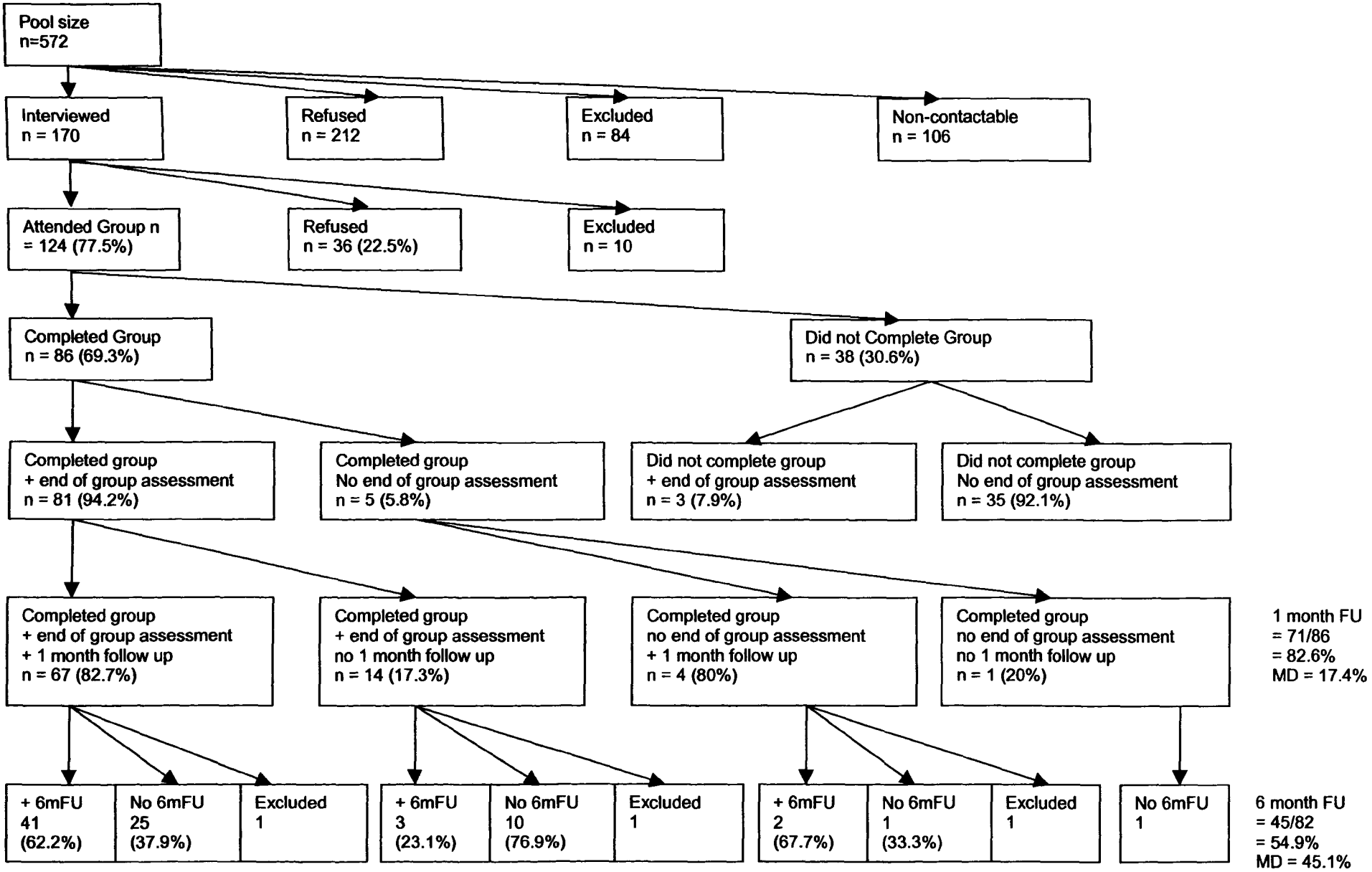
Table 5.7 Age and Gender Distribution of the Study participants

Gender	Percentage of participants in each age range		
	65-74 years	75-84 years	85+ years
Males	16.0	11.0	0.6
Females	30.7	33.7	8.0

Table 5.8 Marital Status and Living Arrangements

Marital Status	%	Living Arrangements	%
Single	3.6	Lone Female	51.5
Married / Co-habiting	35.7	Lone Male	4.8
Widowed	50.3	With Spouse or Partner	35.7
Divorced /Separated	10.3	Other (including 2 in residential care)	7.9
Total	100	Total	100

Figure 5.2 Details of participants at each stage



5.8.2 Missing data treatment and normality tests and transformations

5.8.2.1 Missing data

Missing data were examined for each variable at each time point. At initial interview, 170 participated and missing data occurred on only seven variables with ranges from 0.6% to 5.3% missing. At the beginning of the intervention, there were 112 attenders who completed the consumer satisfaction ratings and the HADS and WOMAC, missing data on these variables ranged from 1.8% to 8.9%.

At the assessment conducted at the end of the intervention, there were three participants who had completed the intervention but did not provide data, and three non-completers who provided end of intervention assessments. These six were excluded from the calculation of missing data rates. The missing data on those who completed the intervention and the end of intervention assessment ranged from 0 to 13.6% across all variables.

At the one month follow-up, there were 14 non-respondents and four individuals who provided data at this point but did not provide end of intervention assessment data; they were excluded from the missing data calculation. The missing data ranged from 0 to 3.0% across all variables.

At the six month follow-up, there were 41 participants who had completed the intervention and provided data at each preceding data collection point. In addition, five individuals provided data at this point but had been non-responders at a previous time point; their data were excluded in the calculation of missing data rates. The missing data at six month follow-up ranged from 0 to 2.4% across all variables. The missing data rates are reported in Table 5.9.

5.8.2.2 Normality tests and transformations

Data from the initial interview were used to conduct tests of normality and appropriate transformations to improve normality were carried out on these data guided by visual inspection of distributions (see Table 5.10 for details). Little's MCAR test was significant (chi-square=196.17, df=148, p=0.005). When the TUAG variable was removed, Little's test was non-significant (chi-square=139.84, df=115, p>0.05) indicating the missing data were missing completely at random. The

missing data in the TUAG were due to the inability of nine participants to complete the task. Reasons included extreme physical frailty, being chairbound or bedbound.

Where variables from the initial interview were transformed, the same transformations were undertaken with the variables collected at the subsequent time points: end of intervention, one month follow up and six month follow up. Little's MCAR test was conducted separately on the data from each data collection point including only the participants who provided complete data at that time point. Therefore, for the end of intervention interview data (n = 81) Little's MCAR test was non-significant (chi-square=264.33, df=280, p=0.741). For the 1 month follow up data (n=67), Little's MCAR test was non-significant (chi-square=35.22, df=33, p=0.364). For the six month data (n=41), Little's MCAR test was also not significant (chi-square=57.46, df=47, p=0.141).

Apart from the initial interview, data from each data collection point had data missing completely at random, the EM (Expectation-Maximisation) method using maximum likelihood estimates was used to interpolate data from each data collection point separately. Interpolation was undertaken separately with data from the four main data collection time points: initial interview, end of intervention, 1 month follow up, and 6 month follow up.

Table 5.9 Missing data at each data collection point

Measure	N	Missing	(%)
Initial interview			
HADS	170	0	0
General Well-Being Schedule	170	0	0
Philadelphia Geriatric Center Morale Scale	168	2	1.2
FLP - Physical domain	170	0	0
WOMAC – Total	170	0	0
COOP Charts	170	0	0
Timed Up and Go	161	9	5.3
Illness Perception Questionnaire	170	0	0
COPE	166	4	2.4
MOS Social Support Scale	169	1	0.6
Pre-intervention measures			
HADS	104	8	7.1
WOMAC	102	10	8.9
Rating of enjoyment	108	4	3.6
Rating of helpfulness	105	7	6.3
Post session 1 measures			

Measure	N	Missing	(%)
Rating of enjoyment	110	2	1.8
Rating of helpfulness	109	3	2.7
Rating of ease of understanding	110	2	1.8
Post intervention			
HADS	80	1	1.2
General Well-Being Schedule	77	4	4.9
Philadelphia Geriatric Center Morale Scale	78	3	3.7
FLP - Physical domain	79	2	2.5
WOMAC – Total	78	3	3.7
COOP Charts	73	8	9.9
Timed Up and Go	80	1	1.2
Illness Perception Questionnaire	76	5	6.2
COPE	78	3	3.7
MOS Social Support Scale	70	11	13.6
Rating of enjoyment	76	5	6.2
Rating of helpfulness	75	6	7.4
Rating of ease of understanding	76	5	6.2
One month follow up			
HADS	67	0	0
General Well-Being Schedule	66	1	1.5
Philadelphia Geriatric Center Morale Scale	66	1	1.5
FLP - Physical domain	66	1	1.5
WOMAC	67	0	0
COOP Charts	66	1	1.5
Timed Up and Go	65	2	3.0
Illness Perception Questionnaire	66	1	1.5
COPE	65	2	3.0
MOS Social Support Scale	65	2	3.0
Six month follow up			
HADS	41	0	0
General Well-Being Schedule	41	0	0
Philadelphia Geriatric Center Morale Scale	41	0	0
FLP - Physical domain	41	0	0
WOMAC	41	0	0
COOP Charts	40	1	2.4
Timed Up and Go	41	0	0
Illness Perception Questionnaire	41	0	0
COPE	40	1	2.4
MOS Social Support Scale	41	0	0

Table 5.10 Variables with normality statistics and transformation details

Variable	Kolmogorov-Smirnov			Transformation
	Statistic	df	Sig.	
HADS - Anxiety	.117	170	.000	Square root
HADS-Depression	.117	170	.000	
General Well-Being Schedule Total	.056	170	.200	
PGMS - Total (not other)	.135	168	.000	Reflect and square root
IPQ-Time Line	.244	170	.000	Logarithm
IPQ-Consequences	.097	170	.001	
IPQ-Control/Cure	.139	170	.000	
COPE Active Coping	.142	166	.000	Reflect and square root
COPE Planning	.110	166	.000	Reflect and square root
COPE Suppress Competing Activities	.142	166	.000	Reflect and square root
COPE Positive reinterpretation and growth	.139	166	.000	Reflect and square root
MOS – n friends/relatives	.239	169	.000	Logarithm
MOS - Total	.131	170	.000	Logarithm
COOP Social Support	.282	170	.000	
COOP Function	.270	170	.000	
FLP - Physical domain	.052	170	.200	
WOMAC - Total	.084	170	.005	Square root
Timed Up and Go	.161	161	.000	Logarithm

5.8.3 Differences between participants and refusers or drop-outs at each stage of the study.

5.8.3.1 Is there a difference between those who participated in an initial interview and those who refused?

No significant differences were found in age (t=-1.34, df = 380, p=0.180) or gender distribution (Chi-square=2.39, df = 1, p = 0.122) between those who participated in the initial interview and those who refused (Table 5.11). No further variables were available on which to compare the refusers with the initial interview participants.

5.8.3.2 Is there a difference between those who attended an intervention (at least once) and those who refused to attend?

There were 160 participants allocated to an intervention on the basis of their agreement at initial interview (ten were excluded). Subsequently, 36 individuals refused to participate in an intervention. Few reasons were provided but they included individuals stating that they were feeling unwell or deciding that a group

intervention 'was not their thing'. No significant differences were found on age (t=1.02, df = 159, p = 0.311) and gender (chi-square=0.32, df = 1, p = 0.571) (Table 5.11).

The attenders and refusers were then compared on their responses at initial interview using MANOVA. The difference between attenders and refusers was not significant (F(36, 302) =1.45, p>0.05).

5.8.3.3 Is there a difference between those who completed the intervention and those who attended the intervention but did not complete it?

The 86 completers (attended 3 or more sessions) and 38 non-completers were compared on age and gender. No significant differences were found (t=-0.22, df = 122, p = 0.824; Chi-square=2.02, df = 1, p = 0.155) (Table 5.11).

The completers and non-completers were then compared on their responses at initial interview using MANOVA. No significant difference was found (F(18,105) =0.79, p>0.05).

5.8.3.4 Is there a difference between those who completed the intervention and provided one month follow up data and those who completed the intervention but refused the one month follow up?

No significant differences were found on gender between the 67 participants and 14 non-participants in the one month follow up (Chi-square=1.33, df = 1, 0.248). A significant difference in age was found between the participants and non-participants with the latter being older (t=-2.70, df=84, p=0.008) (Table 5.11).

The participants and non-participants at 1 month follow up were then compared on their responses at initial interview using MANOVA. No significant difference was found (F (18,70) = 1.374 p>0.05). End of intervention data were then used to compare the participants and non-participants at the 1 month follow up. The sample size was 81 as not all who had completed the intervention had provided end of intervention data. A MANOVA compared 1 month follow up participation with non-participation on the end of intervention interview variables. No significant difference was found (F (18,62) = 0.84 p>0.05).

5.8.3.5 Is there a difference between those who completed the intervention and provided one month & six month follow up data and those who completed the intervention, provided one month follow up data but refused six month follow up?

At this stage, there were 67 individuals who had provided data at each data collection point thus far. At the six month interview, one individual was excluded due to ill-health.

No significant differences were found on age or gender between the 41 participants and 25 non-participants in the six month follow up ($t=-0.17$, $df=64$, $p=0.862$; Chi-square=0.00, df = 1, $p>0.05$) (see Table 5.11).

The participants and non-participants at 6 month follow up were then compared on their responses at initial interview using MANOVA. No significant difference was found ($F(18, 67) = 1.75$ $p>0.05$). They were then compared on their responses at end of intervention interview using MANOVA. No significant difference was found ($F(18,60) = 0.90$, $p>0.05$). A further comparison was made using their responses at 1 month follow-up interview using MANOVA. No significant difference was found ($F(18,47) = 1.12$ $p>0.05$).

Table 5.11 Age and gender distribution for each subset of the initial sample, displaying interviewed participants, attenders and refusers.

	N	Mean age (SD)	Male N (%)	Female N (%)
Initial Sample (section 5.8.3.1)				
Interviewed	170	74.9 (6.8)	46 (27.1)	124 (72.9)
Refused	212	75.9 (7.2)	73 (34.4)	139 (65.6)
Attenders and Refusers (section 5.8.3.2)				
Attended intervention	124	75.6 (6.6)	32 (25.8)	92 (74.2)
Refused intervention	36	74.3 (7.0)	11 (30.6)	25 (69.4)
Completers and Non-completers (section 5.8.3.3)				
Completed intervention	86	75.5 (6.2)	19 (22.1)	67 (77.9)
Did not complete intervention	38	75.8 (7.6)	13 (34.2)	25 (65.8)
1 month follow-up participants and 1 month follow-up non-participants (section 5.8.3.4)				
Participated in 1 month follow up	71	74.7 (5.7)	14 (19.7)	57 (80.3)
Did not complete 1 month follow up	15	79.3 (6.9)	5 (33.3)	10 (66.7)

	N	Mean age (SD)	Male N (%)	Female N (%)
6 month follow-up participants and 6 month follow-up non-participants (section 5.8.3.5)				
Participated in 6 month follow up	41	74.9 (5.8)	8 (19.5)	33 (80.5)
Did not complete 6 month follow up	25	79.2 (5.6)	5 (20)	20 (80)

5.8.3.6 Summary of differences between participants and non-participants

There were virtually no differences found between the participants and non-participants at each stage of the study. The only difference found was that the non-participants at the one month follow up were older but this was not found at the six month follow up. No differences were found in either the process or outcome variable from the preceding time point indicating that the dropouts were not differentiated by their psychological well-being, functioning or by the psychological factors.

5.8.4 Comparison of attendance rates between the two interventions

In total, 15 interventions took place (eight cognitive behavioural and social support and seven education and exercise). There were 67 participants who attended the CB&SS group and 57 who attended the E&E group. The range of number of participants in the groups was five to 14 (mean = 8.3). Median attendance was three sessions (mean = 2.98). No difference in participation rates between the interventions was found (Mann-Whitney U= 1564, $p > 0.05$).

5.8.5 Participants' satisfaction with the intervention

Friedman's two way analysis of variance found significant increases in perceptions of Helpfulness and Enjoyment (chi-square=22.34, df=2, $p<0.001$; chi-square=28.571, df=2, $p<0.001$. For Understanding, the Wilcoxon signed ranks test found a significant decrease in the ratings ($z=-2.147$, $p=0.032$). The medians and means in Table 5.12 are based on the maximum available sample.

Table 5.12 Medians, means and number contributing data on the consumer satisfaction measures

Measure	Time collected	Median	Mean	N
Helpfulness	Pre-group prediction	4.0	3.6	108
	Post session 1	4.0	3.8	108
	Post session 4	4.0	3.7	70
Enjoyment	Pre-group prediction	4.0	3.6	105
	Post session 1	4.0	3.9	105
	Post session 4	4.0	3.7	72
Understanding	Post session 1	4.0	3.8	110
	Post session 4	4.0	3.6	72

5.8.6 Do the participants demonstrate changes in the HADS and WOMAC between initial interview and the start of the intervention?

No significant differences were found between the participants' scores at baseline and start of the intervention on the HADS-Depression ($t=0.420$, $df=103$, $p>0.05$) or the WOMAC Total ($t=-1.592$, $df=101$, $p>0.05$). A significant difference was found in the HADS-Anxiety scale ($t=-2.311$, $df=103$, $p=0.023$) with the participants recording slightly higher anxiety scores at the start of the intervention compared to baseline (Table 5.13).

Table 5.13 Mean scores on outcome variables at initial interview and start of intervention

Measure	Time collected	n	Mean
HADS- Anxiety	Initial interview	104	6.96
	Pre-group	104	7.63
HADS-Depression	Initial interview	104	5.52
	Pre-group	104	5.41
WOMAC-Total	Initial interview	102	68.62
	Pre-group	102	71.25

5.8.7 Does the intervention affect functioning and psychological well-being at each stage of the study? (Hypotheses 1,2 & 6)

5.8.7.1 Does the intervention affect Function (Hypotheses 2 & 6)?

5.8.7.1.1 Does the intervention affect Function at the end of the intervention?

MANOVA was computed with time as the within-subjects factor with 2 levels and the type of intervention assigned as the between-subjects factor. The Function variables were the WOMAC total, FLP and COOP-Physical Condition. There was no significant interaction between time and type of intervention ($F(3,77)=0.70$, $p>0.05$) or between-subjects ($F(3,77)=0.64$, $p>0.05$). Time was significant ($F(3,77)=8.60$, $p<0.001$). Post hoc univariate analyses with time as the within-subjects factor indicated that all the variables changed significantly (WOMAC $F(1,79)=4.22$, $p=0.043$); FLP $F(1,79)=10.52$, $p=0.001$; COOP-Physical Condition $F(1,79)=12.08$, $p=0.001$). The FLP and COOP Physical Condition scores decreased (from 35.8 to 28.9 and 4.1 to 3.7 respectively) indicating an improvement in functioning but the WOMAC scores increased (65.8 to 69.0) suggesting greater difficulties in functioning (see Figures 5.3 to 5.5). Partial eta squared did not exceed 0.3; thus effect sizes are small. Raw data tables are in Appendix 3, tables 3.1 to 3.3

5.8.7.1.2 Does the intervention affect Function at one month follow up?

The MANOVA was computed with time as the within-subjects factor with 3 levels. No significant interaction was found between time and type of intervention ($F(6,66)=1.33$, $p>0.05$) or between-subjects ($F(3, 63)=0.85$, $p>0.05$). Time was significant ($F(6,60)=5.08$, $p<0.001$). Univariate analyses with time as the within-subjects factor were conducted post hoc. Significant effects were found for the FLP ($F(2,130)=7.48$, $p=0.003$) and the COOP-Physical Functioning ($F(2, 130)=6.22$, $p=0.003$) but not for the WOMAC. In both the FLP and COOP-Physical Functioning, scores decreased at the end of the intervention but increased at the 1 month follow up indicating that improvements in functioning were not maintained over this time period. The COOP Physical Functioning scores returned to the baseline (4.1). The FLP scores decreased from 36.2 to 27.9 and increased to 29.8. Line graphs display the data in Figures 5.4 and 5.5. Effect sizes remained small with partial eta squared not exceeding 0.3.

5.8.7.1.3 Does the intervention affect Function at six month follow up?

MANOVA was computed to analyse the effects of time (4 levels) and type of intervention assigned. No significant interaction was found between time and the type of intervention ($F(9,31)=1.07$, $p>0.05$), nor between-subjects ($F(3,37)=1.21$, $p>0.05$), nor time ($F(9,31)=1.99$, $p>0.05$). Post hoc univariate analyses were conducted also to ensure consistency. Only the FLP variable displayed significant changes with time ($F(3, 117)=6.91$, $p=0.001$). Scores on this variable decreased at the end of the intervention (36.9 to 27.6), increased at the 1 month follow up (27.6 to 33.3) and decreased at 6 month follow up (33.3 to 30.4) (Figure 5.5). Overall, the scores decreased from the initial interview to the 6 month follow up suggesting some improvement but effect size (partial eta squared) did not exceed 0.3.

5.8.7.1.4 Summary of changes

No difference was found between the interventions but all the functioning variables changed at the end of the intervention indicating that both interventions had an effect on functioning. At the end of intervention the FLP and COOP scores changed over time to indicate better functioning but the WOMAC changed to indicate poorer functioning. At one month follow up; both the FLP and COOP approached baseline. At six month follow up, the FLP scores displayed improvement. The results, therefore, do not indicate consistent improvement or deterioration in functioning over the period of the study. Line graphs for each variable for the relevant data collection points display significant changes in Figures 5.3 to 5.5.

Figure 5.3 Mean WOMAC Scores at initial interview and end of intervention

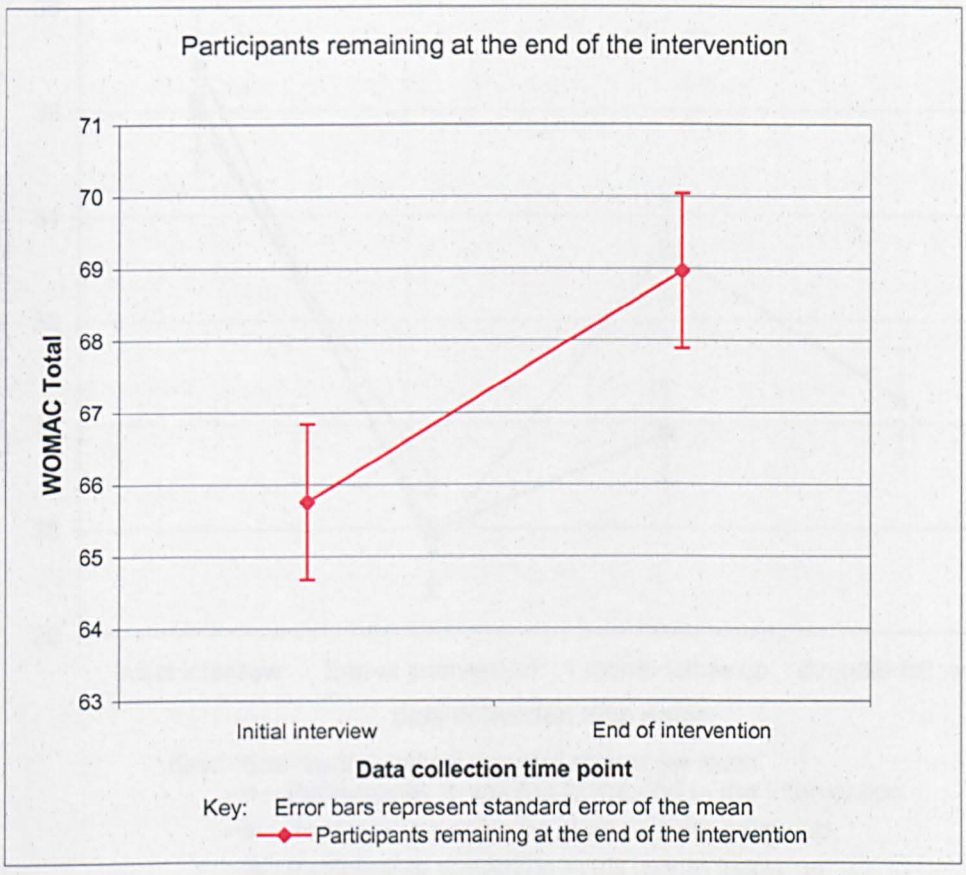


Figure 5.4 Mean COOP-Physical Condition Scores at initial interview, end of intervention and one month follow up

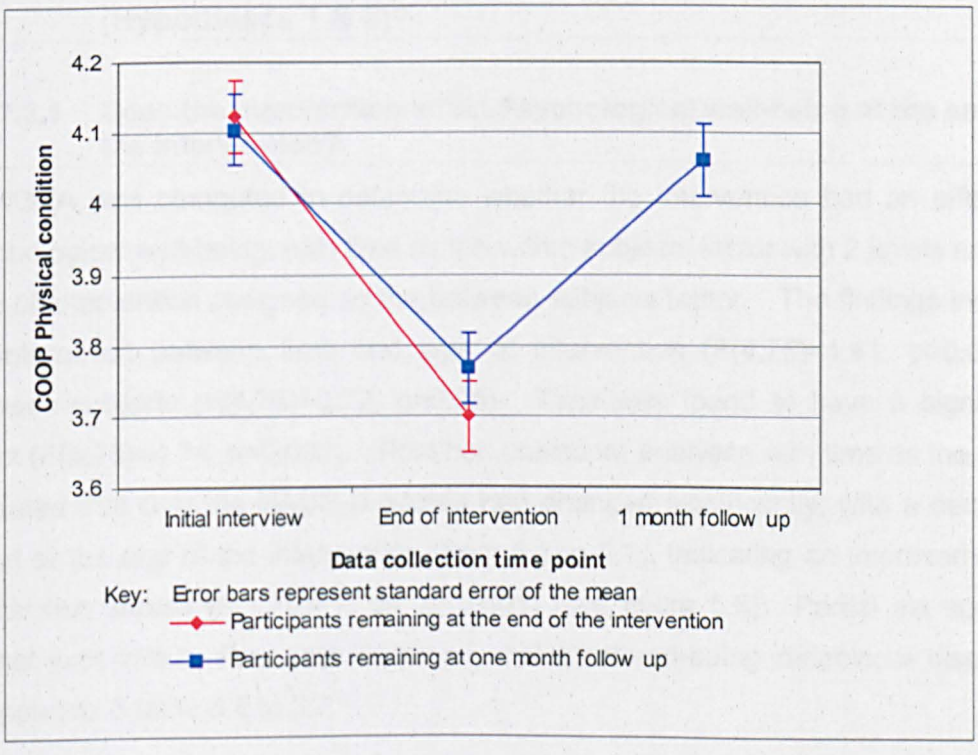
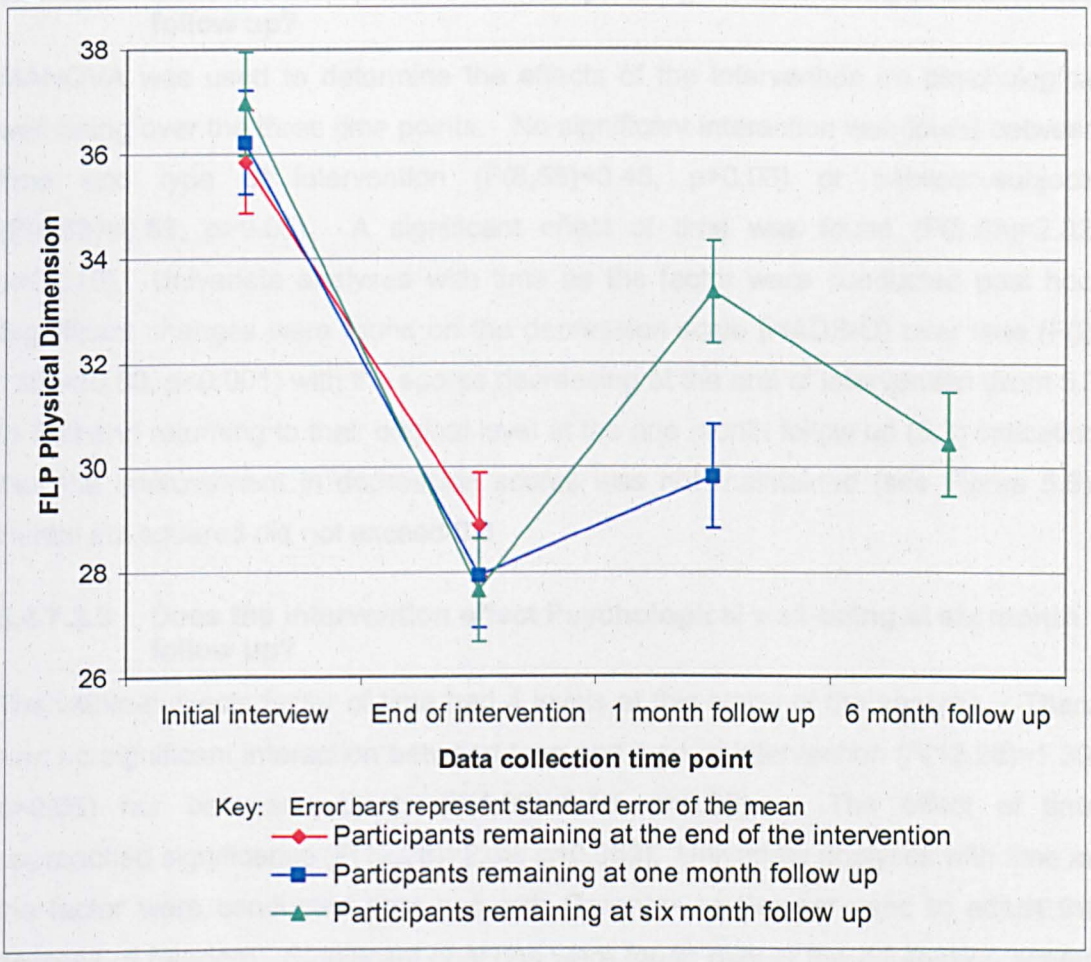


Figure 5.5 Mean FLP Scores over Time



5.8.7.2 Does the intervention affect Psychological well-being (Hypotheses 1 & 6)?

5.8.7.2.1 Does the intervention affect Psychological well-being at the end of the intervention?

MANOVA was computed to determine whether the intervention had an effect on psychological well-being, with time as the within-subjects factor with 2 levels and the type of intervention assigned as the between-subjects factor. The findings indicate no interaction between time and type of intervention ($F(4,76)=1.41$, $p>0.05$) or between-subjects ($F(4,76)=0.72$, $p>0.05$). Time was found to have a significant effect ($F(4,76)=4.74$, $p=0.002$). Post hoc univariate analyses with time as the factor indicated that only the HADS-D scores had changed significantly; with a decrease found at the end of the intervention (from 5.2 to 5.1), indicating an improvement in depression scores ($F(1,79)=17.04$, $p<0.001$) (see figure 5.6). Partial eta squared did not exceed 0.3. Raw data for the psychological well-being variables is displayed in Appendix 3 table 3.4 to 3.7.

5.8.7.2.2 Does the intervention affect Psychological well-being at one month follow up?

MANOVA was used to determine the effects of the intervention on psychological well-being over the three time points. No significant interaction was found between time and type of intervention ($F(8,58)=0.43$, $p>0.05$) or between-subjects ($F(4,62)=0.53$, $p>0.05$). A significant effect of time was found ($F(8,58)=2.82$, $p=0.010$). Univariate analyses with time as the factor were conducted post hoc. Significant changes were found on the depression scale (HADS-D) over time ($F(2, 130)=10.50$, $p<0.001$) with the scores decreasing at the end of intervention (from 5.3 to 5.2) and returning to their original level at the one month follow up (5.3) indicating that the improvement in depression scores was not maintained (see Figure 5.6). Partial eta squared did not exceed 0.3

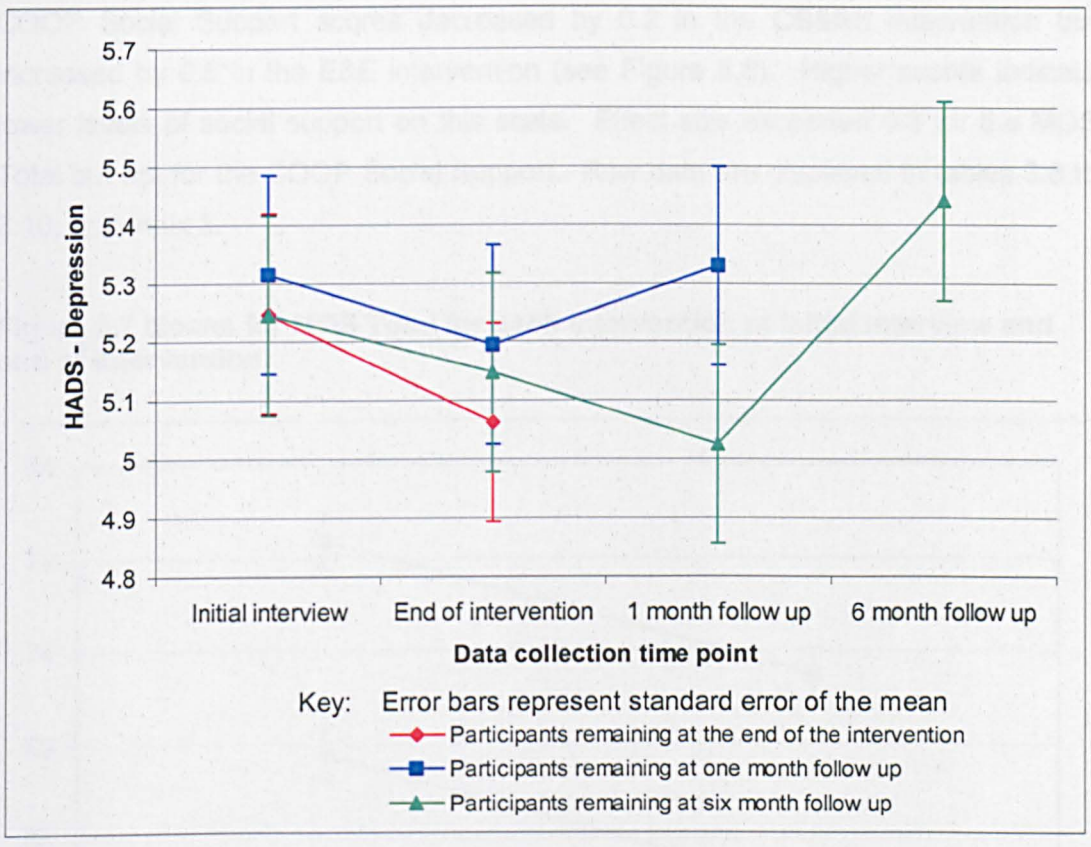
5.8.7.2.3 Does the intervention affect Psychological well-being at six month follow up?

The within-subjects factor of time had 4 levels at this stage of the analysis. There was no significant interaction between time and type of intervention ($F(12,28)=1.30$, $p>0.05$) nor between-subjects ($F(4,36)=0.46$, $p>0.05$). The effect of time approached significance ($F(12,28)=2.09$, $p=0.053$). Univariate analyses with time as the factor were conducted post hoc with Greenhouse-Geisser used to adjust the degrees of freedom. Significant changes were found only in the depression scores (HADS-D variable) ($F(3, 39)=7.88$, $p<0.001$) (partial eta squared=0.168). At both end of intervention and one month follow up, scores had decreased from the initial interview (from 5.2 to 5.1 and 5.0 respectively) but increased at six month follow up to 5.4 which is above the initial level but effect sizes were still less than 0.3.

5.8.7.2.4 Summary of changes

There was no difference found between the interventions in their effect on psychological well-being. Scores on the HADS-Depression decreased at the end of the intervention but scores returned to the initial interview level at the one month follow up and increased at six month follow up. Effect sizes were small (<0.3) and depression scores changes were also small suggesting that the effects of the interventions were limited. Figure 5.6 displays the changes in HADS-Depression in a line graph.

Figure 5.6 Mean HADS-Depression scores at each data collection point



5.8.8 Does the intervention affect the process variables (Hypotheses 3, 4 & 5)?

5.8.8.1 Social Support (Hypothesis 3)

5.8.8.1.1 Does the intervention affect social support at the end of the intervention?

MANOVA was computed for the intervention, time and the interaction of both with the time factor set at 2 levels for the end of group analysis. No significant effects were found between-subjects ($F(3, 77)=1.03$, $p>0.05$). Significant effects were found for the interaction between type of intervention and time ($F(3, 77)=3.76$, $p=0.014$) and time ($F(3,77)=35.82$, $p=<0.001$). Post hoc univariate analyses with time as the within-subjects and type of intervention as the between-subjects factor found significant changes in the MOS total ($F(1, 79)=7.73$, $p=0.007$) (partial eta squared=0.581) and the COOP-Social Support ($F(1,79)=4.76$, $p=0.032$) (partial eta squared=0.057). No significant difference was found for MOS-N. Post hoc univariate analyses with time as the within-subjects factor found significant changes in the MOS total ($F(1,79)=109.4$, $p<0.001$) but not for the MOS-N or COOP-Social Support. Scores on the MOS total decreased by the same amount (7.2) in both

interventions indicating reduced levels of social support (see Figure 5.7). The COOP Social Support scores decreased by 0.2 in the CB&SS intervention but increased by 0.5 in the E&E intervention (see Figure 5.8). Higher scores indicate lower levels of social support on this scale. Effect size exceeded 0.3 for the MOS Total but not for the COOP Social Support. Raw data are displayed in tables 3.8 to 3.10, appendix 3.

Figure 5.7 Means for MOS Total for each intervention at initial interview and end of intervention.

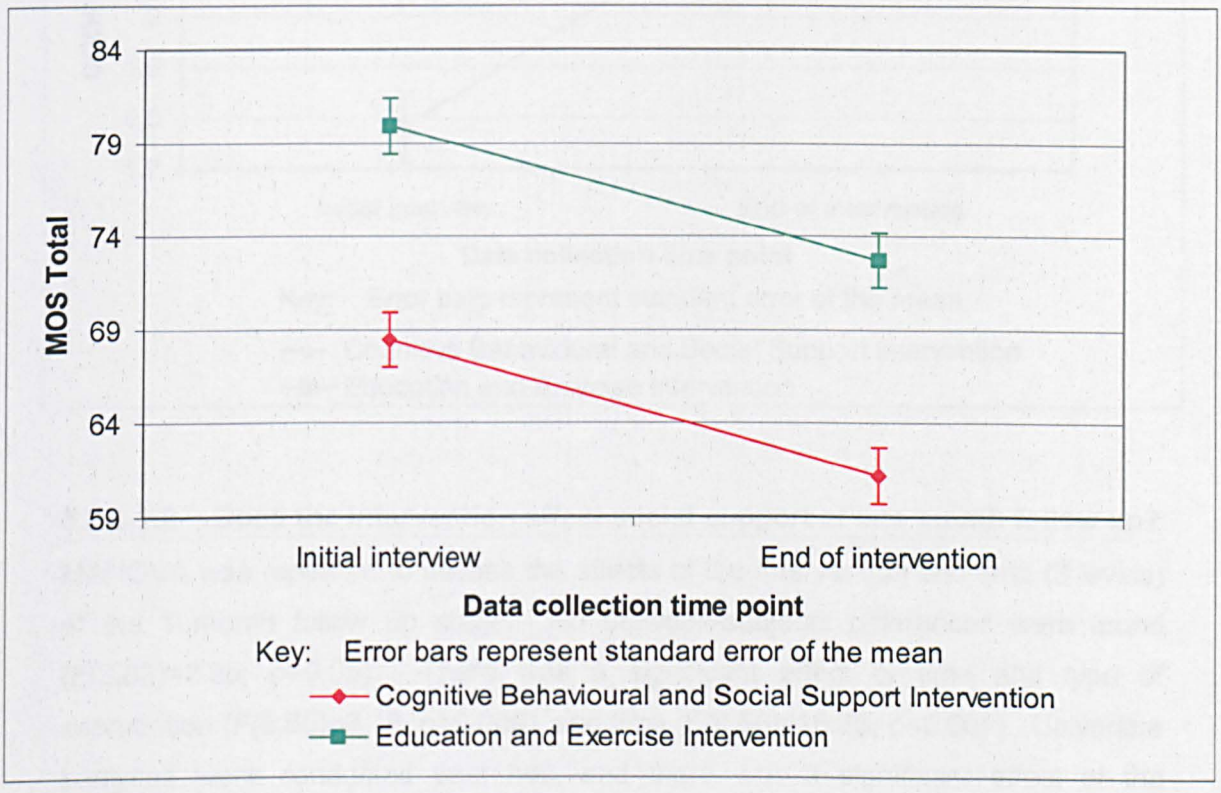
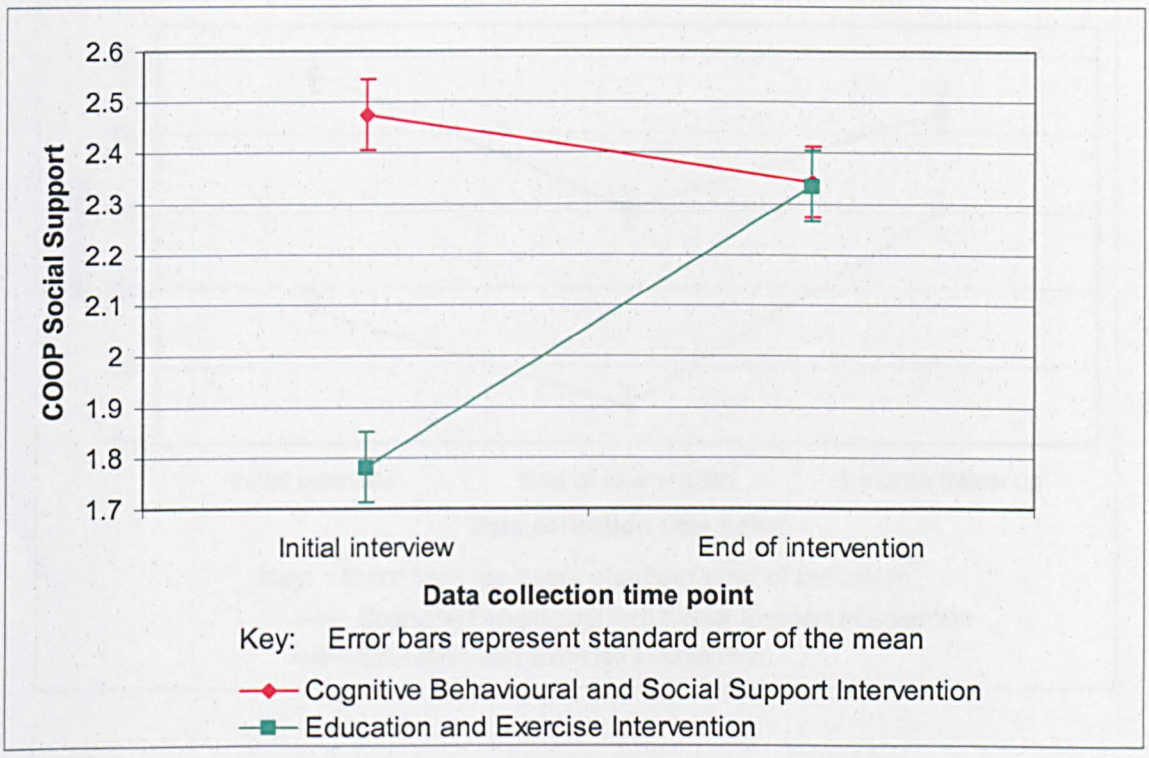


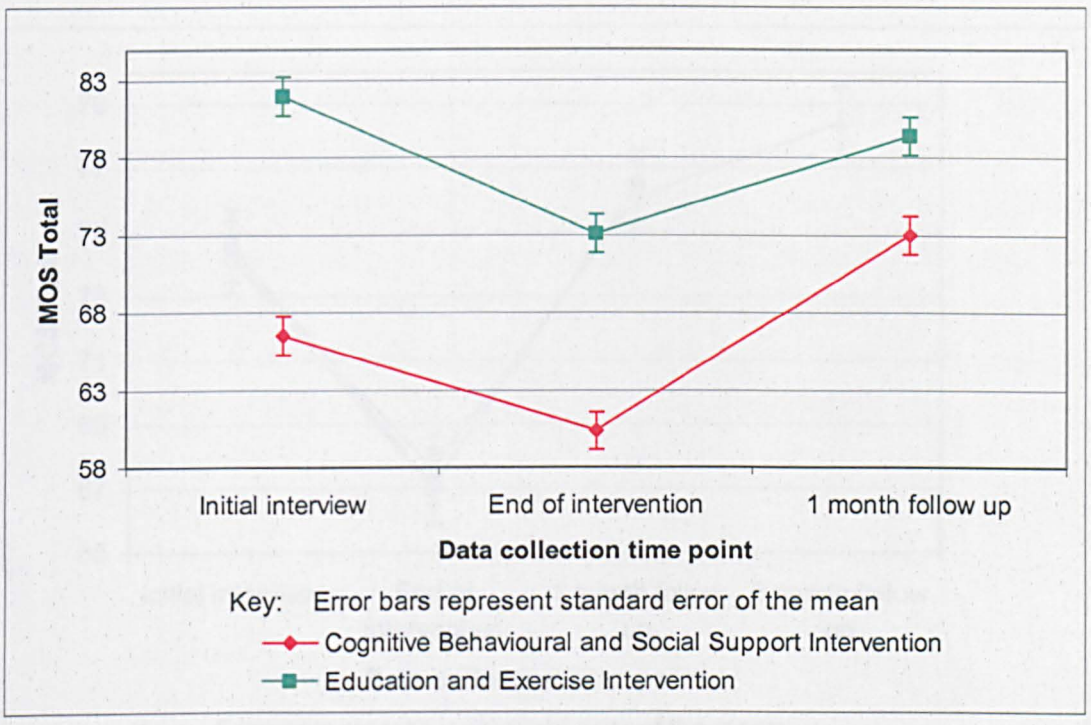
Figure 5.8 Means for COOP Social Support for each intervention at initial interview and end of intervention



5.8.8.1.2 Does the intervention affect social support at one month follow up?

MANOVA was repeated to assess the effects of the intervention and time (3 levels) at the 1 month follow up stage. No between-subjects differences were found ($F(3,63)=2.36$, $p>0.05$). There was a significant effect of time and type of intervention ($F(6,60)=3.18$, $p=0.009$), and time ($F(6,60)=16.33$, $p<0.001$). Univariate analyses were conducted post hoc, and there was a significant effect of the interaction over time on the MOS total ($F(2,130)=6.12$, $p=0.008$) (partial eta squared = 0.566). Post hoc univariate analyses with time as the within-subjects factor found significant changes in the MOS total ($F2,130=84.7$, $p<0.001$). In both interventions, the MOS total decreased at the end of intervention with a decline of 6.2 in the CB&SS and 8.8 in the E&E. At one month follow up, scores on both interventions had increased but in the CB&SS intervention, the increase was greater (12.7) than in the E&E intervention (6.3) (see Figure 9). For the MOS Total, the effect size of 0.57 suggests moderate effects of the intervention.

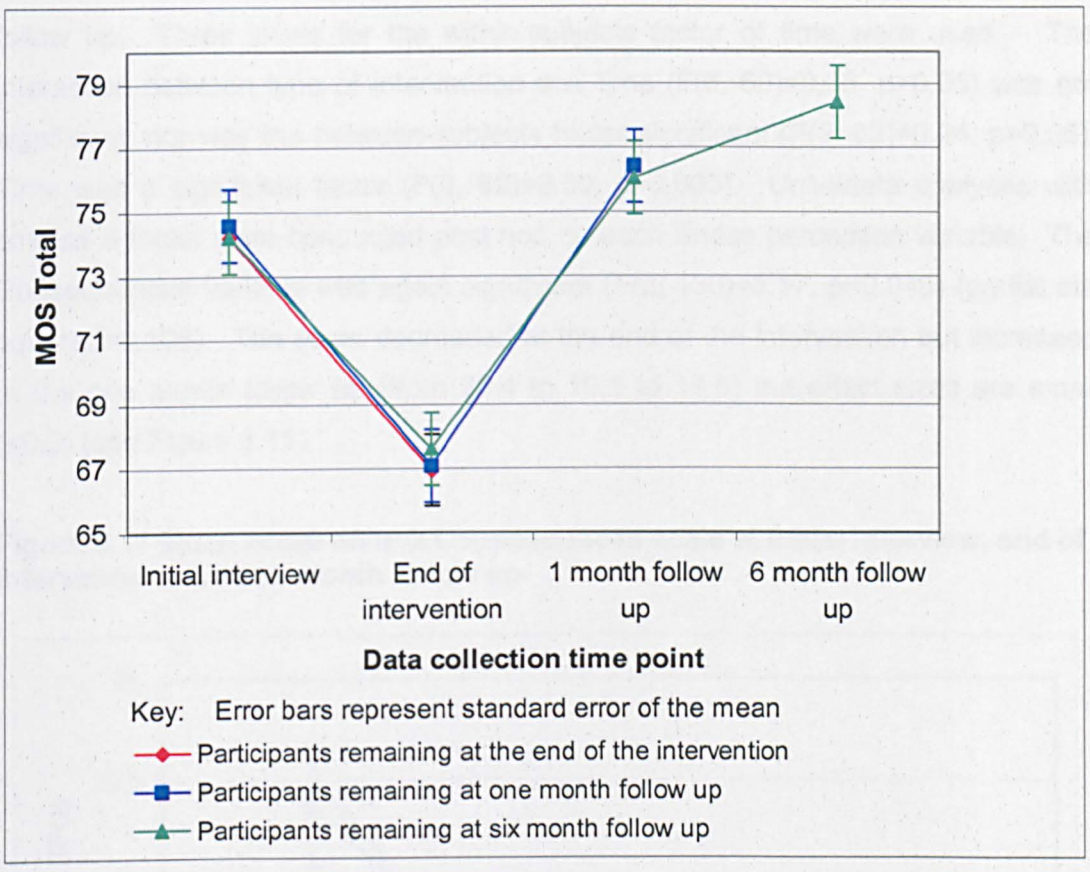
Figure 5.9 Mean MOS Total scores for each intervention at initial interview, end of intervention and one month follow up data collection points



5.8.8.1.3 Does the intervention affect social support at six month follow up?

A further MANOVA was conducted to examine the effects of time (4 levels) and the intervention type. No significant differences were found for the interaction between time and type of intervention ($F(9,31)=1.08$, $p=0.406$) or between-subjects ($F(3, 37)=0.44$, $p>0.05$). Time was shown to be significant ($F(9,31)=8.69$, $p<0.001$). Post hoc univariate analyses with time as a factor were conducted. Only the MOS total was significant ($F(3, 117)=39.99$, $p<0.001$) (partial eta squared = 0.506). The scores for the MOS total on increased by 4.2 from initial interview to 6 month follow up, although there was a decrease found at the end of the intervention (see Figure 5.10). Effect size was moderate with partial eta squared equal to 0.51.

Figure 5.10 Means for MOS Total for each intervention at initial interview, end of intervention, one month follow up and six month follow up.



5.8.8.2 Illness Perception (Hypothesis 4)

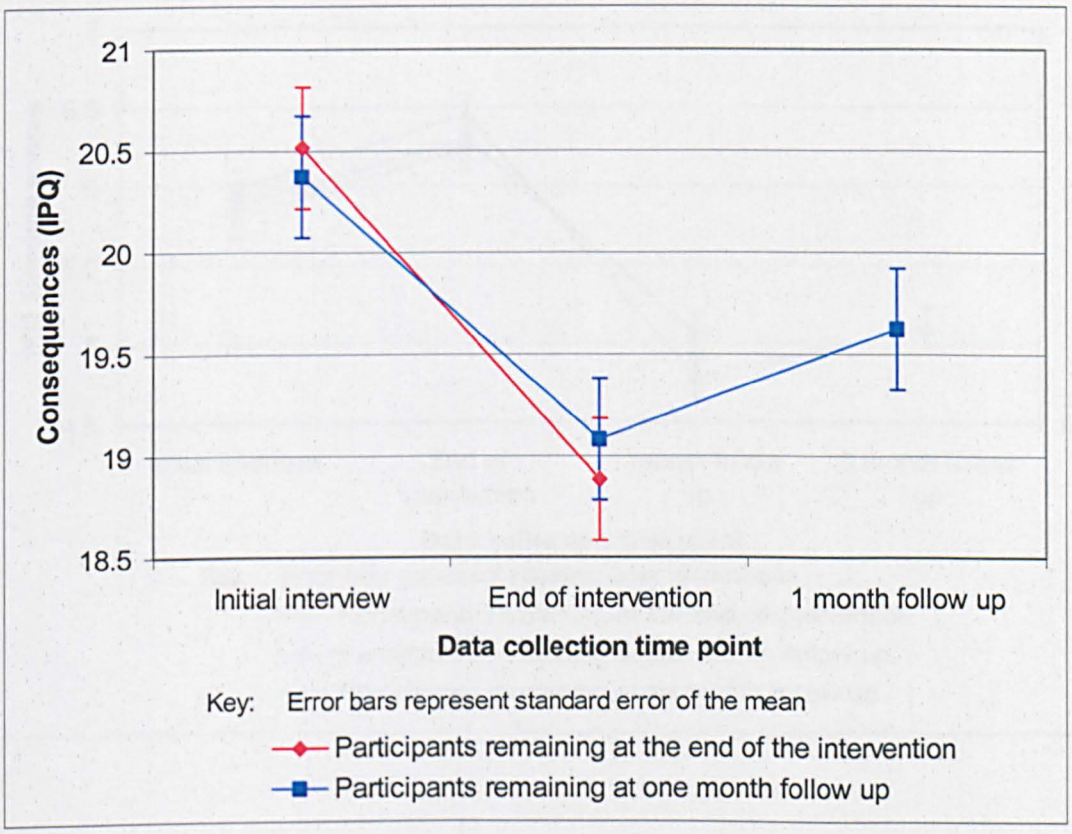
5.8.8.2.1 Does the intervention affect illness perception at the end of the intervention?

A MANOVA was conducted to analyse the effect of type of intervention and time on illness perception. No significant interaction was found between type of intervention and time ($F(3,77)=0.77$, $p>0.05$) or between-subjects ($F(3,77)=0.25$, $p>0.05$). There was a significant effect of time ($F(3,77)=4.68$, $p=0.005$). Post hoc univariate analyses with time as a factor were conducted on each variable, and the Consequences variable was found to be significant ($F(1, 79)=8.31$, $p=0.005$) (partial eta squared=0.095) but effect sizes are small (<0.3). A decrease in the Consequences score was found at the end of intervention (from 20.5 to 18.9) (see Figure 5.11). A decrease in scores on the Consequences subscale indicates that the consequences of the illness are perceived as less serious. Raw data are displayed in table 3.11 to 3.13, appendix 3.

5.8.8.2.2 Does the intervention affect illness perception at one month follow up?

MANOVA was used to analyse the effects of intervention and time at one month follow up. Three levels for the within-subjects factor of time were used. The interaction between type of intervention and time ($F(6, 60)=0.33$, $p>0.05$) was not significant, nor was the between-subjects factor significant ($F(2, 63)=0.24$, $p>0.05$). Time was a significant factor ($F(6, 60)=3.50$, $p=0.005$). Univariate analyses with time as a factor were conducted post hoc on each illness perception variable. The Consequences variable was again significant ($F(2, 130)=3.17$, $p=0.045$) (partial eta squared=0.106). The score decreased at the end of the intervention but increased at the one month follow up (from 20.4 to 19.1 to 19.6) but effect sizes are small (<0.3) (see Figure 5.11).

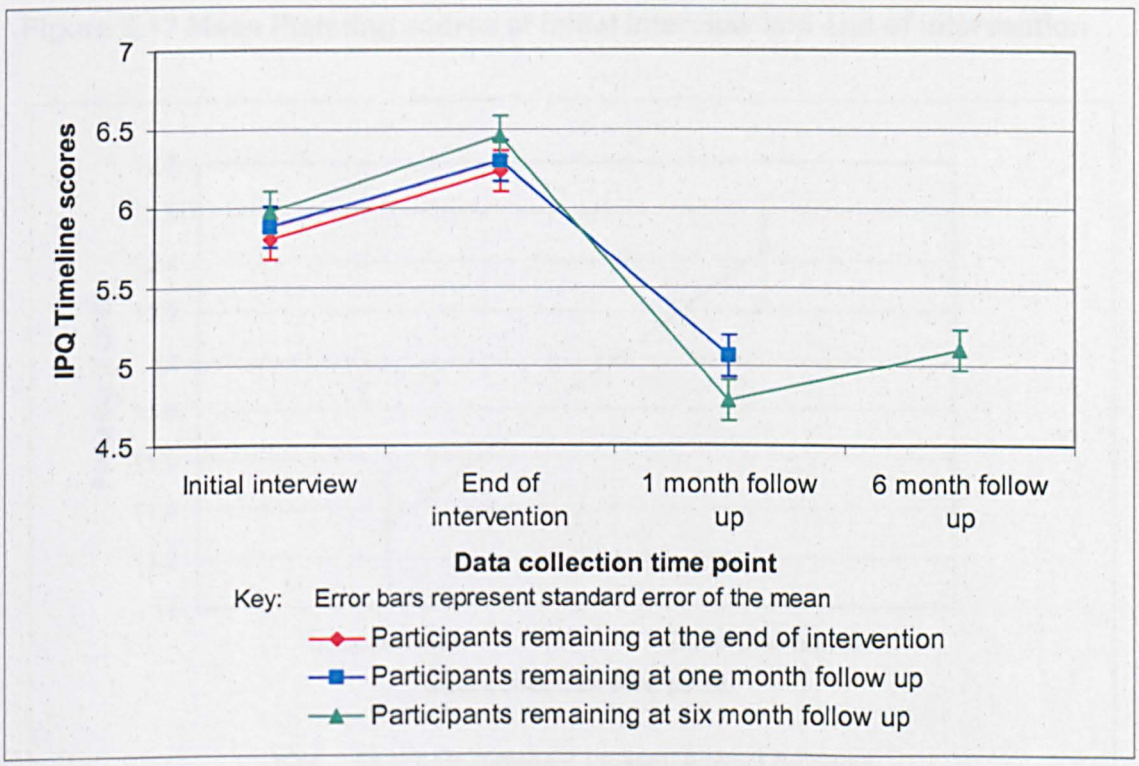
Figure 5.11 Mean score on IPQ Consequences scale at initial interview, end of intervention and one month follow up



5.8.8.2.3 Does the intervention affect illness perception at six month follow up?

At six month follow up, there were 4 levels of the within-subjects factor of time. No significant interaction was found between type of intervention and time ($F9,31)=1.75$, $p>0.05$) or between-subjects ($F(3,37)=2.21$, $p>0.05$). Time was significant ($F(9,31)=2.70$, $p=0.019$). Post hoc univariate analyses found significant effects of time on the Timeline variable ($F(3, 117)=5.86$, $p=0.002$) (partial eta squared=0.131). Scores fluctuated on this variable with an increase at the end of the intervention (6.0 to 6.5), a decrease at one month follow up (6.5 to 4.8) and an increase at six month follow up (from 4.8 to 5.1) (see Figure 5.12). Lower scores indicate the perception that the arthritis will last a long time. Effect size did not exceed 0.3.

Figure 5.12 Mean IPQ Timeline scores at each data collection point

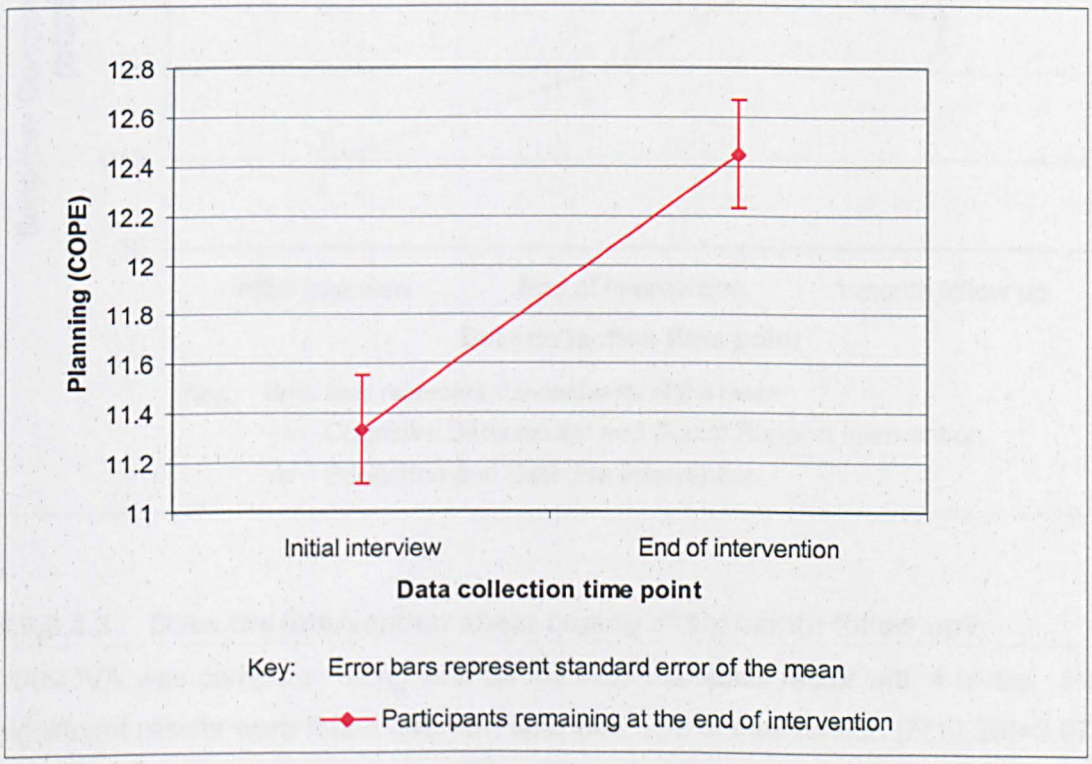


5.8.8.3 Coping (Hypothesis 5)

5.8.8.3.1 Does the intervention affect coping at the end of the intervention?

There were two levels for time (within-subjects factor) in the MANOVA. There was no significant interaction between time and type of intervention ($F(4,76)=0.38$, $p>0.05$). Significant effects were found for between-subjects ($F(4,76)=2.54$, $p=0.046$) and time ($F(4,76)=3.15$, $p=0.019$). Post hoc univariate analyses of the effect of the intervention on each coping variable were undertaken but these did not identify any significant effects. Post hoc univariate analyses examining the effects of time on each variable indicated that Planning was significant ($F(1, 79)=6.57$, $p=0.012$) (partial eta squared=0.077). Scores had increased at the end of the intervention from 11.5 to 12.5 (see Figure 5.13) but effect sizes were small (<0.3). Raw data are displayed in tables 3.14 to 3.17, appendix 3.

Figure 5.13 Mean Planning scores at initial interview and end of intervention

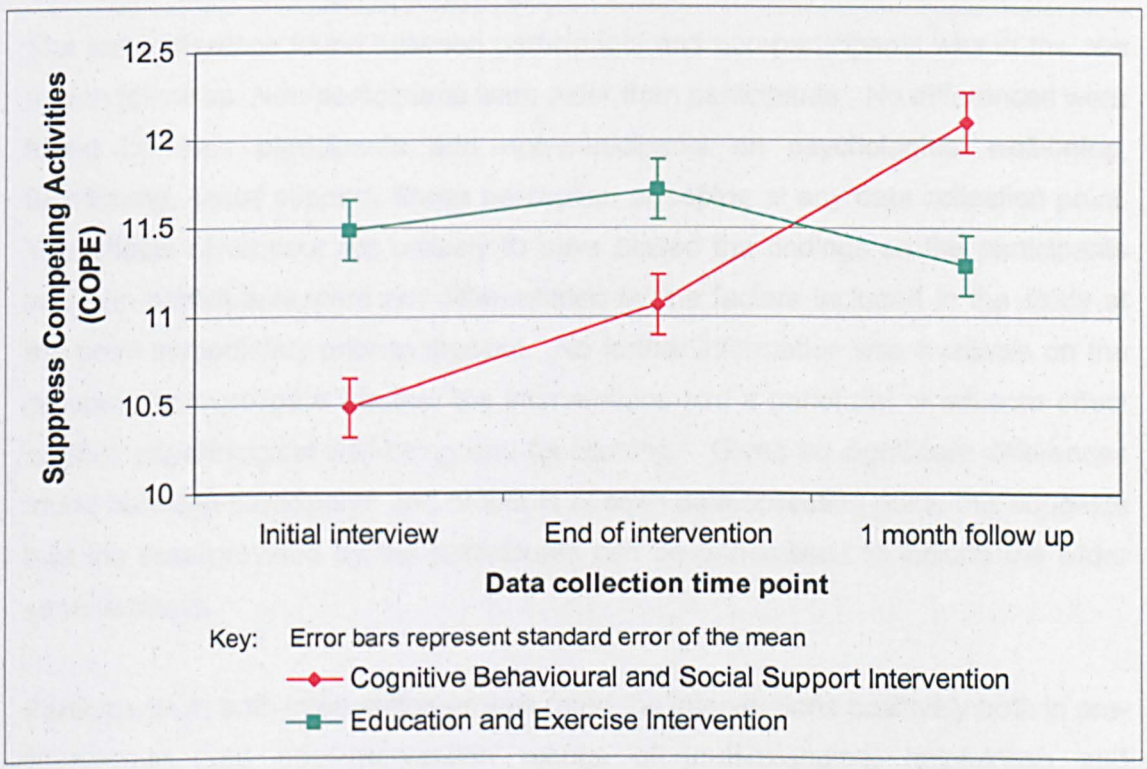


5.8.8.3.2 Does the intervention affect coping at one month follow up?

Analysis using MANOVA was conducted with three levels for the within-subjects factor of time. No significant effects were found for time ($F(8,58)=1.53$, $p>0.05$) or between-subjects ($F(4,62)=0.22$, $p>0.05$). There was a significant interaction (F(8,

58)=2.26, p=0.036). Post hoc univariate analyses with time as the within-subjects and type of intervention as the between-subjects factor identified changes in the Suppressing Competing Activities variable (F(2, 130)=4.00, p=0.025) (partial eta squared=0.058). Scores on this variable increased equally (0.4 increase) for both types of intervention at the end of the intervention. At one month follow up, the mean score on Suppressing Competing Activities for the CB&SS intervention had again increased (11.1 to 12.1) whereas the E&E intervention scores had decreased by 0.4 (11.7 to 11.3). An increase in scores reflects greater use of this method of coping (see Figure 5.14) but effect size was small (<0.3).

Figure 5.14 Mean COPE Suppress Competing Activities scores for each intervention at initial interview, end of intervention and one month follow up



5.8.8.3.3 Does the intervention affect coping at six month follow up?

MANOVA was computed using time as the within-subjects factor with 4 levels. No significant results were found between time and type of intervention (F(12,28)=0.97, p>0.05), time (F(12, 28)=0.89, p>0.05), or between-subjects (F(4,36)=0.38, p>0.05).

5.8.8.4 Summary of changes

The CB&SS intervention had a greater effect on two of the social support variables with increases found at one month follow up. The social support variables did not display differential effects of the interventions at six month follow up.

Both interventions had a positive impact on illness perception with changes on two variables (Consequences and Timeline) at the end of the intervention. This was sustained at one month and six month follow up for Timeline but not for Consequences.

Improvement in one coping variable (Planning) was found for both interventions at the end of the intervention. At one month follow up, the CB&SS intervention had a positive impact on the Suppress Competing Activities variable with an increase in the mean scores. This was not found for the E&E intervention where scores declined.

5.8.9 Summary of findings

The only difference found between participants and non-participants was at the one month follow up. Non-participants were older than participants. No differences were found between participants and non-participants on psychological well-being, functioning, social support, illness perception or coping at any data collection point. The effects of dropout are unlikely to have biased the findings as the participants and non-participants were not differentiated by the factors included in the study at the point immediately prior to dropout. No further information was available on the dropouts to investigate whether the interventions had a beneficial or adverse effect on their psychological well-being and functioning. Given no significant differences found between participants and dropouts at each data collection point, this suggests that the data provided by the participants can be generalised to include the wider sample frame.

Participants in both intervention groups rated the interventions positively both in pre-intervention and post-intervention ratings of understanding, helpfulness and enjoyment. Furthermore, there was no difference in attendance at each type of intervention. This shows that the interventions were acceptable, and equally so, to the participants.

With regard to hypotheses 1 and 2, the type of intervention did not have an effect on the participants' psychological well-being or functioning. Some improvements were found at the end of intervention on the HADS-Depression scale but this was not sustained at one month or six month follow up. There were some changes in the variables indicating the Functioning factor, but over time the two variables displayed

improvement but the third indicated deterioration. Therefore, hypothesis 6 proposing that improvements would be maintained over time cannot be upheld.

The CB&SS intervention had a positive impact on social support over time compared to the E&E intervention where decreases in social support were found. No differential effects of type of intervention were found at the six month follow up. Therefore, hypothesis 3 is partially confirmed.

Positive changes were found in illness perception but the E&E intervention did not have a greater impact on illness perception as predicted. Therefore, hypothesis 4 is not confirmed.

The CB&SS intervention had a greater impact on the coping variables with improvements found on one variable (Suppress Competing Activities) over time. Scores on this variable declined in the E&E intervention. Improvement in one coping variable (Planning) was found for both interventions at the end of the intervention. Therefore, hypothesis 5 is partially confirmed as the CB&SS intervention has a positive impact on coping although this was not uniform for all the coping variables at each data collection time point.

5.9 Preliminary Discussion

The findings of the study are generaliseable to the wider older adult osteoarthritis primary care population as no differences were found between participants and non-participants on the psychological well-being and functioning factors at any stage of the study.

The interventions were rated as being helpful, enjoyable and understandable and no difference in attendance rates were found for the type of intervention indicating that participants found the group intervention approach acceptable. Dropout rates were higher than anticipated from the literature with only a 70% completion rate. Of those completing the interventions, 77% provided one month follow up data but only 48% provided data at six month follow up. The dropout rate means that the study was insufficiently powered and the findings must be treated with caution.

Reasons for dropout were not formally assessed but reported reasons from some initial participants in the interventions indicated that the acute onset of another illness or difficulties with transport were factors. The onset of illness could bias the

sample but given the wide sample frame of individual with osteoarthritis, there would have been other participants who had experienced acute illness in the past but were relatively well at the time of this study. Participants with acute illness are unlikely to benefit from interventions focused on osteoarthritis when treatment for another condition is required. Consequently, attempting to include these participants would have compromised the findings by offering interventions at an inappropriate time. Within an ageing population, increasing illness is found and excluding potential participants who had any other illness other than osteoarthritis would have significantly reduced the population available for study. More seriously, it would have reduced the generaliseability of the findings to the small number of older people who only have osteoarthritis. Initial non-participation and dropout rates were higher in this study than has been reported in the literature. The population in this study were older people with osteoarthritis in primary care and some of these may not have perceived their osteoarthritis as a problem compared with regular rheumatology clinic attenders that form the population for much osteoarthritis research. This is likely to have influenced the response rate found. In assessing the benefits of psychological or educational intervention work, self-selected participants are more likely to engage with the intervention on offer and thus provide a better opportunity to assess the merits of the intervention. Therefore, to reduce the impact of dropouts in the future, a larger sample size should be selected than that indicated by power calculations and estimates of dropout rates reported in the research to date to allow for the range of factors which influence the recruitment and retention of participants in primary care.

The findings of the study indicate that there are benefits to participants in attending group interventions with some improvements found in depression scores and in some functioning variables at the end of the intervention but these effects were not sustained at one month or six month follow up. The type of intervention did not have differential effects on psychological well-being and functioning as predicted. With the model identified in chapter four, and pictured in Figure 5.1, there is an association between psychological well-being and functioning and it was anticipated that the interventions would have an impact on both these variables. Given the association between the outcome factors, combining the psychological factors into a single intervention could increase the impact of the intervention. Therefore, a combined intervention approach including cognitive behavioural therapy, social support, education and exercise would allow further assessment of the model but this is beyond the scope of this study.

There were differential intervention effects on the psychological factors in the study. Both coping and social support were positively influenced by the CB&SS intervention but the effects were not maintained at six month follow up. Therefore, the CB&SS intervention did affect the psychological factors that it was designed to influence.

Both interventions had a positive impact on illness perception. Osteoarthritis was perceived as having less serious consequences at the end of the interventions and at one month follow up. Perceptions of the duration of the illness indicated that the participants thought it would last a long time at the end of the intervention but this declined over the one and six month follow ups. Given that participants in both interventions displayed these changes, education about osteoarthritis is unlikely to have had this effect. Interaction with other people with osteoarthritis could have provided the evidence that osteoarthritis is a chronic condition which would account for ratings of longer duration at the end of the intervention. At follow up, the evidence from others was no longer there and participants could then ignore this and rate the osteoarthritis as having a shorter duration. This could have an impact on mood state. Further work in determining what influences illness perception is necessary to identify which changes in illness perception are beneficial to older adults with osteoarthritis.

5.9.1 Conclusions

The model identified in study one (Figure 5.1), indicated that the influence of the psychological factors on psychological well-being and functioning differed, with social support and coping influencing psychological well-being and illness perception influencing functioning. Manipulation of these psychological factors did not find differential effects on psychological well-being and functioning. The association between psychological well-being and functioning may have accounted for this. Both interventions had positive effects on the outcome factors although these were not sustained, suggesting that intervention work with older people with osteoarthritis is merited but that consideration must be given to methods of maintaining the benefits over time. The education approach did not have a differential effect on illness perception which suggests that this factor is not influenced by an increase in knowledge about the disease. The intervention may not have increased participants' knowledge of the illness. Both the interventions had an impact on illness perception and this may be explained by the participants'

interactions with each other or changes in social support may reflect changes in illness perception given their association. In contrast, the coping and social support factors were positively influenced by the CB&SS intervention confirming a relationship between cognitive behavioural approaches and use of coping strategies, and social support interventions with an increase in social support. The interventions were found to be acceptable to the participants in their ratings of consumer satisfaction.

Overall, the findings indicate that there are benefits to participants in attending group interventions, including ratings of satisfaction, but the type of intervention does not make a difference to psychological well-being or functioning. The implications of these findings will be discussed further in chapter six.

Chapter Six: Discussion of the findings and their implications

6.1 Summary of the findings

The review of the literature in chapter two identified the need for research into the key psychological influences on psychological well-being and functioning in osteoarthritis. The literature reviewed was limited in that many studies failed to control for mood and were limited to single factor-single outcome associations. The studies described in this thesis addressed this need by comprising a two phase study. The first study empirically tested a theoretically derived model that included the key factors in a simultaneous analysis and also controlled for mood. The second study tested the influences of the psychological factors on psychological well-being and functioning in a longitudinal study. These studies are, to the author's knowledge, the first to identify in such a way the key psychological factors influencing psychological well-being and functioning in osteoarthritis and to test the suggested causal influences.

Study one identified a model of illness severity and psychological factors influencing the psychological well-being and functioning of older adults with osteoarthritis. Illness severity was found to influence both psychological well-being and functioning. Coping and social support were both found to influence psychological well-being; illness perception was found to influence functioning. Psychological well-being and functioning were associated. In study two, interventions were derived from the information about relevant psychological factors in study one to improve psychological well-being and functioning. Interventions were designed specifically to modify illness perception (education and exercise intervention (E&E)) or coping and social support (cognitive behavioural and social support intervention (CB&SS)). Participants found the interventions acceptable. As intended, participants in the CB&SS intervention displayed greater improvements in coping and social support than participants in the E&E intervention. No differences were identified between the interventions in effects on illness perception but changes in illness perception indicating less severe consequences of the illness were found at the end of the interventions. The participants improved on some measures of psychological well-being and functioning.

6.2 Implications of the findings

The implications of these findings will be discussed in relation to study one and study two separately.

6.2.1 Study One: Identifying the relationships between the three key psychological factors of illness perception, coping, social support, and their influence on the outcome factors of psychological well-being and functioning

The objective of study one was to analyse simultaneously the effects of coping, social support and illness perception on psychological well-being and functioning. In previous literature, many studies only examined relationships between one psychological factor and outcome (see chapter two). In contrast to the studies cited in chapter two, this study included multiple factors and controlled for the potentially confounding effects of mood. This study appears to be the first to have included the three key psychological factors of illness perception, coping and social support simultaneously in a theoretically derived model, and then to have tested the model using robust and sophisticated statistical techniques. The findings can be accepted with confidence as the final model confirmed most of the hypothesised relationships and adequately fitted the data. This model, therefore, has implications both for understanding the interrelationships between the outcome factors (psychological well-being and functioning) and the separate and overlapping influences of the psychological influences that were studied. The relationships confirmed in the model will be reviewed before discussing methodological and statistical issues.

6.2.1.1 The relationship between psychological well-being and functioning

As predicted, psychological well-being and functioning were associated. Within the chronic illness literature, depression and physical functioning are known to be associated (e.g. Hampson et al, 1994; Keefe et al, 1987, 1990, 1997; McDonald-Miszczak et al, 2001). The psychological well-being factor was indicated by measures of positive well-being and morale, as well as depression and anxiety, thus providing a more holistic approach to the psychological well-being of the individual rather than merely measuring depression or anxiety. The findings of study one showed that positive well-being and a reduction in depression and anxiety were associated with better functioning. Therefore, interventions focused on improving psychological well-being should also improve functioning.

6.2.1.2 The effect of illness severity on psychological well-being and functioning

Within the chronic illness literature, illness severity is known to influence psychological well-being or functioning but few studies have reported the effects of illness severity on both psychological well-being and functioning at the same time. Furthermore, within the osteoarthritis literature, the influence of illness severity on psychological well-being or functioning is confounded by using self-reports of pain as a proxy measure (Creamer et al, 1999, 2000; Hopman-Rock et al, 1996). It is known that radiological evidence of osteoarthritis is not related to pain (Salaffi et al, 1991; Summers et al, 1988). Testing the model in study one confirmed the influence of illness severity on psychological well-being and functioning as predicted. Illness severity had a negative effect on positive psychological well-being and a negative effect on higher functioning.

Illness severity in this study was only represented by one measure. The initial measurement model for illness severity included the Timed Up and Go (TUAG) walking task, duration of osteoarthritis, number of joints affected and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Only the TUAG displayed a significant factor loading. In isolation it cannot be a factor but it still provides a performance measure of the impact of osteoarthritis on individuals by assessing sitting and walking ability. The TUAG task could potentially be influenced by cognitions such as fear of falling or motivation. In this study (and in study 2), a few participants (<10%) were unable to complete this task due to these individuals being chairbound or bedbound. Therefore, the task was acceptable to the majority of the participants. In addition, participants completed the task in a reasonably safe environment, usually their own homes (or the intervention setting for part of study 2) which may have reduced their fears. This was not measured and further work would benefit from assessing fear of falling in relation to the TUAG. A further consideration is that there was no benefit to the participants to peform poorly. The inclusion of participants in both studies was solely on the basis of osteoarthritis and age (65 years and above) and their willingness to participate.

Radiological evidence does indicate severity but does not predict levels of pain or difficulties with mobility that are common symptoms in osteoarthritis (Creamer & Hochberg, 1997). Furthermore, radiological evidence is not always available, as osteoarthritis is often diagnosed at primary care level by history and examination (Afable & Ettinger, 1993). Therefore, the current measures of illness severity do not

perfectly describe it. Consequently, further work should be undertaken to confirm the key variables that indicate illness severity as a factor. A wider range of performance tasks such as those incorporating walking or balance (e.g. one-leg stand, functional reach, balance scales and longer walking tasks) should be used. The TUAG task should be included as it provides an easily observable performance measure not confounded by self-report.

6.2.1.3 Social support

The limited research in osteoarthritis has demonstrated a positive relationship between social support and psychological well-being (Sherman et al, 2003; Weinberger et al, 1987). Less social support has been associated with increased ratings of depression (Sherman et al, 2003) but not with stress, pain, disability or functioning (Weinberger et al, 1987). In the model identified in study one, social support was found to influence only psychological well-being and not functioning. These findings are therefore consistent with the current osteoarthritis literature.

Nevertheless, research into other chronic illnesses has associated higher levels of social support with better physical functioning in chronic obstructive pulmonary disease (COPD) (Grodner et al, 1996) and low blood pressure (Carels, 1998; Uchino et al, 1982). Social support and functioning were not associated in study one. The functioning factor in study one was indicated by self-report measures of functioning including pain and stiffness. Breathing and blood pressure can be objectively measured and may be more indicative of illness severity than functioning. Therefore, the findings in COPD and hypertension suggest a relationship between social support and illness severity. The relationship between social support and illness severity in osteoarthritis was not explored in study one and this gap should be addressed by further research.

The findings in this study indicated that higher levels of social support were associated with less perceived seriousness of the illness, as measured by the illness perception factor. In the literature review in chapter two, no associations between illness perception and social support have been reported in the literature. This is an important new finding. As there is no literature on which to base an explanation, a common-sense explanation may help. High levels of social support may lead individuals to rate the impact of their illness as less serious. If supporters are available to enable the individual with osteoarthritis to maintain their lifestyle, then the consequences of the illness are likely to be perceived as less serious.

Therefore, interventions focusing on social support should also have an impact on illness perception. This will be discussed further in relation to study two.

Social support was not associated with coping. This finding was unexpected as it was hypothesised that social support, illness perception and coping would all be associated. Within the literature, coping and social support have been associated where coping has been defined as encompassing a wide range of strategies which include seeking emotional, instrumental and social support; this is a circular argument as it suggests that the two factors measure the same concept. The measurement model for coping did not include these factors and reflected a more cognitive, problem solving approach. Therefore, coping and social support represent discrete processes in osteoarthritis. This is important in the overall model where both coping and social support influence psychological well-being, suggesting that different intervention approaches are necessary to influence coping and social support in order to improve psychological well-being.

The influence of social support on psychological well-being was found to be consistent with the osteoarthritis literature. Social support may be associated with illness severity in osteoarthritis as is found in other chronic illnesses, but this was not explored in this study. The relationship between illness perception and social support also merits further investigation. Future work should address these gaps.

6.2.1.4 Illness Perception

Illness perception was found to influence functioning but not psychological well-being. Within the osteoarthritis illness perception literature, higher ratings of illness perception (indicating perception of seriousness) have been associated with lower ratings of health status and higher ratings of self care activity (Hampson et al, 1994; McDonald Miszczak et al, 2001). No direct relationships were found between illness perception and psychological well-being in this study which is consistent with the literature.

Illness perception was associated with social support (see section 6.2.1.2) but not with coping. The lack of association between coping and illness perception in the simultaneous analysis of the factors in the model suggests that they measure two separate and unrelated factors. The influence of illness perception on functioning but not psychological well-being suggests separate paths of influence. This has

important implications in intervention work seeking to improve psychological well-being and functioning, and will be discussed further below.

6.2.1.5 Coping

This study found that coping in osteoarthritis is not an illness-specific factor. The coping factor initially included measures of coping specifically focused on the illness as well as measures of coping that asked more generally how an individual copes with stressors. The final measurement model showed that coping was better indicated by the general measures of coping than by the illness-specific ones. This finding is important as it demonstrates that coping in osteoarthritis is not focused solely on the illness. Coping was found to influence psychological well-being in this study. In the past, studies have restricted themselves to illness-specific measures of coping and found influences on psychological well-being (e.g. Keefe et al, 1987, 1990, 1997). By demonstrating that coping in osteoarthritis is not illness specific, rather that it reflects coping in general, this represents an important development in describing coping in the context of chronic illness. This suggests that an individual's psychological well-being and their coping strategies are not defined by their chronic illness. The focus of much clinical psychology intervention work is to engender change to help individuals improve their psychological well-being. One feature of this work is to aid individuals to generalise the use of strategies from one area to another. The view that coping is a non-illness specific factor and that individuals use the same coping strategies in a range of situations has implications in the design of clinical interventions for individuals with chronic illness and/or multi-faceted problems. Clinical interventions could focus on aiding individuals by helping them devise general strategies and then applying them to a range of specific situations rather than the reverse which is attempted more frequently (e.g. Beck, 1979, Hawton et al, 1989).

In the osteoarthritis literature, coping has also been found to influence functioning (Hampson et al, 1996; Steultjens et al, 2001). However, the expected influence of coping on functioning was not found in this study. This appears surprising, but given that the influence of coping on psychological well-being in this study was not illness-specific, coping would not necessarily have a separate influence on functioning in osteoarthritis, as the functioning factor in the final model focused specifically on functioning in relation to osteoarthritis. This further indicates that there are separate influences of the psychological factors (coping, illness perception, social support) on psychological well-being and functioning. This will be discussed further below.

6.2.1.6 Methodological issues

6.2.1.6.1 Sample frame

This study recruited participants at primary care level, and was thus able to include participants with the range of symptom presentation and severity that is representative of the osteoarthritic population. Recruiting at primary care level has significant advantages over studies recruiting from rheumatology outpatient clinics (e.g. Creamer et al, 1999; Keefe et al, 1987, 1990, 1997) in that the findings will be generaliseable to the osteoarthritic population. No other studies in the literature reported recruitment from primary care, suggesting that this study was the first to do so.

The sample frame for study one (and study two) included older adults with osteoarthritis recruited from general practices. Identification was from GP records, with diagnosis of osteoarthritis having normally been undertaken at general practice level. The recruitment method may have 'missed' some individuals for whom osteoarthritis was not recorded in their records, but given the prevalence of osteoarthritis in the population, this is unlikely to have had a significant effect on the findings.

6.2.1.6.2 The implications of non-participation

In most studies, it is difficult to ensure that all potential participants approached actually participate. In study one, individuals opted in to the study by replying to a letter from their general practitioner detailing the aims of the study. This approach was successful and more efficient in allowing the study to focus solely on those willing to participate. Sufficient numbers were obtained using this approach. The participation rate was 77% defined by dividing the number of participants by the number of participants and refusals added together (see equation PR1 in chapter three, section 3.3.6). In the literature, participation rates are lower in older adults than in younger age groups, with ranges between 50% and 73% (Carter et al, 1991; Herzog & Rodgers, 1988). In study one, the participation rate is therefore higher than that found in the literature indicating this method of recruitment was acceptable.

Nevertheless, there are potential problems with the opt-in approach in that those participants who opted in may not be fully representative of the osteoarthritic population. Information on which to compare participants and non-participants was limited; only age and gender comparisons could be made. No differences were

found between participants and non-participants on age or gender. This suggests that these findings are generaliseable to the sample frame. It is important to note that the sample frame may not be the whole osteoarthritis population but those who may be ready to receive help with their osteoarthritis.

In future, collecting more information on duration and number of joints affected for both participants and non-participants would enable better estimates of generaliseability. There are ethical considerations in collecting data on non-participants, especially those who have refused. Examining reasons for non-participation may be helpful in understanding what environmental, cultural or sociodemographic factors may have an influence on participation and non-participation. In seeking future ethical approval, the work must emphasise the importance of such information in determining the generaliseability of the results.

6.2.1.6.3 Problems with power

Methods of estimating power for covariance structural modelling (CSM) designs are limited by the available software. Estimates of power using conventional analyses of comparable designs are normally used. In study one, correlational methods indicated that a sample size of 113 would provide sufficient power. Given the complexity of the design, greater numbers are likely to be required. The CSM literature recommends a minimum of 100 to 150 for adequate power. In the absence of more formal calculation methods, a sample size of 150 was accepted as having adequate power. Study one had 157 participants and was thus adequately powered using both comparable designs and the numbers required for CSM. With a larger number of participants (e.g. greater than 250), the findings of the CSM analysis could be accepted with greater confidence. With greater numbers of participants, the inclusion of additional factors, such as radiological evidence or use of medication, would be viable and provide a more comprehensive approach to osteoarthritis in older adults.

6.2.1.6.4 The use of covariance structural modelling (CSM)

The inclusion in a single model of several psychological factors and their hypothesised influence on psychological well-being and functioning allowed for the simultaneous analysis of these influences and examination of their common and unique properties. In using CSM, this study was therefore able to determine the relationships between factors in the model whilst being able to control for them. Consequently, the simultaneous analysis of all the variables in the model using a

CSM approach allowed for these separate relationships to be disentangled. This represents a significant improvement on previous cross-sectional studies in which effects may be confounded by other psychological factors not measured simultaneously. This study included all the factors of interest in one single analysis. By including the key factors in a model and testing the model, the relative importance of the factors could be assessed as well as their relationships to each other. Therefore the empirical testing of a model theoretically derived from a wide range of literature allows an extension of the evidence base. The final model in study one provided a good basis for testing its applicability in an intervention approach (the aim of study two).

A defining feature of CSM is the need for multiple indicators of a factor. Where a number of indicators were not available (e.g. social support) then the best fit measurement model could not be analysed and confirmed. It is important, therefore, to include a wide range of measures to indicate a factor so that the best fit measurement models can be identified prior to CSM analysis. This study might have benefited from a wider range of measures, although each proposed factor was assessed using at least three measures. An increase in measures might have unacceptably increased the administrative burden on the participants. Within the study, each measurement model tested fitted the data adequately. In addition, the analysis of each measurement model prior to testing of structural model ensured that each factor was indicated by appropriate measures.

The sample size in this study at 157 was at the lower end of that recommended for CSM but acceptable for this type of analysis. Future work would benefit from a larger sample but ethically the sample size should be restricted to only that deemed necessary by power calculation and statistical analysis requirements.

6.2.1.7 Conclusions from Study One

This study was the first to include a combined analysis of the key psychological factors that emerged from the literature review, as influencing psychological well-being and functioning. Furthermore, the study controlled for the potentially confounding variables in its design by including the relevant key factors in a model. By using CSM, a simultaneous analysis could be undertaken, and the associations found in the model accepted with confidence. This study represents an improvement on previous studies by confirming empirically a theoretically driven model.

This study confirms the influence of social support, illness perception and coping on psychological well-being and functioning in osteoarthritis. The findings show that the relationships found are not equal, and that different factors influence psychological well-being and functioning, despite the correlation between these outcomes. This is an important finding as the influences and associations found in the model can then be tested through an intervention study to determine whether they represent causal paths.

6.2.2 Study Two: Can psychological interventions based on an empirically tested model improve psychological well-being and functioning in older adults with osteoarthritis?

From the findings of study one, a model of psychological factors, illness severity and psychological well-being and functioning was identified. The model supported the influence of the three psychological factors (illness perception, coping, social support) on either psychological well-being or functioning. This suggested a causal role and the aim of study two was to test this by manipulating the key psychological factors to improve outcome (psychological well-being and functioning). Two interventions were designed to influence the psychological variables shown to be important in study one. A key feature of this study is that the interventions were based on a theoretically derived and empirically tested model.

The interventions were designed to improve the independent or process variables of coping, illness perception and social support. The CB&SS intervention aimed to improve coping and social support and thereby the outcome of psychological well-being. The E&E intervention was designed to improve illness perception and thereby the functioning outcome factor. For the interventions to be successful, three criteria should be satisfied: (1) the interventions should be acceptable to the participants, (2) the interventions influence the process variables that they are designed to manipulate, (3) the interventions should improve outcomes. The findings indicated that the interventions were acceptable. The CB&SS intervention improved social support and coping in the short term but the E&E intervention did not influence illness perception. Improvements were found in psychological well-being and functioning but unfortunately these were not maintained over time. This study used a within-participants baseline control design and no changes in psychological well-being or functioning were found over the four week baseline pre-intervention confirming that the changes found in the participants were attributable

to the effects of the intervention. The findings are discussed in more detail below in relation to: acceptability, the effects of the interventions on the independent or process variables, and the intervention effects on the outcome factors. The methodological issues are then discussed.

6.2.2.1 Acceptability of the interventions

Few intervention studies report on consumer satisfaction ratings. Of over 40 studies cited in chapter five, only three reported ratings of consumer satisfaction. Consumer satisfaction ratings are a useful method of feedback on the content and delivery of the intervention, and thus its acceptability. Within the literature, evidence is available around appropriate session length and overall intervention duration; this provides the framework in which the interventions are delivered. It cannot, however, replace direct feedback from participants that allows further development of the intervention approaches to ensure maximum benefit to participants.

The interventions were delivered to groups of between six and 15 participants for two hours per week over a period of four weeks. Consumer satisfaction ratings on helpfulness, enjoyment and understanding were recorded at the beginning and end of the first session of the intervention and at the end of the intervention. These were uniformly positive which demonstrated the acceptability of the interventions to the participants. The ratings were undertaken using short four point Likert type scales. These may have been too crude to identify specific reactions to the intervention. Evaluations of the length of the intervention, its timings and where it took place were not sought. These ratings may have been useful in determining ideal location and duration of each sessions, and total number of sessions offered in each intervention. No difference was found between attendance rates at each type of intervention suggesting that no differences in format were present. The overall format was not assessed, and future work should ask participants more questions about the format of the intervention, such as preference for discussion versus presentations.

Dropout rates also demonstrate the acceptability of the interventions. Of the participants who attended at least one session of the intervention, 70% completed the intervention and 30% dropped out. This initial dropout rate is higher than the rates of 15 to 20% found in the literature (Calfas et al 1982; Currie et al, 2000; Sumathipala et al, 2000). It is, however, at the lower level of dropout rates found in health promotion programmes where dropout rates have ranged from 29 to 48%

(Carter et al, 1991). Therefore, the acceptability of the interventions was consistent with that found in the health promotion literature. Given that participants were selected as having osteoarthritis, and not on the basis of having a mental health problem, this is an acceptable completion rate for the intervention. Non-participation at the pre-intervention stage and the one and six month follow ups will be discussed below (section 6.2.2.3.2).

6.2.2.2 The influence of the interventions on the process variables

6.2.2.2.1 Social Support

Study one suggested a causal influence of social support on psychological well-being. Therefore, the intervention approach sought to influence social support in order to improve psychological well-being. In the chronic illness literature reviewed in chapter five, group social support approaches combined with cognitive behavioural therapy (CBT) or stress management produced better outcomes than social support in isolation (Radojevic et al, 1992; Shearn & Fireman, 1985). Therefore, study two combined the social support intervention with the CBT intervention.

Differences were found between the interventions in changes in social support up to one month follow up, with greater improvements found in the CB&SS intervention as predicted. This confirms that the intervention was influencing social support as designed. At six month follow up, increases in social support had occurred for both interventions. Consequently, improvements in social support over time may be attributed to the intervention up to one month follow up but ongoing increases at six month follow up are not explained by the differential effects of one intervention. From the osteoarthritis and chronic illness literature, there is limited information available on the long-term effects of social support interventions. Only one study provided six month follow-up data (Radojevic et al, 1992) but no significant changes were found in measures of psychological well-being. It is unclear why participants improved on measures of social support at six month follow up; it may be that efforts to improve social support by the participants take time to have an impact on individual's perceptions of social support.

A further consideration is the impact of the group interventions on social support. The interventions were presented in a group format and the participants may have derived some social support from being in a group with others who also experienced

similar difficulties, namely osteoarthritis. This informal peer support may explain the improvements found in social support in both interventions at the end of the intervention. The improvement in the CB&SS intervention was greater and confirms that the social support intervention had a differential effect in addition to the effects of informal peer support.

Further work is needed to assess the longer term impact of CB&SS interventions and identifying the mechanisms influencing longer term change. Also, the impact of informal peer support following a group intervention should be further assessed as this may extend an individual's supportive network as friendships may develop. This may be particularly important in later life when mortality reduces the size and range of supportive relationships.

6.2.2.2.2 Illness Perception

Longitudinal studies in arthritis found that initial illness perception or initial level of depression can predict depression up to 21 months later (Scharloo et al, 2000; Sharpe et al, 2001). Cross-sectional studies confirm associations between illness perception and the range of self-care activities (Hampson et al, 1994; McDonald-Miszczak et al, 2001). Within the chronic illness literature review (hypertension, angina, COPD, rheumatoid arthritis and osteoarthritis), no studies were identified that sought to alter illness perception to improve either functioning or psychological well-being. In this study, it was hypothesised that E&E approaches would have an effect on illness perception. Scores on the illness perception measures had changed at the end of both the CB&SS and E&E interventions, indicating a reduction in the perceived seriousness of the illness. This was not sustained at one and six month follow-up. In chronic illness, there is unlikely to be spontaneous improvement. Also, the baseline assessments showed no change in psychological well-being or functioning, indicating no improvement or deterioration on these measures. Therefore, the change in scores can be attributed to the effects of the intervention but these effects were short-lived. Separate effects of each intervention were not found. Greater information about the illness or exercise does not explain the improvements found in illness perception. Therefore, the E&E intervention did not affect illness perception, and was not the appropriate intervention to change illness perception.

This study appears to be the first to attempt to change illness perception in osteoarthritis and it may be that other researchers have been unsuccessful to date,

and negative findings have remained unpublished. Future work should note that illness perception did improve at the end of both interventions. Study one found an association between illness perception and social support. Given that the CB&SS intervention improved social support, it is likely to have had a positive effect on illness perception also, albeit indirectly. This does not explain why illness perception improved at the end of both interventions. It may be that interacting with others with varying degrees of osteoarthritis had a positive impact on illness perception. Less exposure to others with osteoarthritis, such as that found at one month and six month follow up could explain the increase in perceived seriousness of the illness (illness perception).

It is clear that either interacting with others with osteoarthritis or attendance at an intervention had a positive impact on participants' illness perception but further work is necessary to understand the factors which mediate the effects of illness perception on psychological well-being and functioning. Given that the E&E approach was ineffective in modifying illness perception, an intervention which takes into account the social support factor may be of benefit. Furthermore, given the association between self-care and illness perception found in the literature, a more interactive approach where participants are encourage to think and then apply a range of self-care activities in collaboration with other participants may merit further investigation. Then a more appropriate intervention could be tested.

6.2.2.2.3 Coping

Within the literature, CBT interventions have been found to improve coping with chronic illness (Calfas et al, 1992; Keefe et al, 1990; Keefe et al, 1996). In testing this model, the intervention work designed used cognitive behavioural strategies to change coping. Changes were found at both the end of the intervention and one month follow up for the CB&SS intervention but not the E&E intervention. Therefore, the cognitive behavioural approach was successful in improving coping, as it was designed to be. Six month follow up did not find any significant change which is consistent with the limited literature to date (Calfas et al, 1993). This study confirms that CBT approaches are of benefit in increasing the use of problem-solving styles that are of known benefit in osteoarthritis but no effects lasting beyond six months were found. Improving coping strategies on a long term basis would be beneficial, this merits further investigation. Booster sessions of CBT are used in clinical practice to maintain improvements in mood and this approach could be tested in relation to coping with osteoarthritis.

6.2.2.3 Effects of the interventions on psychological well-being and functioning

6.2.2.3.1 Effect of the CB&SS intervention on psychological well-being

In study one, the influence of coping and social support on psychological well-being was confirmed in the model. The CB&SS intervention was found to improve coping and social support as designed. Therefore, psychological well-being should also improve because of the influence of coping and social support. Some improvements were found but not on all measures of psychological well-being.

Changes were found in the depression scores over time, with improvement at the end of the intervention but not at one or six month follow-up. The type of intervention had no differential effect on depression scores. These improvements are unlikely to be attributable merely to the effects of time on depression as no changes in depression scores were found over baseline from initial interview to pre-group assessment. The benefit of having a baseline measure allowed direct within subjects comparisons to be made and these findings can be accepted as demonstrating improvement in the participants as a result of the interventions. Within the intervention literature, improvements have been found in psychological well-being irrespective of type of intervention (Cronan et al, 1998; Savelkoul et al, 2001; Shearn & Fireman, 1985). Therefore, finding improvement in depression scores in this study is consistent with the literature. Studies using CBT and social support interventions have found a greater duration of improvement in depression (Calfas et al, 1992; Keefe et al, 1990; Keefe et al, 1996) but this was not found in this study. The positive impact of the interventions on depression is important clinically as it may be that a combined CB&SS and E&E intervention could have greater effects on depression than those found in this study.

No improvements were found on the other measures of psychological well-being (anxiety, morale and general well-being), despite improvements on social support and coping found as a result of the intervention. This suggests that coping and social support may only have a causal influence on depression and not on the other variables comprising psychological well-being. Therefore, the suggested causal influences of coping and social support on psychological well-being identified in study one are only partially confirmed by study two. The variables not influenced by the intervention may be relatively stable over time and thus not amenable to psychological intervention or the one that sought to influence psychological well-being. This suggests that to improve psychological well-being holistically may

require additional intervention and further work should be undertaken to determine the specific mediating factors.

A further consideration is that the psychological well-being factor comprises orthogonal components with well-being and morale independent of depression. Anxiety is, however, known to overlap with depression and the lack of causal influence on anxiety is not easily explained. A possible explanation may be that in study two, anxiety scores on the Hospital Anxiety and Depression Scale (HADS) were on average two points higher than on the Depression scale of the HADS. Also, the CB&SS intervention did not focus on anxiety reduction techniques but on changing coping cognitions and problem solving. These two techniques are of known benefit in the psychological treatment of depression (Beck et al, 1985) but may not be sufficient in anxiety interventions where exposure techniques are included (Beck & Emery, 1979). Consequently, further work is needed to analyse the relationships between the variables that have comprised psychological well-being in this study.

6.2.2.3.2 Effect of the E&E intervention on functioning

There was no separate effect of the type of intervention on the illness perception factor, as improvements were found in participants in both interventions. Therefore, functioning scores should have improved at the end of both interventions. Functioning scores did improve on both interventions but not on all the variables indicating functioning.

Changes on the measures indicating the functioning factor were found. On two measures (COOP charts, Functional Limitations Profile (FLP)), scores indicated improvements at the end of the intervention but on the third (WOMAC), the scores indicated decline. At one month follow up, scores on the two improved measures had either returned to baseline (COOP) or indicated decline (FLP). The third measure (WOMAC) that indicated decline at the end of the intervention had returned to just above baseline. At six month follow up, the FLP displayed some improvement from the one month follow up and showed overall improvement in this measure. These findings suggest that the measures used may be identifying different factors or subfactors although each measure included items on activities of daily living. A wider range of functioning measures initially may have identified a better measurement model, but the loadings of each on the functioning factor were high (0.74 to 0.89). The inconsistent findings may be explained by the choice of

measures. The FLP measured the widest range of activities of daily living on which functioning was measured in comparison with the WOMAC and COOP. Therefore, it is likely to be more sensitive to change than the less comprehensive measures with significant changes found at each data collection point. The less comprehensive measures may have been compromised by Type I errors. Consequently, functioning as a factor may not be the most appropriate indicator and the FLP may have been sufficient. This requires further investigation.

6.2.2.3.3 Summary of the effects of interventions on psychological well-being and functioning

The interventions had positive influences on the outcome factors of psychological well-being and functioning. The effects on the specific measures were variable and this suggests that further work should focus on identifying the influences to be manipulated to improve anxiety, morale and well-being. Understanding of both the psychological well-being and functioning factors may benefit from further work. This may include clarification of the relationships between the variables in the factors and further identification work using measurement models.

6.2.2.4 Methodological considerations

6.2.2.4.1 Sample frame

Participants were recruited from general practices as in study one which provided a wide range of severity of osteoarthritis and thus greater generaliseability.

6.2.2.4.2 Non-participation and dropout

Participants were recruited through the same opt-in process as in study one. Of those with whom contact was made, 45% (n=170) agreed to take part. In the older adults literature, participation rates range from 50% to 73% (Carter et al, 1991; Herzog & Rodgers, 1988). The rate of participation is slightly lower than that found in the literature. The range of participation rates across the nine practices from which participants were recruited from was from 18% to 67%. Two practices (out of nine) had significantly lower participation rates than the remainder. Jarman indices were higher in these two practices indicating higher levels of deprivation and this may have been a factor. In areas of highest deprivation, access and take-up of health services is known to be lower (Feinstein, 1993) and perhaps more proactive promotional work may have enhanced recruitment in these areas. In future, it would be useful to gather additional information from non-participants in an effort to find out reasons for non-participation. For ethical reasons, this was not undertaken

in this study. Increased promotion of the proposed benefits of the study within the general practices may have improved participation but this hypothesis would need further investigation.

In the majority of intervention studies, dropout is a common problem, and this study proved no different. From completion of intervention to one month follow up, there was a 17% rate of dropout, this increased to 45% at six month follow up. The one month dropout rate is consistent with the literature, with rates of 5% to 21% found at one month follow up (Calfas et al 1982; Currie et al, 2000; Sumathipala et al, 2000). The figure for six months is higher than that reported in the literature where 15% to 25% dropout rates have been reported (ibid.). Therefore, the findings at this stage may be less reliable. There were, however, no differences found between dropouts and participants on data collected at previous data collection points, which suggests that the findings on the reduced sample are representative of the initial sample.

Reasons for dropout were difficult to ascertain as participants rarely gave reasons for non-attendance, and the constraints on ethical approval in this study meant that they could not be followed up further. In future studies, it would be beneficial to follow up dropouts to find explanatory factors. The high dropout rate between one and six months could have been ameliorated by maintaining contact with the participants so as to maintain their interest in the intervening period. This could be done either by an additional follow up at three or four months or by telephone contact. Either could have a perceived therapeutic effect that might bias the results, and if undertaken would need to be carefully structured to ensure a standard format for each telephone contact. An alternative approach could be to send reminder letters or postcards. Future work should attempt to reduce dropout rates and the inclusion of an additional data collection point between one and six months could have reduced dropout.

6.2.2.4.3 Potential interviewer bias

Interviewers were blind to treatment allocation at initial interview as allocation to treatment was undertaken by the principal researcher. Allocation to treatment was done on the basis of age and gender and not on the interview measures. Therefore, it is unlikely that there would have been bias prior to or at treatment allocation. The interviewers also facilitated the group interventions and would not have been blind to treatment allocation at the end of intervention, nor at one month and six month follow up. Therefore, there was some potential for bias in the follow-up interviews.

Given the numbers of interviews conducted and that the interviewers were unlikely to have a bias towards one intervention over another (as they had facilitated both types of intervention), bias remains unlikely.

Nevertheless, in future studies bias could be minimised if all interviews were conducted by one set of researchers and intervention facilitation by another set. If treatment allocation is on the basis of independent sample characteristics (e.g. age or gender) then the principal researcher could undertake treatment allocation without fear of bias. If, however, treatment allocation is on the basis of scores on particular measures, it may be helpful to devise a process prior to allocation to minimse the risk of bias. Computer based protocols can aid in this.

6.2.2.4.4 Power

Power calculations for the Multivariate Analysis of Variance (MANOVA) are limited by the available software. Therefore, power calculations for the most similar statistical approach (ANOVA) were undertaken. The sample size figure was then inflated to allow for potential dropout. The study was sufficiently powered at the start of the intervention with 124 participants attending at least one session. At the end of the intervention there were 86 completers and the different power calculations indicated the need for a minimum of 64 to 90, indicating that the study was probably sufficiently powered at one month follow up with 67 participants but not at six month follow up with 41 participants. Therefore, identifying intervention effects may have been compromised by the low numbers. Given the complexity of the analysis, greater numbers would improve the validity of the statistical analysis and therefore while the findings do contribute to the literature, replication with a larger sample should confirm these findings with greater confidence.

6.2.2.4.5 Use of baseline control

The baseline control comprised the use of two key measures at both initial interview and at the start of the intervention. These two measures (HADS and WOMAC) found little change over the four week baseline. Therefore, the changes found on, at least, these two measures at the end of the intervention and subsequent follow ups suggest that the changes were due to the effects of the interventions. As the study focused on multiple measures, administering them all at the start of the intervention would have provided baseline change measures for all the factors in the study, and provided further confirmatory data that changes found were attributable to the intervention. To avoid the effects of repeated measurements and fatigue on

participants, this was not undertaken. Future work should consider the inclusion of at least one measure of each factor where multiple measures repeated analyses are being considered.

6.2.2.4.6 Statistical analyses

The high rate of dropout and use of multiple measures meant that data interpolation for dropouts (as opposed to item non-response) would have meant that the 'complete' data was responded at six months. Data interpolation on such small numbers may have produced skewed data. Therefore, this was not undertaken.

Due to the high dropout rate and the use of multiple measures, partial intention to treat analyses were carried out by comparing participants and non-participants on the available data at the data collection point prior to dropout. No significant differences were found and therefore the findings do not appear to have been biased by dropout.

Within the randomised control trial literature, one outcome measure is usually selected as being of greater importance, and intention to treat analyses conducted on this measure. The issue of intention to treat analyses remains problematic in studies where no control group is included and where multiple measures are used. This study sought to assess the effect of the interventions on a range of measures that represented the process variables of illness perception, social support and coping, and psychological well-being and functioning. A combination of measures that define 'improvement' could allow for the development of one outcome measure on which to conduct intention to treat analyses may be conducted. This does not, however, address the issue of partial improvement on one or more measures. Defining a hierarchical approach may not be straightforward where two measures are seen as being of equal importance, in this study the HADS and the WOMAC were of equal importance. Further work is needed in this area to avoid the current simplistic approach that assigns treatment success or failure on the basis of one measure.

The use of MANOVA was effective in assessing the relationships of more than one independent variable with two dependent variables (psychological well-being and functioning). Sample sizes were sufficient until the six month stage where they fell due to participant attrition. This may have compromised the findings and retention of a greater number of participants would address this.

6.2.2.5 Conclusions from Study Two

The findings of study two used the model identified in study one to test the relationships found between the psychological factors (illness perception, coping and social support) and psychological well-being and functioning. An intervention study with two interventions was carried out using a within subjects baseline control design. The findings indicated that the interventions were acceptable to the participants. Both interventions were shown to be of benefit in improving psychological well-being and functioning but separate effects were found only in social support and coping. The separate causal influences suggested in the model in study one are confirmed for social support and coping but further work is required to determine the factors influencing illness perception. Therefore, two of the three criteria for successful interventions were fulfilled in that the interventions were acceptable to the participants and outcomes improved. The third criterion was partially fulfilled as changes were found in two of the process variables. These findings are consistent with the literature but represent a development in the knowledge base by the use of interventions derived explicitly from an empirically tested model.

The implications of the findings suggest that future work should explore models of illness severity to determine whether it is made up of a number of indicator variables or is best represented by one measure. The relationship between illness severity and social support merits further investigation given findings in the COPD and hypertension literature. The association found between illness perception and social support is not easily explained and should be explored further. The positive impact of the interventions on one variable (HADS Depression) in the psychological well-being factor confirms the benefits of the intervention approach but further work should explore the factor structure of psychological well-being. Similarly, the FLP improved overall but not linearly and the inconsistent changes in the other functioning variables merits further exploration. In conclusion, the findings of study two confirmed the benefits of intervention approaches for older people with osteoarthritis but have raised some interesting questions on which to base future research.

The use of a baseline control maximised the available numbers in the interventions and also provided control information within subjects thus using the participants more efficiently. The dropout rate reduced the power for the later stages of the study and the follow up findings should therefore be treated with caution. Comparisons

between dropouts and participants found no significant differences suggesting that the results were generaliseable to the initial sample.

6.3 Research implications

Within the chronic illness literature, there have been few studies that have tested a theoretically derived model and identified the relationships between key variables while controlling for potentially confounding factors. In intervention research, the literature on chronic illness has rarely controlled for the potentially confounding effects of mood; and predicted influences have not been empirically tested. This two phase study addressed these problems. Study two tested the influences found in the in the cross-sectional study (study one) confirming the causal influences suggested by the model. This was undertaken by designing interventions based on the model and testing these in a longitudinal design. Therefore, the two phase study represents an improvement on previous studies by linking an explicitly tested model with intervention work.

In identifying measurement models for each of the factors in the model, a number of issues emerged. Future studies should be clear about measures of illness severity or functioning as self-report measures can confuse the two. By testing the WOMAC measure in two different measurement models in this study, the WOMAC provided a better indicator of the functioning factor, and this pitfall was avoided. An association was found between social support and illness perception. This relationship requires further exploration that is beyond the scope of this study. In this study of psychological factors in osteoarthritis, coping was found not to be illness specific. This merits further investigation to confirm these findings in other chronic illness or psychological disorders. Confirmation of the findings of this study in other chronic illnesses and psychological disorders would have important implications for establishing linkages between models of health and psychological well-being. This would provide a more holistic view of the individual as being more than just their psychological problem or chronic illness.

The findings indicated the acceptability of the interventions and their influence on the outcome factors of psychological well-being and functioning. The influence of the interventions on social support and coping was consistent with the literature but the effects were short-lived. Further work should be undertaken to improve the long term impact of intervention work. This could be provided by booster sessions and further research could determine the most effective content of the booster. In

addition, providing boosters by telephone intervention or bibliotherapy merits further exploration. There appears to be a gap in the published literature in respect of studies aimed at improving illness perception. This study found some improvements in illness perception that were short-lived but the factors influencing this were not as predicted, therefore further work is necessary. An approach where participants were actively engaged in identifying illness perceptions and appropriate activities may be of more benefit than a largely didactic approach.

The study was sufficiently well-powered until one month follow up despite a higher than expected dropout rate between one and six months. Therefore, the statistical analysis was valid and the findings up to one month can be regarded as sound. The relatively small sample size and loss of participants at follow up may merit replication of the study and this should include efforts to improve the retention of participants. The use of a within-subjects baseline control design maximised the available numbers. This proved a useful method of obtaining no-treatment comparison data where spontaneous improvement is not expected.

The sample population included the widest available number of older adults with osteoarthritis and included the wide range of symptoms and severities as well as a range of participants from different sociodemographic areas. The findings are, therefore, applicable to the older adult osteoarthritic population and not restricted to a subset such as that found in hospital out-patients. Future research should adopt this approach to increase the generaliseability of the findings.

6.4 Clinical implications

From the generation of a model and testing it by intervention work, the findings have provided greater understanding of the processes involved in managing chronic illness. The findings of study one identified a model of psychological factors in chronic illness and study two tested this model. The findings can be applied clinically to improve management of osteoarthritis in older people in the general practice population. Thus these findings have wide applicability. Work to improve functioning and psychological well-being could be undertaken at either an individual or a group level. The two intervention approaches were acceptable to the participants and had a beneficial effect on their psychological well-being and functioning on some measures. Future clinical work could apply the intervention techniques in combination or singly as clinically appropriate. For some individuals, who present with: limited knowledge of their illness, symptoms of depression,

adequate social support, an intervention could include the CBT and education components of the interventions to offer a tailor made approach.

In addition to individual or group clinical psychological interventions, the findings can be used to improve the management of osteoarthritis in a range of ways. Bibliotherapy approaches could build on the material used in the interventions to offer a complete package targeting both psychological well-being and functioning. This could include information on coping, problem-solving as well as information on the illness. Including information on exercises without checking correct practice may be unwise. The bibliotherapy package could be piloted within primary care by offering the package to all osteoarthritic patients within a general practice. From an experimental point of view, these patients could be compared with others (from another general practice) not in receipt of the bibliotherapy package to determine the efficacy of such an approach.

The use of practice staff in delivering the intervention should also be considered. Practice nurses and district nurses have a monitoring role with many patients within the practice (Herzberg, 1995; Worrall et al, 1997). Therefore, they will come into regular contact with many older people with osteoarthritis. With advice, training and support they could provide some of the intervention approaches to their patients. This could include education, problem-solving and social support interventions in relation to osteoarthritis. In addition, they would be in a better position to recognise where and when more specialised help is required from physiotherapy, clinical psychology or rheumatology and refer patients appropriately.

Self-help material can also be developed which then could be distributed more widely throughout the local community including libraries, clubs and day centres which offer services to older people and others with osteoarthritis. From the findings of the study, coping and social support were found to improve as a result of the CB&SS intervention. Leaflets describing useful coping techniques and suggestions for increasing social contacts and where to find appropriate information could be helpful.

This research has focused on osteoarthritis but it has drawn on the literature on a range of chronic conditions. The findings could be tested in other chronic conditions to determine whether the model applies more widely than just older people with osteoarthritis. Work with older people is limited and using these findings as a basis

for further work in, for example, COPD or hypertension would be an efficient way of extending the evidence base. The model could then be tested and disease specific interventions using the current methods as a template could be investigated.

6.5 Conclusions

This two-phase study represents a significant development in the literature by identifying a multi-factorial model of psychological factors in osteoarthritis and then testing the model empirically by the use of intervention work. The findings are consistent with the literature and extend the evidence base by explaining the processes involved in interventions focused at improving functioning and psychological well-being. While the sample size was small, the findings provide a basis for both further work in this area as well as the practical clinical applications.

The findings can be applied to older adults with osteoarthritis in primary care as part of routine clinical psychology service provision. Routine primary care treatment of osteoarthritis could then be improved by the provision of specific psychological self-help materials based on the findings of this research. The findings can also be tested with older people with other chronic illness to develop appropriate evidence based psychological interventions. This research has important implications in improving treatment approaches in a neglected and under-treated group of older people.

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Appendices

Appendix 1: Details of Studies in Chapters One to Five

Appendix 1.1 Studies cited in Chapter One

Table 1.1 Studies indicating no association between radiological evidence of osteoarthritis and the presence of pain

Author	n	% female	age range /mean age	setting	joint
Summers et al (1988)	65	80	71	rheumatology outpatients	hip and/or knee
Davis et al (1991, 1992)	4134	52	45-74	community	knee
Salaffi et al (1991)	61	100	64	rheumatology outpatients	knee

Table 1.2 Studies describing sex differences in osteoarthritic pain

Author	n	% female	age range /mean age	setting	joint
Davis (1981)	2483	59	25-74	community	knee
Creamer et al (1999)	549	31	64	community	knee
Keefe et al (2000)	168	57	61	rheumatology outpatients and community	knee

Table 1.3 Studies reporting on osteoarthritis and functional impairment

Author	n	% female	age range /mean age	setting	joint
Davis et al (1991)	2844	not known	45-74	community	knee
Hopman-Rock et al (1996)	306	68	65	community	not specified
Van Baar et al (1998)	200	80	68	primary care	hip and/or knee
Klinger et al (1999)	30	63	76	community	hip and/or knee
Creamer et al (2000)	69	70	66	rheumatology outpatients	knee

Note: Verbrugge et al (1991, 1995) not reported due to limited information about a large population based sample.

Table 1.4 Depressive symptoms in older adults

Author	n	% female	age range /mean age	setting	measure	% depressed
Koenig et al (1988)	171	0	74	hospital	Hamilton DRS, MADRS	10-23
Kennedy et al (1989)	2137	66	75	primary care	CES-D	16.9
Livingston et al (1990)	813	63	74	community	Short CARE	17.3
Colenda et al (1993)	123	56	74	primary care	GDS, STAI	11.4 depressed
Callahan et al (1994)	1711	69	68	primary care	CES-D	17.1
Turrina et al (1994)	255	64	73	primary care	GHQ-12 and GMSA	22.4
Van Marwijk et al (1994)	384	70	75	primary care	Zung SDS, GDS, MADRS	11 - 29
Beekman et al (1995)	224	51	55-89	community	CES-D	not specified
Hendrie et al (1995)	3765	68	69	primary care	CES-D, Hamilton DRS	16.2
Penninx et al (1996)	3076	52	55-84	community	CES-D, HADS-Anxiety	14.8% depressed 39.7% anxious
Beekman et al (1997)	646	58	55-85	community	CES-D	major 9.2 minor 41.3
Ormel et al (1997)	5072	44	55-84	community	HADS	17% depressed 15% anxious
Kirby et al (1999)	40	68	74	community dysthymics	GMSA, Hamilton DRS	n/a

Table 1.5 Associations between osteoarthritis and depression

Author	n	% female	age range /mean age	setting	joint	measure	% depressed
Dekker et al (1993)	58	83	70	physiotherapy patients	not specified	Profile of Mood States	not specified
Hawley & Wolfe (1993)	463	70	63	rheumatology outpatients	hip/knee	AIMS	19
Dexter & Brandt (1994)	108	88	75	community	hip/knee	AIMS	not specified
Zautra et al (1994)	37	100	not known	rheumatology outpatients	not specified	Mental Health Inventory subscale	not specified
Rajala et al (1995)	780	56	55	population	not specified	Zung SRDS	10
Abdel-Nasser et al (1998)	40	not specified	not specified	rheumatology outpatients	not specified	SCL-90	10
Creamer et al (1999)	374	32	64	community	knee	AIMS	not specified
Blixen & Kippes (1999)	50	50	70	rheumatology outpatients	not specified	CES-D	46
Zautra & Smith (2001)	101	100	65	community	not specified	6 item questionnaire	not specified

Table 1.6 Pain Management

Author	n	% female	Age range /mean age	Joint	setting	Measures	Findings
Davis et al (1990)	82	78	49 younger age group 72 older age group	RA & OA	rheumatology outpatients	Pain Management Inventory, AIMS, CES-D, McGill Pain Questionnaire	Medication, rest, heat, distraction, exercise most often used by older adults. Younger people used more methods

Table 1.7 Exercise and osteoarthritis

Author	n	% female	Age range /mean age	Joint	Setting	Exercise	Conclusion
Minor et al (1989)	80	80	64	knee or hip	rheumatology outpatients	12 week group, 3 conditions – aerobic walking, aerobic aquatics, range of motion control group	improvement in anxiety, depression, self-reported physical activity 60% exercise 1 year from baseline
Dexter (1992)	110	88	75	knee and/or hip	community	stretching, strengthening	medical support needed for compliance
Kovar et al (1992)	102	83	69	knee	rheumatology outpatients	8 week hospital based fitness walking	improvement in pain, reduction in medication use
Minor & Brown (1993)	80	82	64	knee and/or hip	rheumatology outpatients	18 month fu	initial post exercise maintained
Ettinger et al (1997)	365	70	69	knee	community	resistance, aerobic exercise training, control = health education	improvements in functioning, pain
Halbert et al (2001)	69	59	69	knee and/or hip	community	physical activity advice	beneficial but no control group difference

Table 1.8 Aids and adaptations

Author	N	% female	Age range /mean age	Joint	Setting	Measures	Findings
Mann et al (1995)	66	86	77	Arthritis	Community sample	Assistive Technology Used Survey, OARS, FIM, MMSE, CES-D, SIP	Average number of aids used was 2.2

Table 1.9 Education needs in osteoarthritis

Author	N	% female	Age range /mean age	Joint	Setting	Education	Factors	Findings
Allegrante et al (1993)	92	Not stated	70	OA of the knee	Hospital out-patients	ASES. AIMS	8 weeks x 80 min x 3 times per week, 10 – 15 participants, education about exercise	Improvements in activity, distance walked, and reduction in pain and medication used compared to control group
Ettinger et al (1997)	365	70	69	OA knee	Community	Physical performance tests	10 weeks x 3 times per week, 1 hour, 10 – 15 participants	Exercise group improved in disability, physical performance and pain compared with control group
Kovar et al (1992)	102	83	70	OA knee	Rheumatology clinic	Physical assessment, AIMS	8 week, 90 minutes, 3 x per week, group size 20 – 30, supervised walking course and patient education	Improvements in functional status, walking, decrease in pain and medication use found in walking group compared with control group
Mahmud et al (19950)	100	74	61	RA and OA	Rheumatology outpatients	Questionnaire measuring knowledge, preferences for education	Education considered important by patients but often inadequate and associated with less effective overall treatment	
Minor et al (1993)	120	82	64	OA	Not stated	AIMS, SES, TSCS, Pain VAS, physical assessment	12 weeks, 60 mins, 3 x per week, group size not stated	Maintenance of exercise behaviour predicted by baseline depression and anxiety, physical activity

Author	N	% female	Age range /mean age	Joint	Setting	Education	Factors	Findings
Neville et al (1999)	41	83	71	not specified	rheumatology outpatients	information about disease	disease severity, level of pain, psychological distress, physical disability	
Sullivan et al (1998)	92	83	69	OA knee	Rheumatology clinic	AIMS, VAS Pain, ASES,	8 week education + supervised fitness walking, 3 times per week, 10-15 per group	Intervention group improved exercise and walking compared with controls but not maintained at 12 months

Table 1.10 CBT & Pain Coping Skills Training studies

Author	N	% Female	Age Range /Mean Age	Groups	Setting	Measures	Significant Improvements
Calfas et al (1992)	35	73	67	CBT, Education	community	Quality of Well-being Scale, AIMS, BDI, Social Support Questionnaire	no significant differences at 12 month follow-up
Keefe et al (1990)	99	72	63	Pain coping skills, education, standard care	rheumatology outpatients	Coping Strategies Questionnaire, AIMS	6 month follow-up indicated better coping for pain coping skills group
Keefe et al (1996)	88	61	63	Coping skills training, with and without spouse, education control group	not specified	AIMS, CSQ,	improvement in pain and psychological disability in spouse + CST and CST

Table 1.11 Summary of Arthritis Self-management program studies

Author	N	% Female	Age Range /Mean Age	% Osteoarthritis	Setting	Measures	Significant Improvements
Barlow et al (1998a)	112	82	60	44	community	HAQ, HADS	pain, disability, depression, reduction in visits to general practitioner
Barlow et al (1998b)	117	81	60	39	community	Arthritis Self-Efficacy Scale, HAQ, HADS	more confident in ability to manage pain, fatigue
Groessl & Cronan (2000)	363	64	70	100	health maintenance organisation	Arthritis Self-efficacy, QWB, Cost information	cost-effective program in that reduces future attendance at hmos
Hampson et al (1993)	61	65	72	100	rheumatology outpatients	MOS, Summary of Arthritis Management Methods	different self-management tasks used on good and bad days
Lorig & Holman (1993)	1061	82	64	73	community	Visual analogue scales, HAQ, CES-D, BDI	pain, disability, depression, reduction in visits to physician

Table 1.12 Other Intervention Studies

Author	N	% Female	Age Range /Mean Age	Groups	Setting	Measures	Significant Improvements
Rene et al (1992)	40	87	62	Monthly telephone intervention, treatment as usual	rheumatology outpatients	AIMS	improvement in pain
Weinberger et al (1986)	134	88	66	12 biweekly telephone interview over 6 months	rheumatology outpatients and primary care	AIMS, SIP	improvement in physical and psychological disability and pain
Weinberger et al (1989)	439	87	62	Telephone monthly Intervention clinic Telephone + clinic Treatment as usual	rheumatology outpatients and primary care	AIMS, Philadelphia Geriatric Center Morale Scale	10% functional status improvement in telephone compared with no telephone

Note: AIMS = Arthritis Impact Scale, BDI = Beck Depression Inventory, CES-D Center for Epidemiological Studies – Depression Scale, CSQ = Coping Strategies Questionnaire, GDS = Geriatric Depression Scale, GHQ-12 = General Health Questionnaire 12 item version, GMSA = Geriatric Mental State Assessment, HADS = Hospital Anxiety & Depression Scale, Hamilton DRS = Hamilton Depression Rating Scale, HAQ = Health Assessment Questionnaire, MADRS = Montgomery Asberg Depression Rating Scale, MOS = Medical Outcomes Scales, QWB = Quality of Well-being scale, SCL-90 = Symptom Check List, Short CARE = , SIP = Sickness Impact Profile, STAI = State Trait Anxiety Inventory, Zung SRDS = Zung Self Rating Depression Scale

Appendix 1.2 Studies cited in Chapter Two

Table 2.1 Application of appraisal studies

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Aldwin (1991)	228	61	42 (18-78)	Random community	Community	WOCS, CES-D	Path analysis	No effects of age on appraisal on stress
Aldwin et al (1996)	1052	0	66 (48-91)	Normal ageing study	Community	BWOC, stress and coping interview	MANOVA	No effects of age on appraisal but age affected coping strategy selection
Bombardier et al (1990)	101	63	45	Chronic medical inpatients	Hospital	WCCL-R, SIP, CDRS, PSC	Cross-sectional, correlations	Emotion-focused coping maladaptive in coping with chronic illness and associated with higher depression scores
Downe-Wamboldt (1991)	90	100	80	OA patients in receipt of home nursing care	Community	AIMS, Stress Questionnaire, Jalowiec Coping Scale, LSIZ	Correlational, path analysis	Problem focused and emotion focused coping used with former increasing life satisfaction
Giorgino et al (1994)	217	78	52	RA	Rheumatology patients	AIMS, HAQ, items from WOC, McGill pain questionnaire	MANOVA, correlations	Pain less controllable than household, leisure activities and perceived as more important
Kalfoss (1993)	80	55	73	Medical inpatients	Hospital	WCC, MADRS, Likert scales	Cross-sectional, ANOVA & linear regression	Helplessness and powerlessness associated with depression

Table 2.2 Application of perceptions of illness studies

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Design/Analysis	Findings
Ahern et al (1995)	211 107	Not specified	18 – 81/66 46 – 86/70	RA OA	Hospital out patients	Illness behaviour questionnaire	Cross-sectional, factor analysis	OA patients more focused and somatic symptoms and their severity
Baumann et al (1989)	51	Not specified	Not specified	University students	Students !	Symptom checklist	Cross-sectional, comparison of means	Those given high BP readings more likely to report symptoms
Bishop (1987)	58	67	36.5	Adults	Community	Symptom sorts	Cross-sectional, cluster analysis	4 basic dimensions viz. viral, body area, psychological, disruption
Gray (1983)	103	Not specified	Not specified	Outpatients and community	Rheumatology and community	Symptom checklists	Cross-sectional, frequencies	Models of arthritis generated associated with specific symptoms
Hampson et al (1994)	61	72	72	OA	Rheumatology clinic	Structured interview, General Health Survey, Summary of Arthritis Management Methods	Cross-sectional and longitudinal, correlational	Higher levels of self-management associated with more use of medical services and poorer quality of life
Haug et al (1998)	350	61	75	Older adults	Medicare patients	Interview, life events, hassles scale, CES-D, SCL-90	Longitudinal, multiple regression	Seriousness associated with identity with illness

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Design/Analysis	Findings
Lau & Hartman (1983)	257	68	18.5	Students	University	Health locus of control scale and open-ended questions	Correlational	5 components viz. label, consequence, timeline, cause, cure
Lau & Ware (1981)	326	60	15 - 30	Students	University	Health locus of control questionnaire	correlation	4 dimensions of health beliefs viz. chance health outcomes, general threat to health, provider control over health, self-control over health
Lau et al (1989)	532	31%	17-18	Students	University	Set of illness specific open-ended questions	3 year longitudinal, correlational analysis of components	5 components viz. identity, timeline, consequences, cause, cure
Leventhal & Prohaska (1986)	396 614	Not specified	20 – 89 20 – 83	Older people	Community	Questionnaires Scenarios	Correlational,	Elderly report more health activities and attributing symptoms to age
McDonald-Miszczak et al (2001)	794 (377 with OA)	57	69	Older adults approx. 50% with OA	Community sample selected by random digit dialling	Structured interview including self care questions	Parametric comparisons between groups and regression analysis	Illness specific beliefs are better predictors of care in the arthritis group
Meyer et al (1985)	230	55	47	Hypertension	Primary care, community clinics	Semi-structured interview,	Cross-sectional, non-parametric	Associations between treatment adherence and symptom monitoring

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Design/Analysis	Findings
Murphy et al (1999)	62	84	60	RA	Hospital out patients	HADS, IPQ, HAQ	Cross-sectional, non-parametric	Association between depression and more severe illness perception
Perrig-Chiello et al (1999)	442	30	75	Healthy elderly	Community	Interview and health control beliefs assessment	correlational, ANOVA	Older age is associated with greater externality
Prohaska et al (1985)	112	51	70	Health elderly	community	6 disease focused questionnaires	Cross-sectional, ANOVA	illness perceptions disease specific, greater perceived vulnerability amongst older adults
Salmon et al (1996)	144	60	37	Adults	General practice	Physical symptom lists, GHQ	Cross-sectional, principal components analysis	4 principal components viz. abdominal, cold, musculo-skeletal, somatic anxiety
Scharloo et al (1998)	224	53	64 48 52	80 COPD 80 psoriasis 84 RA	Hospital out patients	Semi-structured interview, IPQ, coping questionnaire, HAQ, MOS	Cross-sectional, multiple regression	Positive correlations between worse outcome and more severe illness perception
Scharloo et al (2000)	64	Not specified	43-74	COPD	COPD out patients	Utrecht Coping List, IPQ, MOS-SF20	Longitudinal study over 12 months, regression analysis	First time illness perceptions and coping significantly contributed to social functioning, mental health, health perceptions 12 months later

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Design/Analysis	Findings
Schiaffino & Cea (1995)	63 101	90 90	53 42	RA MS	Hospital out patients	IMIQ	Cross-sectional, correlational	RA rated more variable than MS
Sharpe et al (2001)	22	55	70	RA	Hospital out patients	HADS, HAQ, CSQ	Cross-sectional, longitudinal over 21 months, ANOVA	Depression occurs early in RA and deteriorates. May be associated with greater disability in early stages
Turk et al (1986)	165	Not specified	31.9	Diabetes educators, diabetic patients, students	Professional body, clinical practice, university respectively	Implicit Models of Illness questionnaire	Cross-sectional, factor analysis	4 dimensional structure viz. seriousness, personal responsibility, controllability, changeability

Table 2.3 Application of coping studies

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Ax et al (2001)	Review paper			Chronic fatigue syndrome		Range in review include COPE, WCC, Illness Management Questionnaire	Review paper	Cognitive coping associated with better outcome
Beckham et al (1991)	65	67	55 (29 – 83)	RA	Rheumatology outpatients	AIMS, BDI, CSQ, Hassles Scale	Correlational, cross-sectional	Cognitive coping associated with measures of adjustment
Beckham et al (1994)	112	65	59 (30 – 84)	RA outpatients	Hospital outpatients	AIMS, CEQ, Arthritis Self-efficacy questionnaire, CSQ, PBAPI	Correlational, cross-sectional	Cognitive distortions associated with higher pain, disability
Blalock et al (1995)	300	83	68	Knee OA	Newspaper advert, clinic records	AIMS2, CSI, CES-D, PANAS	Longitudinal over 6 months, regression analyses	Cognitive coping strategies use predicated better affect
Burke & Flaherty (1993)	130	100	83	OA	Sheltered housing	WOCS, AIMS, Musculoskeletal impairment index	Correlational, cross-sectional	Poorer health associated with avoidance strategies
Carmody et al (2001)	67	25	56	Chronic low back pain	Newspaper advertising	MPI, RCSQ, pain level ratings, chronic disease index, Pain behavior checklist	Longitudinal over 12 weeks, analysis of variance	Dysfunction associated with catastrophising, fear and anger self-statements

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Endler et al (2001)	274	70	40	Acute and chronic health problems	Visitors to science museum volunteers	CHIP, Personal Attitudes Scale, Event Perception Measure	Analysis of variance, cross-sectional	Chronic health problems used more instrumental, distraction and emotional coping strategies than acute
Felton et al (1984)	170	61	61 (41 – 89)	Hypertension, diabetes, RA, blood cancer	Hospital specialty clinics	Items from WOC, cognitive restructuring questionnaire	Cross-sectional, analysis of variance, regression analyses	Cognitive coping strategies associated with positive affect
Felton & Revenson (1987)	151	63	61	Hypertension, RA, diabetes, cancer	Hospital, general practice	WOC, HLOC, interview	Longitudinal over 7 months, multiple regression	Older adults less likely to use emotional expression or information seeking in coping with illness
Gignac et al (2000)	286	86	68	Osteoarthritis and/or osteoporosis	Community	HAQ, OARS, Arthritis Helplessness Scale, coping efficacy, activity rating	Correlational, cross-sectional	Range of adaptation in response to disability
Griffin et al (2001)	42	64	55	RA	Rheumatology clinic	PANAS, COPE, West Haven-Yale Multidimensional Pain Inventory	Longitudinal over 9 months, multiple regression	Poor interpersonal relationships associated with venting negative emotions and increased negative affect

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Hampson et al (1996)	82	71	71	OA	Paid volunteers recruited via newspaper or community adverts	Personal models of arthritis interview, Summary of Arthritis Management Methods Questionnaire, AIMS2, Profile of Mood states	Longitudinal over 0, 1 and 4 months, regression analysis	Active coping associated with less depressed status
Hopman-Rock et al (1998)	157	65	65	Hip and knee pain	Community	SIP, Pain Coping Inventory, structured interview	Correlational, cross-sectional	Distraction most frequently used but resting was the mediator between pain chronicity and physical disability
Jensen et al (1991)	Review paper			Chronic pain		Included CES-D, BDI, WOCS, CSQ		Catastrophising is consistently associated with poorer functioning
Keefe et al (1987)	51	67	64	Knee OA	Rheumatology outpatients	CSQ, McGill Pain Questionnaire, AIMS, SCL-90	Cross-sectional, factor analysis	Cognitive coping e.g. rational thinking associated with lower pain levels, lower psychological distress
Keefe et al (1989)	223	75	53	RA	Rheumatology outpatients	Catastrophising items from CSQ, AIMS, CES-D, visual analogue scales	Longitudinal over 6 months, t tests, multiple regression	Catastrophising related to greater functional impairment and depression

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Keefe & Williams (1990)	88	59	50	Chronic pain	Pain management program referrals	CSQ, SCL-90, BDI, McGill Pain Questionnaire	Cross-sectional, correlational	No significant differences found between age groups
Keefe et al (1990)	99	72	63	Knee OA	rheumatology outpatients	CSQ, AIMS	Longitudinal (6 month follow up from intervention), analysis of variance	Use of cognitive pain control and rational thinking associated with lower levels of pain and disability
Keefe et al (1997)	130	59	61	Married knee OA	Pain management outpatients	CSQ, ASE, McGill Pain Questionnaire	Correlational, cross-sectional	Coping self-statements associated with higher self-efficacy
McCrae (1982)	255	40	24 - 49 (n=88) 50 – 64 (n=81) 65 – 91 (n=86)	Healthy community elderly	Community	Life events checklist, WOC,	Cross-sectional, analysis of variance	No significant differences in coping strategies between age groups
Miller et al (1989)	50	52	44	Hypertension, normotensive control group	Medical outpatients	BDI, Rand Anxiety scale, Miller behavioural style scale		Hypertensive patients are high monitors and information seeking is used as coping style

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Revenson & Felton (1989)	45	80	63	RA	Rheumatology outpatients	WCC, AIMS	Longitudinal over 6 months, multiple regression	Cognitive coping associated with positive affect
Rosenstiel & Keefe (1983)	61	69	43	Chronic low back pain	Hospital outpatients	CSQ, STAI, Zung Depression scale	Correlational, cross-sectional	Cognitive coping associated with lower pain ratings
Scharloo et al (1998) See Table 2.2								
Sinclair (2001)	90	100	46	RA	Rheumatology patients	ASE, Perceived Health Competence, Arthritis Helplessness Index, Vanderbilt, Pain Coping Inventory	Longitudinal over 6 weeks, correlational	Catastrophising predicted by passive pain coping, venting emotion and arthritis helplessness

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Steultjens et al (2001)	190	70	68	Hip or knee OA	Patients participating in exercise therapy trial including both intervention and control group	Pain Coping Inventory, visual analogue scales, Fear avoidance beliefs questionnaire	Longitudinal over 36 weeks, regression analysis	Passive coping styles predicted pain and disability in knee osteoarthritis
Strahl et al (2000)	154	86	54	RA	Arthritis foundation members	AIMS2, VPMI, PASS, ASE	Cross-sectional, correlational	Greater use of avoidance and withdrawal associated with poorer physical functioning, active coping associated with increased social interaction
Sullivan et al (1998)	86	69	36	Soft-tissue injury in back, neck or shoulders	Pain clinic	Pain Catastrophising scale, BDI, STAI, McGill Pain Questionnaire, Pain Disability index	Correlational, cross-sectional	Catastrophising predicted disability
Sullivan et al (2001)	111	19	62	Coronary artery disease	Cardiovascular clinic	SF-36, HAM-D, TPQ, MAF, SAQ, MPI, PANAS	Longitudinal over 5 years, regression analyses	Depression is mediated by angina and fatigue, positive affect in coronary disease

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Witty et al (2001)	78	6	48	Chronic low back pain	Inpatient rehabilitation	Problem-solving inventory, SIP, BDI, BHS, McGill Pain Questionnaire, visual analogue scales	Correlational, cross-sectional	Problem solving associated with better psychosocial adjustment
Yuet et al (2002)	54	48	73	COPD	Hospital	Jalowiec Coping Scale, PAIS-SR, PFSDQ-M	Correlational, cross-sectional	Emotional coping styles associated with poorer psychosocial adjustment

Table 2.4 Application of self-efficacy studies

Author	n	% female	age range /mean age	participants	setting	Measures	Analysis/Design	Findings
Arnstein (2000)	479	64	Not specified	Chronic pain	Pain clinics	VAS, Chronic Pain Self-efficacy scale, Pain disability index, CES-D,	Correlational, cross-sectional	Self efficacy is a mediator of the relationship between pain intensity and disability
Barlow et al (1998)	112	Not specified	49	Arthritis sufferers	Voluntary organisation recruitment	ASE, HAQ, HADS, PANAS	Longitudinal over 12 months, analysis of variance	Arthritis self-management programs improve psychological well-being and decrease pain
Endler et al (2001) See Table 2.3								
Holahan et al (1984)	64	50	65 – 75	Retired healthy elderly	Ex university employees	Structured interview	Longitudinal over 30 years, analysis of variance	Inverse relationship between self-efficacy and maladjustment
Keefe et al (1997) See Table 2.3								

Author	n	% female	age range /mean age	participants	setting	Measures	Analysis/Design	Findings
Keefe et al (2000)	177	67	58	RA and OA	Volunteers from newspaper, community ads and rheumatology clinic	URICA, CSQ, ASE	Cross-sectional, cluster analysis	5 different subgroups in sample associated with different stages of change
Kramer et al (2002)	3017	53	55 – 85	Community older adults	Longitudinal Aging Study	Hearing status questionnaire, CES-D, GSES, Pearlin Mastery, Loneliness scale,	Correlational, cross-sectional	Hearing impairments are associated with lower self-efficacy
Lefebvre et al (1999)	128	83	56	RA	Rheumatology clinics, public advertising	Diaries, ASES, POMS	Longitudinal over 30 days, regression analyses	Self-efficacy related to pain ratings, coping and mood
Lorig et al (1989a)	707	84	64	Arthritis sufferers	Newspaper and broadcast advertisements	HAQ, CES-D, knowledge questionnaire	Longitudinal over 4 months, correlational	Improvements in health outcomes after attendance at arthritis self-management program
Lorig et al (1993)	968	77 – 92	55 – 68	Arthritis sufferers	Newspaper and broadcast advertisements	HAQ, ASE, BDI	Longitudinal over 4 years, descriptive	Attendance at self-management program showed reduction in pain

Author	n	% female	age range /mean age	participants	setting	Measures	Analysis/Design	Findings
McDonald-Miszczak et al (2001) See Table 2.2								
O'Leary et al (1988)	33	100	49	RA	Arthritis Centre	HAQ, ASES, Zung Depression Scale, UCLA Loneliness scale, Perceived Stress Scale	Longitudinal over 5 weeks, pre & post group parametric comparisons	Improved pain management associated with higher self-efficacy
Penninx et al (1998)	2810	Not specified	Not specified	Chronic disease including arthritis, cardiac, COPD, diabetes	Community ageing study	CES-D, Pearlin mastery scale, structured interview	Cross-sectional, regression analyses	Perceived positive social support associated with better coping with depression in chronic illness
Rejeski et al (1996)	79	70	69	OA of the knee	Exercise trial sample	Confidence ladder	Correlational, cross-sectional	Self-efficacy contributed to improvement performance on exercise
Rejeski et al (2001)	480	51	72	OA of the knee	Telephone recruitment of over 65s	Likert scales, self efficacy confidence ladder	Longitudinal over 30 months, analysis of covariance	Decline in function associated with low self-efficacy

Author	n	% female	age range /mean age	participants	setting	Measures	Analysis/Design	Findings
Rhee et al (2000)	47	Not specified	60	RA	Rheumatology Clinic	CES-D, SCL-90, AIMS, MPQ, ASES, CSQ	Longitudinal over 18 months, path analysis	Decreases in pain and depression associated with higher self-efficacy following stress management intervention
Schiaffino et al (1991)	101	82	52	RA	Rheumatology clinic	CES-D, self-efficacy scale, experimenter coping scale	Longitudinal over 12 months, correlational	Higher self-efficacy associated with less disability and greater use of problem-solving coping
Shifren et al (1999)	121	83	56	RA	Rheumatology clinics and newspaper advertising	OARS, ASES, cognitive assessments, AIMS2, CES-D	Cross-sectional, structural equation modelling	Poorer cognitive performance was associated with lower self-efficacy and poorer mental health and more pain
Smarr et al (1997)	44	41	50	RA	Rheumatology clinics	ASES, CES-D, MPQ, AIMS	Longitudinal over 15 months, correlational	Improvement in self-efficacy after stress intervention associated with lower depression and pain
Taal et al (1993)	57	74	49	RA	Rheumatology clinics	AIMS (Dutch version), ASES (Dutch version)	Intervention, longitudinal over 14 months, ANCOVA	Improvement in self-efficacy and exercise behaviour over 14 months but no change in anxiety and depression

Author	n	% female	age range /mean age	participants	setting	Measures	Analysis/Design	Findings
Waller & Bates (1992)	57	65	75	Healthy elderly	Community	Multidimensional health locus of control scale, self-efficacy scale, health lifestyle	Correlational, cross-sectional	Healthy elderly had internal locus of control, high self-efficacy associated with good health behaviours

Table 2.5 Application of social support studies

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Affleck et al (1988)	129	67	50	RA	Rheumatology clinic	Arizona Social Support Interview Schedule, Global Adjustment to Illness Scale	Cross-sectional, correlational	Perceived social support satisfaction associated with better psychosocial adjustment
Anderson (1995)	126	55	68	COPD	COPD clinic	BDI, BAI, Rosenberg Self-esteem scale, Life Orientation Test, Personal Resource Questionnaire, Quality of Life Scale		Better social support associated with better quality of life
Andressen (1985)	207	100	77	Community elderly	Waiting list for sheltered housing	Blood pressure, UCLA Loneliness Scale, Self esteem and alienation measures	Group Intervention 3 – 5 participants focusing on social support topics study with 6 month Follow up	Intervention group had lower loneliness, lower blood pressure, higher social contacts, higher self esteem

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Brown et al (1989)	233	75	51	RA	Rheumatology clinic	Strong Ties Measure of Social Support, Social Health Scale, CES-D, AIMS	Longitudinal over 6 months, structural equation modelling	Higher satisfaction with social support less likely to be depressed when reporting higher levels of pain
Carels et al (1998)	126	43	25-45	Hypertension	Media recruitment	Blood pressure, SSQ6	Cross-sectional, correlational	High perceived social support satisfaction associated with lower blood pressure
Doeglas et al (1994)	54	65	53	RA	Rheumatology clinic	Groningen Activity Restriction Scale, GHQ, Social Support Questionnaire for Transactions	Cross-sectional, correlational	Receiving greater daily emotional support is associated with greater psychological well-being

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Doeglas et al (1996)	744	70	52	RA	Rheumatology clinic	Social Support Questionnaire for Transactions, Social Support Questionnaire for Satisfaction, GHQ, Rosenberg self-esteem,	Cross-sectional, principal components analysis	Support satisfaction more relevant in explaining health related quality of life measures.
Fyrand et al (1997)	138	100	55	RA	Rheumatology clinic	HAQ, EPQ, SSQT, GHQ-28	Cross-sectional, correlational, structural equation modelling	Mental health more affected by personality traits than social support
Goodenow et al (1990)	194	100	51	RA	Rheumatology clinic	HAW, Berkman Social Network Inventory, Quality of Social Support Scale, CES-D	Cross-sectional, correlational	Social support is a better predictor of functioning than illness severity

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Grodner et al (1996)	110	29	63	COPD	COPD clinical rehabilitation	SSQ, self-efficacy scale, QEB, CES-D	Longitudinal over 8 weeks, correlational	Perceived social support satisfaction is positively related to better physical and psychological functioning
Keele-Card et al (1993)	30 + spouses	77	67	COPD	Pulmonary clinic	CES-D, SSQ6, Loneliness scale	Cross-sectional, correlational, parametric comparisons	Social support satisfaction was linked to loneliness and depression in COPD patients but not their spouses
Krol et al (1993)					review			
Lambert et al (1989)	122	100	57	RA	Rheumatology clinic	Mental Health Index, social support index, Keitel Functional Test	Cross-sectional, correlational	Satisfaction with social support significant predictor of psychological well-being
Leidy (1995)			review					
Maisiak et al (1996)	405	87-96	60	RA and OA	Rheumatology outpatients	AIMS	RCT over 9 months, ANCOVA	Telephone contact associated with improved functioning

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Martire et al (1999)	5201	57	73	Cardiovascular study	Community sample	Social network scale, Interpersonal Support Evaluation List	Longitudinal over 5 years, hierarchical linear modelling	No decline found in instrumental or emotional support in older adults in longitudinal study over 5 years
Matt & Dean (1993)	623	50	50 +	Older adults	Community	'care and concern', CES-D, SCL-42	Longitudinal over 22 months, structural equation modelling	Increased psychological distress at t1 associated with less friend support at t2. Less friend support at t1 associated with greater psychological distress at t2
Mellor & Edelmann (1985)	36	86	82	Older adults	Community	Mobility Scale, UCLA Loneliness scale, PGCMS, LSI B, Social network list	Cross-sectional, correlation	No association found between psychological well-being and perceived social support
Penninx et al (1998)	2810	Not specified	Not specified	Chronic disease including arthritis, cardiac, COPD, diabetes	Community ageing study	CES-D, Pearlin mastery scale, structured interview	Cross-sectional, regression analyses	Perceived positive social support associated with better coping with depression in chronic illness

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Prince et al (1997)	654	61	76	Older adults	Community study (Gospel Oak)	List of threatening events, social support deficits, SHORT-CARE	Cross-sectional, correlations and odds ratios	Social support deficits associated with increased depression
Radojevic et al (1992)	59	76	54	RA	Outpatient rheumatology clinic	AIMS, CES-D	Behaviour therapy with family support, behaviour therapy, family support, no treatment control compared, 4 week intervention x 90 mins, 2 month FU, MANOVA	Behavioural intervention found greater improvement in measures of joint swelling but not psychological or pain measures
Rene et al (1992)	40	87	62	OA of knee and/or hip	rheumatology outpatients	AIMS	Longitudinal over 12 months, ANCOVA	improvement in pain
Revenson et al (1991)	101	82	51	RA	Outpatient rheumatology clinic	Structured interview, CES-D	Cross-sectional, regression analysis	Perceived helpful social support associated with lower depression, perceived problematic support associated with higher depression

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Riemsma et al (2000)	197	61	63	RA	Rheumatology out-patient clinic	AIMS2, Social Support List – Interactions	Cross-sectional, regression analysis	Perceived positive support is associated with lower levels of depression and vice versa
Scharlach (1988)	48	Not stated	84	Nursing home residents	Community	NOSIE-30, Lawton & brody ADL scale	Comparison of peer counsellor support with no support	New admissions paired with peer counsellors displayed better social functioning
Shearn & Fireman (1985)	105	75	56	RA	RA Outpatients	VAS for Pain, Grip strength, ESR, Walking speed, CES-D	Comparison of stress management, mutual support and control. Groups 10 weeks x 90 mins t-tests	No differences between groups on psychological measures, intervention groups better on joint tenderness
Sherman (2003)	298	50	71	Knee OA	Community	SF36, McGill Pain Scale, Ladder of Life, MOS Social Support Survey, 8 item strain scale, CES-D	Regression analyses	Participants reporting high social strain and the least social support had highest depressive symptoms. Participants with low social strain reported lower levels of depression at all levels of social support.

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Uchino et al (1992)	70	73	30-84	Family caregivers of Alzheimer disease	Community and voluntary agency	Social Support Interview, blood pressure monitor, HAM-D	Cross-sectional, analysis of variance	High levels of social support associated with lower blood pressure
Weinberger et al (1986)	134	88	66	OA of knee and/or hip	rheumatology outpatients and primary care	AIMS, SIP	Longitudinal over 6 months, correlational	improvement in physical and psychological disability and pain
Weinberger et al (1989)	439	87	62	OA of knee and/or hip	rheumatology outpatients and primary care	AIMS, Philadelphia Geriatric Center Morale Scale	RCT time period not specified, ANOVA	10% functional status improvement in telephone compared with no telephone
Weinberger et al (1990)	439	88	62					
Weinberger et al (1993)	393	88	62	OA	Rheumatology outpatients	AIMS	RCT over 6 months, parametric comparisons	Telephone contact is potentially cost-effective in osteoarthritis

AIMS = Arthritis Impact Measurement Scales, AIMS2 = Arthritis Impact Measurement Scales Second Edition, ASE = Arthritis Self-Efficacy Scale, BDI = Beck Depression Inventory, BHS = Beck Hopelessness Scale, CDRS = Carroll Depression Rating Scale, CEQ = Cognitive Errors Questionnaire, CES-D Center for Epidemiological Studies – Depression Scale, CHIP = Coping with Health Injuries and Problems, COPE = Coping Orientations to Problems Experience Scale, CSQ = Coping Strategies Questionnaire, GHQ = General Health Questionnaire, HADS =

Hospital Anxiety and Depression Scale, HAM-D = Hamilton Rating Scale for Depression, HAQ = Health Assessment Questionnaire, IMIQ = Implicit Models of Illness Questionnaire, LSIZ = Life Satisfaction Index Z, MADRS = Montgomery Asberg Depression Rating Scale, MAF = Multidimensional Assessment of Fatigue, MPI = Multidimensional Pain Inventory, MPQ = McGill Pain Questionnaire, MSPSS = Multidimensional Scale of Perceived Social Support, OARS = Multidimensional Functional Assessment Questionnaire, PAIS-SR = Psychosocial Adjustment to Illness Scale – Self Report, PANAS = Positive and Negative Affect Scale, PASS = Pain Anxiety Symptom Scale, PBAPI = Pain Beliefs and Perceptions Inventory, PFSDQ-M = Pulmonary Functional Status and Dyspnea Questionnaire, POMS = Profile of Mood States, PSC = Psychosomatic Symptom Checklist, RCSQ = Revised Coping Strategies Questionnaire, SAQ = Seattle Angina Questionnaire, SCL-90 = Symptom Checklist, SIP = Sickness Impact Profile, SSQ = Social Support Questionnaire, SSQ6 = Social Support Questionnare – Short Form, SSQT = Social Support Questionnaire of Transaction, STAI = State Trait Anxiety Inventory, TPQ = Tri-dimensional Personality, Questionnaire, URICA = University of Rhode Island Change Assessment questionnaire, VPMI = Vanderbilt Pain Management Inventory, WOC, WCC = Ways of Coping Checklist, WCCL-R = Ways of Coping Checklist – Revised,

Appendix 1.3 Studies cited in Chapter Three

Table 3.1 Examining recruitment rates in studies of older people

Author	Initial n	Eligible participants	Percentage of eligible participants from initial n	Participants	Percentage of initial n participating	Percentage of eligible participants participating	Setting	Mean age	% female
Boult et al (1988)	23801	1806	8	568	2	31	Recruiting high risk of hospital admission older adults in the community	79	57
Breckenridge et al (1985)	725	112	15	86	12	77	Clinical trial of psychological treatment for depression	Not stated	Not stated
Christensen et al (1992)	2777	203	7	101	4	50	Neuropsychological screening in participants wit medical problems	68	62
Glasgow & Hampson (1995)	155	116	75	81	52	70	Comparison of participants from community and clinic recruitment methods in osteoarthritis and diabetes	70	63

Author	Initial n	Eligible participants	Percentage of eligible participants from initial n	Participants	Percentage of initial n participating	Percentage of eligible participants participating	Setting	Mean age	% female
Halbert et al (1999)	2878	351	12	299	10	85	Recruitment of older adults for an RCT of exercise advice	67	54
Heun et al (1997)	35842	1305	3.64	291	0.8	22	Epidemiological study of psychiatric symptoms in older people	78	62
Mills et al (1996)	466	421	90	99	21	24	Recruiting older adults in sheltered housing to physical activity programs	77	79
Silagy et al (1991)	5780	448	8	400	7	89	Comparison of recruitment methods in a low dose aspirin trial in older people	76	53
Sumathipala et al (2000)	68	71	38	Unexplained physical symptoms	Outpatient clinic	Social Stress and Support Interview, GHQ-30	6 x 30 mins CBT, control group standard care, no baseline, 3 month FU, group size not stated, dropout 15% to 21%	CBT reduced distress, symptom perception	

Author	Initial n	Eligible participants	Percentage of eligible participants from initial n	Participants	Percentage of initial n participating	Percentage of eligible participants participating	Setting	Mean age	% female
Vogt et al (1986)	51417	704	1	551	1	78	Recruitment of participants for a hypertension trial in older people	61% aged 70 and above, 39% aged 60 – 69 years	63
Whelton et al (1997)	8787	4898	56	975	11	20	Comparison of recruitment methods for an RCT of non-pharmacological therapy in older people	69	48

Appendix 1.4 Studies cited in Chapter Five

Table 4.1 Intervention Studies cited in Chapter Five

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Abraham et al (1991)	73	76.7	84.5	Depressed	Nursing home residents	Not stated, no consumer satisfaction	CBT group 24 weeks x 1hour (n per group not stated), no baseline or FU reported	Benefits anecdotal but increased coping tools
Allegrante et al (1993)	92	Not stated	70	OA of the knee	Hospital out-patients	ASES. AIMS, no consumer satisfaction	8 weeks x 80 min x 3 times per week, 10 – 15 participants, education about exercise, no baseline, no FU	Improvements in activity, distance walked, and reduction in pain and medication used compared to control group
Anderssen (1985)	108	100	77	Lonely	Applications for sheltered accommodation	UCLA Loneliness scale, interviews, no consumer satisfaction	4 weekly mtngs. Duration not stated. N per group 3 – 5, no baseline, no FU	Improvements in UCLA Loneliness scale
Arean et al (1993)	75	74.7	66.4	Depressed	Community	GDS, HRSD, no consumer satisfaction	RCT comparing problem-solving with reminiscence with waiting list, 12 weeks x 1.5 hrs (n per group not stated), no baseline, 3 month FU	PST better than RT or WL

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Bouleware (2001)	review			Hypertension				
Bundy et al (1994)	29	14	54	Angina	Cardiology out-patients	HADS, exercise test, diary of angina episodes, no consumer satisfaction	7 weekly session x 90 mins, stress management including relaxation, problem solving, CBT techniques, no baseline, 8 week FU	Stress management associated with improvements in symptomatology, medication reliance and exercise tolerance. Both intervention and control group improved on anxiety
Bundy et al (1998)	120	22	55	Angina	Cardiology out-patients	Exercise test, diary of angina episodes, no consumer satisfaction	7 weekly session x 90 mins, stress management including relaxation, problem solving, CBT techniques, no baseline, 8 week FU	Stress management + exercise programme showed gains in exercise tolerance, less frequent angina and reduced reliance on medication
Calfas et al (1992)	40	73	67	OA	Rhuematology clinic, advertising	QWB scale, AIMS, BDI, SSQ, no consumer satisfaction	CBT group 10 weekly sessions, time not specified, no pre-group baseline, 2, 6, 12 month FU	No difference found between CBT and education.

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Clark & Vorst (1994)	Not stated	75	74	Depressed	Hospital in-patients	Interview, no consumer satisfaction	Problem-solving included, length, duration not stated but ongoing group, no baseline, no FU	Not a comparative study but found group approach helpful as part of integrated treatment plan
Dahlin-Ivanoff & Sjostrand (1998)	45	60	80	Macular degeneration	Low vision clinic	Not stated, focus group collected discussion information on satisfaction	Education about macular degeneration, 6-8 weeks, 2-3 hours per week, 4-6 participants, no baseline, no FU	Satisfaction ratings high for participants, social support perceived as useful
Dai et al (1999)	30	60	73	Depressed	Community	Hamilton DRS, Hamilton Anxiety Scale, no consumer satisfaction	Depression Prevention course including CBT techniques 8 weeks x duration not specified (n per group 15 – 20), no baseline, 8 week FU	Intervention group reduced depressive symptoms compared to control group
Devine & Pearcy (1996)	Review			COPD				
Devine (1996)	Review			COPD				

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Dowrick et al (2000)	108	64	46	Depression	Community	BDI, SF36, no consumer satisfaction	Prevention of depression, 8 x 2.5 hours, compared with problem solving and no treatment, group size not stated, no baseline, FU at 6 and 12 months	Both problem solving and prevention of depression improved measures of depression but not at 12 months
Dusseldorp (1999)	Review			Heart problems				
Ettinger et al (1997)	365	70	69	OA knee	Community	Physical performance tests, no consumer satisfaction	10 weeks x 3 times per week, 1 hour, 10 – 15 participants, no baseline, 3, 9 & 18 month FU	Exercise group improved in disability, physical performance and pain compared with control group
Gallacher et al (1997)	450	0		Angina	General practice	Chest Pain Questionnaire, Derogatis Stress Profile, no consumer satisfaction	3 sessions over 10 weeks, duration not specified, stress management (not described), FU 6 months, no baseline	Stress management group showed reduction in chest pain. Relaxation found to be beneficial

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Gallagher et al (1997)	245	64	69	Osteoarthritis	Outpatients	QWB, ASES, AIMS, AHI, CES-D, GDS, SSQ, Norbeck Social Support Questionnaire, no consumer satisfaction	Social support, education, education + social support interventions compare, 10 weekly, 10 monthly meetings x 2 hours, group size not stated, no baseline, 1,2, and 3 year follow up	No differences reported between interventions
Garcia-Vera et al (1997, 1998)	43	0	45	Hypertension	General practice	Blood pressure readings, Jenkins Activity Survey, Rosenbaum Self Control Schedule, Spielberger State Trait Anxiety Inventory, D'Zurilla-Nezu Problem Solving Inventory	7 individual sessions x 90 mins of relaxation, stress management, problem solving	Improvements in blood pressure and problem solving found in intervention group

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Germond et al (1993)	14	60	49	RA	RA outpatients	Treatment Perception questionnaire (consumer satisfaction), MHLC, Stress Evaluation Inventory, POMS, MPQ, AIMS,	16 x 2 hours x twice weekly, n = 8, sessions of stress inoculation training and pain management, control group 4 x 2 hours, n=6	No significant treatment effects found
Hammond et al (1998)	35	83	55	RA	Rheumatology outpatiens	ASES, AHI, HAQ, no consumer satisfaction measures	CBT 4 weeks x 2 hours, baseline 12 weeks, FU 6, 9 months	Quantitative analysis indicated improvements in joint protection but no change in pain, self-efficacy or helplessness
Kaas & Lewis (1999)	11	90.9	82	Depressed	Nursing home residents	GDS-Short form, no consumer satisfaction reported	CBT group 8 weeks x 2 hours (n per group = 11), no baseline, no FU	Outcomes observational and noted greater interactions
Karel & Hinrichsen (2000)	Review			Depression			Review	Group therapy can be useful

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Keefe et al (1990)	99			OA knee	Rheumatology clinic	CSQ, AIMS, no consumer satisfaction	Pain coping skills 10 sessions, time not specified, no baseline, 6 month FU	Pain coping skills showed better psychological well-being, less physical disability compared with educational approaches. Six month follow up showed lower levels of pain, physical disability, and pain behaviour in coping skills group
Keefe et al (1996)	88	61	63	OA knee	Rheumatology clinic	AIMS, SCQ, no consumer satisfaction	10 weeks x 2 hour Coping skills training, no baseline, no FU	Coping skills training group displayed higher levels of self-efficacy, lower levels of pain and psychological disability compared to control groups
Kovar et al (1992)	102	83	70	OA knee	Rheumatology clinic	Physical assessment, AIMS, no consumer satisfaction	8 week, 90 minutes, 3 x per week, group size 20 – 30, supervised walking course and patient education, no baseline, no FU	Improvements in functional status, walking, decrease in pain and medication use found in walking group compared with control group

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Kunik et al (2001)	56	17	71	COPD	Community and hospital out patients	SF-36, GDS, BAI, Client Satisfaction Questionnaire	1 session CBT or education x 2 hours, 6 – 10 per group, no baseline, 6 week FU	Reduced depression and anxiety in CBT group compared with education
Lacasse et al (1997)	review			COPD				
Leibing et al (1999)	55	74	53	RA	Rheumatology out patients	VAS, McGill Pain Questionnaire, STAI, Depression Index, AHI, Bernese Coping Modes, no consumer satisfaction	12 weeks x 90 minutes CBT, no baseline, no FU	CBT group showed improved coping, reduced impairment, compared to control group
Linden (1994)	review			Hypertension				
Lindroth et al (1997)	96	88	55	RA	Rhuematology outpatients	AHI, VAS, Stanford Health Assessment Questionnaire, no consumer satisfaction	8 sessions x 2.5 hours including information on diet, exercise, medication	Increased knowledge, increased exercise, reduction of pain found in education group compared with control group

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Lisansky & Clough (1996)	8	63	69	COPD	Not stated	SIP, Symptom Severity Scale, Combined General and COPD cognitive error questionnaire, Symptom questionnaire, no consumer satisfaction	8 week x 90 mins, 8 participants, no baseline, 2 week FU	Reduction in ratings of disability and psychological distress
Lox & Freehill (1999)	40	73	67	COPD	Not stated	CRQ, walking tests, no consumer satisfaction,	12 week x 3 times per week x 90 mins, n= 3 to 6.	Improvements in exercise related to improvement in self-efficacy and quality of life.
Minor et al (1993)	120	82	64	OA	Not stated	AIMS, SES, TSCS, Pain VAS, physical assessment, no consumer satisfaction	12 weeks, 60 mins, 3 x per week, group size not stated	Maintenance of exercise behaviour predicted by baseline depression and anxiety, physical activity
Morin et al (1993)				Insomnia				

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
O'Leary et al (1988)	30	100	49	RA	Rheumatology clinic, advertising	HAQ, ASES. Zung Depression Scale, PSS, no consumer satisfaction	CBT group 5 weeks x 2 hours, no baseline, no FU	CBT group displayed enhanced self-efficacy, reduced pain and improved psychosocial functioning compared with no treatment control
Parker et al (1988)	83	4	61	RA	Rheumatology clinic	VAS, McGill Pain Questionnaire, CSQ, AIMS, BDI, SCL-90-R, Hassles Scale, WOCQ, AHI, questionnaire on helpfulness, benefit pre and post treatment	CBT group for 1 week as inpatient with 1 –3 month follow up	CBT group showed greater use of coping strategies and confidence in ability to manage pain compared with control groups.

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Parker et al (1995)	141	42	60	RA	Rheumatology clinic	Hassles scale, Daily stress inventory, AHI, CES-D, STAI, ASES, CSQ, VAS for Pain, McGill Pain Questionnaire, AIMS, no consumer satisfaction	Stress management group including CBT 10 weeks x 1.5 hours compared with control, no baseline, 3 and 15 month FU	Stress management showed improvements on helplessness, self-efficacy, coping and pain both at intervention end and 15 month follow up
Pearlman (1993)	Not stated		> 60 years	Psychiatric patients	Day patients	Not stated, no consumer satisfaction	Not stated	Anecdotal improvements in mood
Radojevic et al (1992)	59	76	54	RA	RA outpatients	AIMS, CES-D, examination of joints, questionnaire on confidence in treatment and logic of treatment, pre and post intervention	Behavioural + social support, social support, no treatment control, 4 weekly meetings x 90 mins, no baseline, 2 month follow up	Behavioural + social support better at the end of the intervention but no difference at follow up

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Rhee et al (2000)	141	Not stated	Median 60	RA	Rheumatology clinic	CES-D, SCL-90-R, AIMS, VAS, McGill Pain Questionnaire, ASES, AHI, CSQ, no consumer satisfaction	10 week x 2 hour stress management, no baseline, no FU	Improved self-efficacy, cognitive strategies and reduced helplessness found in stress management group compared with control
Rose et al (2002)	review			COPD				
Savelkoul et al (2001)	168	68	51	RA	RA outpatients	Utrecht coping questionnaire, SIP, Loneliness scale, Social Support List-Interactions, LSQ, no consumer satisfaction	Coping vs social support vs no treatment control, 10 x 2 hours, 10-12 participants per group, no baseline, 6 month follow-up	Coping better on measures of coping but no differences between social support and coping on other measures
Schimmel-Spreeuw et al (2000)	51	100	69	Depressed	Outpatients	SCL-90, GDS, no consumer satisfaction	CBT, social skills, 4 weeks x 2 hours (n per group 6 – 10), no baseline, 6 month FU	Exploratory study but found improvements in depression scores and decline in severity of depression.

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Shearn & Fireman (1985)	105	75	56	RA	RA Outpatients	VAS for Pain, Grip strength, ESR, Walking speed, CES-D, no consumer satisfaction	Comparison of stress management, mutual support and control. Groups 10 weeks x 90 mins t-tests, no baseline, 4 month FU	No differences between groups on psychological measures, intervention groups better on joint tenderness
Sinclair & Wallston (2001)	90	100	46	RA	Rheumatology clinic	PANAS, AIMS, AHI, ASES, Psychological Vulnerability Scale, Resilient Coping Scale, Perceived Health Competence Scale, no consumer satisfaction used	5 week x 3.5 hours focusing on cognitive strategies, 6 week baseline, 3 month FU	Significant improvement in pain coping behaviours, psychological well-being, fatigue
Sullivan et al (1998)	92	83	69	OA knee	Rheumatology clinic	AIMS, VAS Pain, ASES, no consumer satisfaction	8 week education + supervised fitness walking, 3 times per week, 10-15 per group, no baseline, 1 year FU	Intervention group improved exercise and walking compared with controls but not maintained at 12 months

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Sumathipala et al (2000)	68	71	38	Unexplained physical symptoms	Outpatient clinic	Social Stress and Support Interview, GHQ-30, no consumer satisfaction	6 x 30 mins CBT, control group standard care, no baseline, 3 month FU, group size not stated, dropout 15% to 21%	CBT reduced distress, symptom perception
Superio-Cabuslay et al (1996)	Review			OA and RA				
Tennesdt et al (2000)	434	90	78	Older people with fear of falling	Community	Falls Efficacy Scale, SIP, no consumer satisfaction	Included CBT (behavioural contracting, problem-solving, assertiveness training) as well as exercise. 8 x 2 hour session twice a week x 4 weeks, no baseline, FU at 6 week, 6 month and 12 month	Compared with control group, intervention participants reported increased activity levels, greater mobility immediately after.
Timonen et al (2002)	68	100	83	Acute illness, mobility and balance difficulties	Out patients post discharge	Zung Self-rating Depression scale	Exercise classes twice a week x 10 weeks x 90 minutes	Improved mood in the exercise group

Author	N	% Female	Age Range /Mean Age	Participants	Setting	Measures	Analysis/Design	Findings
Zausniewski et al, 1997	37	89.2	75	Depressed	Community	Self-Control Schedule (SCS), STAI, CES-D, Life Satisfaction Index, Community Living Skills Scale, no consumer satisfaction	Randomly assigned to Learning resourcefulness training (n = 20) or placebo (n = 17) 6 weeks x 2 hours, no baseline , no FU	LRT effective in teaching CBT resourcefulness skills but no effect on anxiety or depression

TSCS Tennessee Self-Concept Scales, SES Support for Exercise Scale, GAS Generalised Anxiety Scale, PSI Physical Symptoms Inventory, CAQ Cogntiive Anxiety Questionnaire, ELI, Efffects of Life Inventory, PSS=Perceived Stress Scale, POMS=Profile of Mood States, MPQ=McGill Pain Questionnaire, AIMS=Arthritis Impact Measurement Scales, MHLC=Multidimensional Health Locus of Control Scale

Appendix 2: Measures Used in Studies 1 and 2

1. Functional Limitations Profile (FLP)
2. Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)
3. Dartmouth COOP Charts
4. Hospital Anxiety and Depression Scale (HADS)
5. Philadelphia Geriatric Center Morale Scale (PGCMS)
6. General Well Being Schedule
7. Timed Up and Go task
8. Illness Perception Questionnaire (IPQ)
9. Illness Beliefs Questionnaire (IBQ)
10. COPE Inventory
11. Pain Coping Strategies Questionnaire (Pain CSQ)
12. Medical Outcomes Study (MOS) Social Support Survey
13. Likert scales pre and post intervention

FUNCTIONAL LIMITATIONS PROFILE

Name:.....

Date:..... **Record Number:**.....

Ambulation items (maximum possible score = 1,006)

The following statements describe walking and use of stairs. Remember, think of yourself **today.** Only tick the box if you agree with the statement, **and if it is due to the state of your health.**

		Item weight
1. I walk shorter distances or often stop for a rest.	☐	(54)
2. I do not walk up or down hills.	☐	(64)
3. I only use stairs with a physical aid; for example, a handrail, stick or crutches.	☐	(82)
4. I only go up and down stairs with assistance from somebody else.	☐	(87)
5. I get about in a wheelchair.	☐	(121)
6. I do not walk at all.	☐	(126)
7. I walk by myself but with some difficulty; for example, I limp, wobble, stumble or I have a stiff leg.	☐	(71)
8. I only walk with help from somebody else.	☐	(98)
9. I go up and down stairs more slowly; for example, one step at a time or I often have to stop.	☐	(62)
10. I do not use stairs at all.	☐	(106)
11. I get about only by using a walking frame, crutches, stick, walls, or hold on to furniture.	☐	(96)
12. I walk more slowly.	☐	(39)

TICK HERE WHEN YOU HAVE READ ALL THE STATEMENTS ON THIS PAGE ☐

Body care and movement items (maximum possible score = 1

The following statements describe how you move about, bath, go to the toile yourself **today.** Only tick the box if you agree with the statement, **and it is due state of your health.**

13. I make difficult movements with help; for example getting in or out of the bath or car. ☐
14. I do not get in and out of bed or chairs without the help of a person or mechanical aid. ☐
15. I only stand for short periods of time. ☐
16. I do not keep my balance. ☐
17. I move my hands or fingers with some difficulty or limitation. ☐
18. I only stand up with someone's help. ☐
19. I kneel, stoop or bend down only by holding on to something. ☐
20. I am in a restricted position all the time. ☐
21. I am very clumsy. ☐
22. I get in or out of bed or chairs by grasping something for support or by using a stick or a walking frame. ☐
23. I stay lying down most of the time. ☐
24. I change position frequently. ☐
25. I hold on to something to move myself around in bed. ☐
26. I do not bathe myself completely; for example I need help with bathing. ☐
27. I do not bathe myself at all, but am bathed by someone else. ☐
28. I use a bedpan with help. ☐
29. I have trouble putting on my shoes, socks or stockings. ☐
30. I do not have control of my bladder. ☐
31. I do not fasten my clothing; for example I require assistance with buttons, zips or shoelaces. ☐
32. I spend most of the time partly dressed or in pyjamas. ☐
33. I do not have control of my bowels. ☐
34. I dress myself, but do so very slowly. ☐
35. I only get dressed with someone's help. ☐

TICK HERE WHEN YOU HAVE READ ALL THE STATEMENTS ON THIS PAGE

Mobility items (maximum possible score = 727)

These next statements describe how you get about the house and outside. Only tick the box if you agree with the statement, **and it is due to the state of your health.**

		Item weight
36.	I only get about in one building.	(76)
37.	I stay in one room.	(101)
38.	I stay in bed more.	(91)
39.	I stay in bed most of the time.	(114)
40.	I do not use public transport now.	(52)
41.	I stay at home most of the time.	(79)
42.	I only go out if there is a lavatory nearby.	(64)
43.	I do not go into town.	(47)
44.	I only stay away from home for short periods.	(46)
45.	I do not get about in the dark or in places that are not lit unless I have someone to help.	(57)

Household management items (maximum possible score = 695)

The following statements describe your daily work, around the home. When you answer, think of yourself today. Only tick the box if you agree with the statement, **and it is due to the state of your health.**

		Item weight
46.	I only do housework or work around the house for short periods of time or I rest often.	(50)
47.	I do less of the daily household chores than I would usually do.	(37)
48.	I do not do any of the daily household chores that I would usually do.	(90)
49.	I do not do any of the maintenance or repair work that I would usually do in my garden.	(75)
50.	I do not do any of the shopping that I would usually do.	(84)
51.	I do not do any of the cleaning that I would usually do.	(78)
52.	I have difficulty using my hands; for example, turning taps, using kitchen gadgets, sewing or doing repairs.	(78)
53.	I do not do any of the clothes washing that I would usually do.	(75)
54.	I do not do heavy work around the house.	(59)
55.	I have given up taking care of personal or household business affairs; for example, paying bills, banking or doing household accounts.	(69)

TICK HERE WHEN YOU HAVE READ ALL THE STATEMENTS ON THIS PAGE ☐

Recreation and pastime items (maximum possible score = 383)

The following statements describe the activities you usually do in your spare time, for relaxation, entertainment or just to pass the time. Again, think of yourself today. Only tick the box if you agree with the statement, **and it is due to the state of your health.**

		Item weight
56. I spend shorter periods of time on my hobbies and recreation.	☐	(32)
57. I go out less often to enjoy myself.	☐	(27)
58. I am cutting down on some of my usual inactive pastimes; for example, I watch TV less, play cards less, or read less.	☐	(50)
59. I am not doing any of my usual inactive pastimes; for example, I do not watch TV, play cards, or read.	☐	(91)
60. I am doing more inactive pastimes instead of my other usual activities.	☐	(43)
61. I take part in fewer community activities.	☐	(25)
62. I am cutting down on some of my usual physical recreation or more active pastimes.	☐	(34)
63. I am not doing any of my usual physical recreation or more active pastimes.	☐	(81)

Social interaction items (maximum possible score = 1,289)

These statements describe your contact with family and friends today. Only tick the box if you agree with the statement, **and it is due to the state of your health.**

		Item weight
64. I go out less often to visit people.	☐	(31)
65. I do not go out at all to visit people.	☐	(91)
66. I show less interest in other people's problems; for example, I don't listen when they tell me about their problems; I don't offer to help.	☐	(50)
67. I am often irritable with those around me; for example, I snap at people or criticize easily.	☐	(64)
68. I show less affection.	☐	(44)
69. I take part in fewer social activities than I used to; for example, I go to fewer parties or social events.	☐	(25)
70. I am cutting down the length of visits with friends.	☐	(31)

TICK HERE WHEN YOU HAVE READ ALL THE STATEMENTS ON THIS PAGE ☐

		Item weight
71. I avoid having visitors.	☐	(73)
72. My sexual activity is decreased.	☐	(64)
73. I often express concern over what might be happening to my health.	☐	(44)
74. I talk less with other people.	☐	(44)
75. I make many demands on other people; for example, I insist that they do things for me or tell them how to do things.	☐	(76)
76. I stay alone much of the time.	☐	(91)
77. I am disagreeable with my family; for example, I act spitefully or stubbornly.	☐	(86)
78. I frequently get angry with my family; for example, I hit them, scream or throw things at them.	☐	(103)
79. I isolate myself as much as I can from the rest of my family.	☐	(100)
80. I pay less attention to the children.	☐	(59)
81. I refuse contact with my family; for example, I turn away from them.	☐	(109)
82. I do not look after my children or family as well as I usually do.	☐	(66)
83. I do not joke with members of my family as much as I usually do.	☐	

Emotion items (maximum possible score = 693)

The next statements describe your feelings and behaviour. Again think of yourself today. Only tick the box if you agree with the statement, **and it is due to the state of your health**.

		Item weight
84. I say how bad or useless I am; for example, that I am a burden on others.	☐	(89)
85. I laugh or cry suddenly.	☐	(58)
86. I often moan and groan because of pain or discomfort.	☐	(67)
87. I have attempted suicide.	☐	(141)
88. I behave nervously or restlessly.	☐	(48)
89. I keep rubbing or holding areas of my body that hurt or are uncomfortable.	☐	(59)
90. I am irritable and impatient with myself; for example, I run myself down, I swear at myself, I blame myself for things that happen.	☐	(79)
91. I talk hopelessly about the future.	☐	(96)
92. I get sudden frights.	☐	

TICK HERE WHEN YOU HAVE READ ALL THE STATEMENTS ON THIS PAGE ☐

Alertness items (maximum possible score = 711)

These statements describe your general alertness today. Only tick the box if you agree with the statement, **and it is due to the state of your health.**

		Item weight
93. I am confused and start to do more than one thing at a time.	☐	(74)
94. I have more minor accidents; for example, I drop things, I trip and fall, or I bump into things.	☐	(90)
95. I react slowly to things that are said or done.	☐	(52)
96. I do not finish things I start.	☐	(45)
97. I have difficulty reasoning and solving problems; for example, making plans, making decisions, or learning new things.	☐	(178)
98. I sometimes get confused; for example, I do not know where I am, who is around, or what day it is.	☐	(115)
99. I forget a lot; for example, things that happened recently, where I put things, or to keep appointments.	☐	(85)
100. I do not keep my attention on any activity for long.	☐	(52)
101. I make more mistakes than usual.	☐	(49)
102. I have difficulty doing things which involve thought and concentration.	☐	(71)

Sleep and rest items (maximum possible score = 591)

These statements describe your sleep and rest activities today. Only tick the box if you agree with the statement, **and it is due to the state of your health.**

		Item weight
103. I spend much of the day lying down to rest.	☐	(96)
104. I sit for much of the day.	☐	(62)
105. I sleep or doze most of the time, day and night.	☐	(111)
106. I lie down to rest more often during the day.	☐	(72)
107. I sit around half asleep.	☐	(84)
108. I sleep less at night; for example, I wake up easily, I don't fall asleep for a long time, or I keep waking up.	☐	(86)
109. I sleep or doze more during the day.	☐	(80)

TICK HERE WHEN YOU HAVE READ ALL STATEMENTS ON THIS PAGE ☐

Eating items (maximum possible score = 706)

The following statements describe your eating and drinking habits. Only tick the box if you agree with the statement, **and it is due to the state of your health.**

		Item weight
110. I eat much less than usual.	☐	(34)
111. I feed myself but only with specially prepared food or special utensils.	☐	(76)
112. I eat special or different food; for example, I follow a soft food, bland, low salt, low fat, or low sugar diet.	☐	(52)
113. I eat no food at all, but I take liquids.	☐	(113)
114. I just pick or nibble at my food.	☐	(39)
115. I drink less fluids.	☐	(33)
116. I feed myself with help from someone else.	☐	(95)
117. I do not feed myself at all but have to be fed.	☐	(121)
NB. Interviewer may respond on behalf of client:		
118. I eat no food at all except by tubes or intravenous infusion.	☐	(143)

Communication items (maximum possible score = 685)

I am going to read out some statements about how much you talk to other people and write. Please think about yourself today. Only tick the box if you agree with the statement, **and it is due to the state of your health.**

		Item weight
119. I have trouble writing or typing.	☐	(50)
120. I communicate mostly by nodding my head, pointing, or using sign language, or other gestures.	☐	(127)
121. My speech is understood only by a few people who know me well.	☐	(94)
122. I often lose control of my voice when I talk; for example, my voice gets louder or softer or changes unexpectedly.	☐	(59)
123. I don't write except to sign my name.	☐	(84)
124. I carry on a conversation only when very close to other people or looking directly at them.	☐	(59)
125. I speak with difficulty; for example, I get stuck for words, I stutter, I stammer, I slur my words.	☐	(76)
126. I am understood with difficulty.	☐	(89)
127. I do not speak clearly when I am under stress.	☐	(47)

TICK HERE WHEN YOU HAVE READ ALL STATEMENTS ON THIS PAGE ☐

Work items (maximum possible score = 520)

The next group of statements has to do with any work you usually do other than managing your home. By this we mean anything that you regard as work that you do on a regular basis. Think of yourself today. If today is not a working day for you, think about your last working day. Only tick the box if you agree with the statement, **and it is due to the state of your health**.

Do you usually do work other than managing your home? YES NO

IF YES, COMPLETE THE WORK SECTION (Q. 128 — 136).

IF NO:

(a) Are you retired? YES NO

(b) If you are retired, was your retirement due to your health? YES NO

(c) If you are not retired, but are not working, is this due to your health? YES NO

IF YES TO QUESTION (C) ABOVE, PLEASE TICK ITEM 128 AND SKIP THE REST OF THE ITEMS IN THIS SECTION.

IF NO TO QUESTION (C) ABOVE, PLEASE SKIP ALL THE ITEMS IN THIS SECTION.

		Item weight
128. I do not work at all (includes retired because of health).	☐	(361)
129. I do part of my job at home.	☐	(40)
130. I am not getting as much work done as usual.	☐	(41)
131. I often get irritable with my workmates; for example, I snap at them or criticize them easily.	☐	(42)
132. I work shorter hours.	☐	(52)
133. I only do light work.	☐	(56)
134. I only work for short periods of time or often stop to rest.	☐	(65)
135. I work at my usual job but with some changes; for example, I use different tools or special aids or I swap jobs with someone else.	☐	(36)
136. I do not do my job as carefully and accurately as usual.	☐	(50)

TICK HERE WHEN YOU HAVE READ ALL THE STATEMENTS ON THIS PAGE ☐

(Maximum possible FLP score = 9,923).

Functional Limitations Profile

Summary scoring sheet

Name:.....

Date:..... **Record Number:**.....

	Sum of item scores a	Maximum score b	Total score $\frac{a}{b} \times 100$
Ambulation	☐	1006	☐
Body care and movement	☐	1927	☐
Mobility	☐	727	☐
Household management	☐	695	☐
Physical Dimension	☐	4355	☐
Recreation and pastime	☐	383	☐
Social interaction	☐	1289	☐
Emotion	☐	693	☐
Alertness	☐	711	☐
Sleep and rest	☐	591	☐
Psychosocial Dimension	☐	3667	☐
Eating	☐	706	☐
Communication	☐	685	☐
Work	☐	520	☐
Overall FLP	☐	9923	☐

INSTRUCTIONS TO PATIENTS

In Section A, B and C questions will be asked in the following format and you should give your answers by putting an "X" in one of the boxes.

NOTE:

1. If you put your "X" in the left-hand box, i.e.

None	Mild	Moderate	Severe	Extreme
X				

then you are indicating that you have no pain.

2. If you place your "X" in the right-hand box, i.e.

None	Mild	Moderate	Severe	Extreme
				X

then you are indicating that your pain is extreme.

3. Please note:
   a) that the further to the right you place your "X" the **more** pain you are experiencing.

   b) that the further to the left you place your "X" the **less** pain you are experiencing.

   c) **Please do not** place your "X" **outside** the box.

You will be asked to indicate on this type of scale the amount of pain, stiffness or disability you are experiencing. Please remember the further you place your "X" to the right, the more pain, stiffness or disability you are indicating that you experience.

Section A: Pain

INSTRUCTIONS TO PATIENTS

The following questions concern the amount of pain you are currently experiencing in your hips. For each situation please enter the amount of pain recently experienced. (Please mark your answers with an "X").

QUESTION: How much pain do you have?

1. Walking on a flat surface

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

2. Going up or down stairs

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

3. At night while in bed

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

4. Sitting or lying

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

5. Standing upright

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

Section B: Stiffness

INSTRUCTIONS TO PATIENTS

The following questions concern the amount of joint stiffness (not pain) you are currently experiencing in your hips. Stiffness is a sensation of restriction or slowness in the ease with which you move your joints. (Please mark your answers with an "X").

1. How **severe** is your stiffness **after first wakening** in the morning?

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

2. How **severe** is your stiffness after sitting, lying or resting **later in the day**?

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

Section C: Physical Function

INSTRUCTIONS TO PATIENTS

The following questions concern your physical function. By this we mean your ability to move around and to look after yourself. For each of the following activities, please indicate the degree of difficulty you are currently experiencing due to the pain in your hips. (Please mark your answers with an "X").

QUESTION: What degree of difficulty do you have with

1. Descending stairs

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

2. Ascending stairs

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

3. Rising from sitting

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

4. Standing

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

5. Bending to floor

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

6. Walking on flat

None ☐ Mild ☐ Moderate ☐ Severe ☐ Extreme ☐

7. Getting in/out of car

None ☐ Mild ☐ Moderate ☐ Severe ☐ Extreme ☐

8. Going shopping

None ☐ Mild ☐ Moderate ☐ Severe ☐ Extreme ☐

9. Putting on socks/stockings

None ☐ Mild ☐ Moderate ☐ Severe ☐ Extreme ☐

10. Rising from bed

None ☐ Mild ☐ Moderate ☐ Severe ☐ Extreme ☐

11. Taking off socks/stockings

None ☐ Mild ☐ Moderate ☐ Severe ☐ Extreme ☐

12. Lying in bed

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

13. Getting in/out of bath

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

14. Sitting

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

15. Getting on/off toilet

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

16. Heavy domestic duties

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

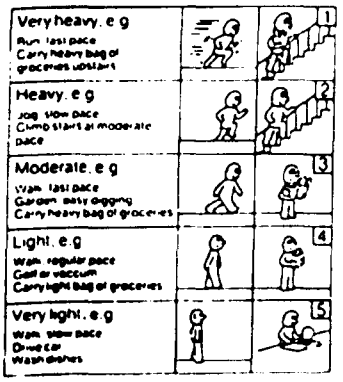
17. Light domestic duties

None	Mild	Moderate	Severe	Extreme
☐	☐	☐	☐	☐

Dartmouth COOP Function Charts[1]

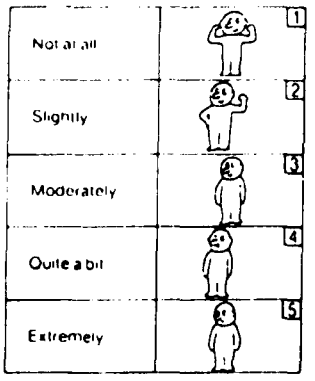
PHYSICAL CONDITION

During the past 4 weeks
What was the most strenuous level of physical activity you could do for at least 2 minutes?



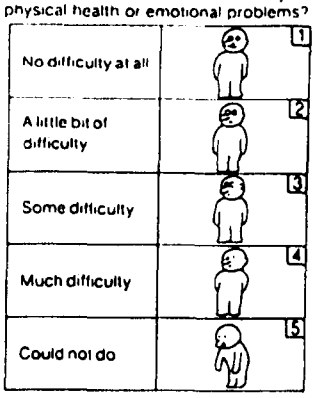
EMOTIONAL CONDITION

During the past 4 weeks
How much have you been bothered by emotional problems such as feeling unhappy, anxious, depressed, irritable?



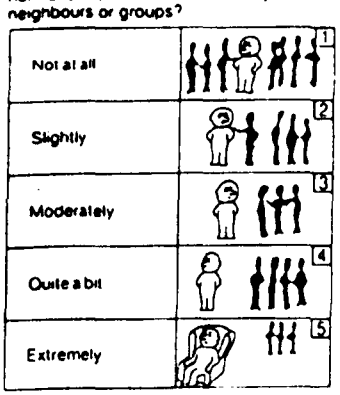
DAILY WORK

During the past 4 weeks
How much difficulty did you have doing your daily work, both inside and outside the house, because of your physical health or emotional problems?



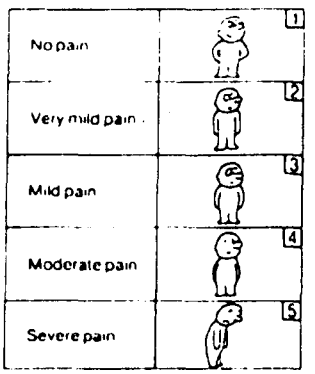
SOCIAL ACTIVITIES

During the past 4 weeks,
To what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours or groups?



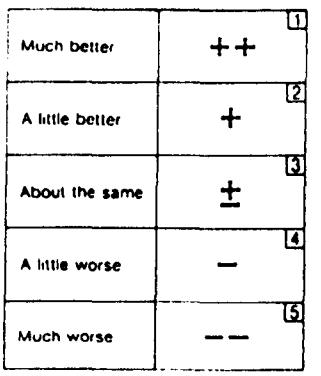
PAIN

During the past 4 weeks
How much bodily pain have you generally had?



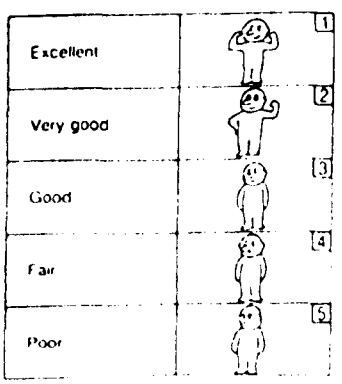
CHANGE IN CONDITION

How would you rate your physical health and emotional condition now compared to 4 weeks ago?



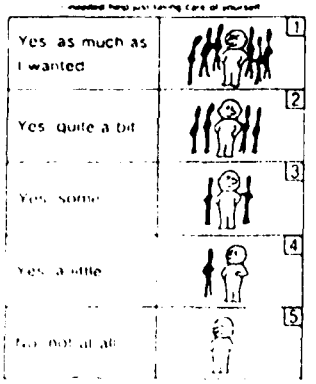
OVERALL CONDITION

During the past 4 weeks
How would you rate your overall physical health and emotional condition?



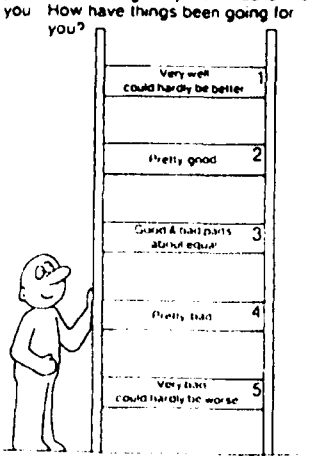
SOCIAL SUPPORT

During the past 4 weeks
Was someone available to help you if you needed and wanted help? For example if you



QUALITY OF LIFE

How has the quality of your life been during the past 4 weeks? i.e. How have things been going for you?



[1] Nelson et al 1987

HAD Scale

Name: Date

Doctors are aware that emotions play an important part in most illnesses. If your doctor knows about these feelings he will be able to help you more.
This questionnaire is designed to help your doctor to know how you feel. Read each item and place a firm tick in the box opposite the reply which comes closest to how you have been feeling in the past week.
Don't take too long over your replies: your immediate reaction to each item will probably be more accurate than a long thought-out response.

Tick only one box in each section

I feel tense or 'wound up':
- Most of the time
- A lot of the time
- Time to time, Occasionally
- Not at all

I still enjoy the things I used to enjoy:
- Definitely as much
- Not quite so much
- Only a little
- Hardly at all

I get a sort of frightened feeling as if something awful is about to happen:
- Very definitely and quite badly
- Yes, but not too badly
- A little, but it doesn't worry me
- Not at all

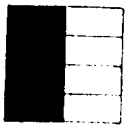
I can laugh and see the funny side of things:
- As much as I always could
- Not quite so much now
- Definitely not so much now
- Not at all

Worrying thoughts go through my mind:
- A great deal of the time
- A lot of the time
- From time to time but not too often
- Only occasionally

I feel cheerful:
- Not at all
- Not often
- Sometimes
- Most of the time

I can sit at ease and feel relaxed:
- Definitely
- Usually
- Not often
- Not at all

I feel as if I am slowed down:
- Nearly all the time
- Very often
- Sometimes
- Not at all



I get a sort of frightened feeling like 'butterflies' in the stomach:
- Not at all
- Occasionally
- Quite often
- Very often

I have lost interest in my appearance:
- Definitely
- I don't take so much care as I should
- I may not take quite as much care
- I take just as much care as ever

I feel restless as if I have to be on the move:
- Very much indeed
- Quite a lot
- Not very much
- Not at all

I look forward with enjoyment to things:
- As much as ever I did
- Rather less than I used to
- Definitely less than I used to
- Hardly at all

I get sudden feelings of panic:
- Very often indeed
- Quite often
- Not very often
- Not at all

I can enjoy a good book or radio or TV programme:
- Often
- Sometimes
- Not often
- Very seldom

Do not write below this line

D (8 10) . . .

A (8 10) . . .

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THE PHILADELPHIA GERIATRIC CENTER MORALE SCALE

1.	Things keep getting worse as I get older.	Yes	No
2.	I have as much pep as I did last year.	Yes	No
3.	How much do you feel lonely? (not much, a lot)	Not much	A lot
4.	Little things bother me more this year.	Yes	No
5.	I see enough of my friends and relatives.	Yes	No
6.	As you get older you are less useful.	Yes	No
7.	If you could live where you wanted, where would you live?	Here	Not here
8.	I sometimes worry so much that I can't sleep.	Yes	No
9.	As I get older, things are than/as I thought they would be.	Better	Worse Same
10.	I sometimes feel that life isn't worth living.	Yes	No
11.	I am as happy now as I was when I was younger	Yes	No
12.	Most days I have plenty to do.	Yes	No
13.	I have a lot to be sad about.	Yes	No
14.	People had it better in the old days.	Yes	No
15.	I am afraid of a lot of things.	Yes	No
16.	My health is	Good	Not so good
17.	I get mad more than I used to.	Yes	No
18.	Life is hard for me most of the time.	Yes	No
19.	How satisfied are you with your life today?	Satisfied	Not satisfied
20.	I take things hard.	Yes	No
21	A person has to live for today and not worry about tomorrow.	Yes	No
22.	I get upset easily.	Yes	No

THE GENERAL WELL-BEING SCHEDULE

NAME.....

This questionnaire contains questions about how you feel and how things have been going with you. For each question, mark (X) which best applies to you.

1 How have you been feeling in general ?
(DURING THE PAST MONTH)

- ☐ In excellent spirits
- ☐ In very good spirits
- ☐ In good spirits mostly
- ☐ I have been up and down in spirits a lot
- ☐ In low spirits mostly
- ☐ In very low spirits

2 Have you been bothered by nervousness or your "nerves"? could (DURING THE PAST MONTH)

- ☐ Extremely so - to the point where I not work or take care of things
- ☐ Very much so
- ☐ Quite a bit
- ☐ Some - enough to bother me
- ☐ A little
- ☐ Not at all

3 Have you been in firm control of your behaviour, thoughts, emotions OR feelings? (DURING THE PAST MONTH)

- ☐ Yes, definitely so
- ☐ Yes, for the most part
- ☐ Generally so
- ☐ Not too well
- ☐ No, and I am somewhat disturbed
- ☐ No, and I am very disturbed

4 Have you felt so sad, discouraged, hopeless, or had so many just problems that you wondered if anything was worthwhile? (DURING THE PAST MONTH)

- ☐ Extremely so - to the point that I have about given up
- ☐ Very much so
- ☐ Quite a bit
- ☐ Some - enough to bother me
- ☐ A little bit
- ☐ Not at all

5 Have you been under or felt you were under any strain, stress or pressure? (DURING THE PAST MONTH)

- ☐ Yes - almost more than I could bear stand
- ☐ Yes - quite a bit of pressure
- ☐ Yes - some - more than usual
- ☐ Yes - some - but about usual
- ☐ Yes - a little
- ☐ Not at all

6 How happy, satisfied, or pleased have you been with your personal life? (DURING THE PAST MONTH)

- ☐ Extremely happy - could not have been more satisfied or pleased
- ☐ Very happy
- ☐ Fairly happy
- ☐ Satisfied - pleased
- ☐ Somewhat dissatisfied
- ☐ Very dissatisfied

7 Have you had any reason to wonder if you were losing your mind, or losing control over the way you act, talk, think, feel, or of your memory? (DURING THE PAST MONTH)

- ☐ Not at all
- ☐ Only a little
- ☐ Some -- but not enough to be concerned or worried about
- ☐ Some and I have been a little concerned
- ☐ Some and I am quite concerned
- ☐ Yes, very much so and I am very concerned

8 Have you been anxious, worried, or upset? (DURING THE PAST MONTH)

- ☐ Extremely so -- to the point of being sick or almost sick
- ☐ Very much so
- ☐ Quite a bit
- ☐ Some -- enough to bother me
- ☐ A little bit
- ☐ Not at all

9 Have you been waking up fresh and rested? (DURING THE PAST MONTH)

- ☐ Every day
- ☐ Most every day
- ☐ Fairly often
- ☐ Less than half the time
- ☐ Rarely
- ☐ None of the time

10 Have you been bothered by any illness, bodily disorder, pains, or fears about your health? (DURING THE PAST MONTH)

- ☐ All the time
- ☐ Most of the time
- ☐ A good bit of the time
- ☐ Some of the time
- ☐ A little of the time
- ☐ None of the time

11 Has your daily life been full of things that were interesting to you? (DURING THE PAST MONTH)

- ☐ All the time
- ☐ Most of the time
- ☐ A good bit of the time
- ☐ Some of the time
- ☐ A little of the time
- ☐ None of the time

12 Have you felt down-hearted and blue? (DURING THE PAST MONTH)

- ☐ All of the time
- ☐ Most of the time
- ☐ A good bit of the time
- ☐ Some of the time
- ☐ A little of the time
- ☐ None of the time

13 Have you been feeling emotionally stable and sure of yourself? (DURING THE PAST MONTH)

- ☐ All of the time
- ☐ Most of the time
- ☐ A good bit of the time
- ☐ Some of the time
- ☐ A little of the time
- ☐ None of the time

14 Have you felt tired, worn out, used-up, or exhausted? (DURING THE PAST MONTH)

- ☐ All of the time
- ☐ Most of the time
- ☐ A good bit of the time
- ☐ Some of the time
- ☐ A little of the time
- ☐ None of the time

For each of the four scales below, note that the words at each end of the 0 - 10 scale describe opposite feelings. Circle any number along the bar which seems closest to how you have felt DURING THE PAST MONTH.

15 How concerned or worried about your HEALTH have you been?

0 1 2 3 4 5 6 7 8 9 10

Not concerned at all — Very concerned

16 How RELAXED or TENSE have you been?

0 1 2 3 4 5 6 7 8 9 10

Very relaxed — Very tense

17 How much ENERGY, PEP, VITALITY have you felt?

0 1 2 3 4 5 6 7 8 9 10

No energy AT ALL listless — Very ENERGETIC, dynamic

18 How DEPRESSED or CHEERFUL have you been?

0 1 2 3 4 5 6 7 8 9 10

Very depressed — Very cheerful

TIMED "UP AND GO"

DESCRIPTION

The Timed Up and Go test is a quick and practical method of testing basic mobility manoeuvres. It can be used both clinically and for research purposes.

INSTRUCTIONS

The client begins seated in a chair. S/he is asked to rise from an arm chair, stand still momentarily, walk to a line on the floor 3 metres away at a comfortable and safe pace, turn, return, turn around and sit down again.

The subject is timed on this task.

ILLNESS PERCEPTION QUESTIONNAIRE

(J Weinman et al, Psychology and Health, 1996, vol. 11, pp431-45)

Illness Identity (Core symptom list)

Please indicate how frequently you now experience the following symptoms as part of your arthritis.

Symptom	All of the time	Frequently	Occasionally	Never
Pain				
Nausea				
Breathlessness				
Weight Loss				
Fatigue				
Stiff Joints				
Headaches				
Upset Stomach				
Sleep Difficulties				
Lack of Strength				

We are interested in your own personal views of how you now see your Arthritis. Please indicate how much you agree or disagree with the following statements about your Arthritis.

Cause

1. A germ or virus caused my Arthritis

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

2. Diet played a major role in causing my Arthritis

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

3. Pollution of the environment caused my Arthritis

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

4. My Arthritis is hereditary - it runs in my family

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

5. It was just by chance that I became ill

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

6. Stress was a major factor in causing my Arthritis

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

7. My Arthritis is largely due to my own behaviour

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

8. Other people played a large role in causing my Arthritis

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

9. My state of mind played a major part in causing my Arthritis

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

Time-line

10. My Arthritis will last a short time

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

11. My Arthritis is likely to be permanent rather than temporary

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

12. My Arthritis will last for a long time

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

Consequences

13. My Arthritis is a serious condition

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

14. My Arthritis has had major consequences on my life

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

15. My Arthritis has become easier to live with

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

16. My Arthritis has not had much effect on my life

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

17. My Arthritis has strongly affected the way others see me

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

18. My Arthritis has serious economic and financial consequences

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

19. My Arthritis has strongly affected the way I see myself as a person

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

Control/Cure

20. My Arthritis will improve in time

Strongly agree *Agree* *Neither agree nor disagree* *Disagree* *Strongly disagree*

21. There is a lot which I can do to control my symptoms

Strongly agree	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*

22. There is very little that can be done to improve my Arthritis

Strongly agree	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*

23. My treatment will be effective in curing my Arthritis

Strongly agree	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*

24. Recovery from my Arthritis is largely dependent on chance or fate

Strongly agree	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*

25. What I do can determine whether my Arthritis gets better or worse

Strongly agree	*Agree*	*Neither agree nor disagree*	*Disagree*	*Strongly disagree*

Thank you for completing this questionnaire.

ILLNESS BELIEFS QUESTIONNAIRE

Here are statements about the symptoms you go to see your doctor about. For each set of 3 please tick the **ONE** statement which best applies to you. Please make sure that you answer **EVERY** question.

1. ☐ I have not thought about what has caused my symptoms.
   ☐ I have thought a little about what has caused my symptoms.
   ☐ I have thought a lot about the cause of my symptoms.

2. ☐ I have no idea of the reason for my symptoms.
   ☐ I have some idea of the reason for my symptoms.
   ☐ I think I know the reason for my symptoms.

3. ☐ Whatever caused my symptoms has probably been going on a long while.
   ☐ Whatever caused my symptoms may have been going on a long while.
   ☐ Whatever caused my symptoms has probably not been going on for long.

4. ☐ I think there probably is something seriously wrong with me.
   ☐ There may be something seriously wrong with me.
   ☐ I do not think there is anything seriously wrong.

5. ☐ I think I do have an illness which others can catch from me.
   ☐ I think I may have an illness which others can catch from me.
   ☐ I do not think I have an illness which others can catch from me.

For each of the following, show whether you think it **PROBABLY WOULD HELP** or **PROBABLY WOULD NOT HELP** to deal with the symptoms you are seeing your doctor about today.

Please answer **EACH** item.

	PROBABLY WOULD HELP	**DON'T KNOW**	**PROBABLY WOULD NOT HELP**
Change my diet or lifestyle.....	☐	☐	☐
Seeing a specialist.....	☐	☐	☐
An operation.....	☐	☐	☐

Tests or X-rays..... ☐ ☐

For each of the following, tick whether you think it **PROBABLY HAS** or **PROBABLY HAS NOT helped to CAUSE the symptoms** you go to see your doctor about.

Please answer every item, for example:

	PROBABLY HAS HELPED TO CAUSE	DON'T KNOW	PROBABLY HAS NOT HELPED TO CAUSE
Working or living conditions.....	☐	☐	☐
Something I ate.....	☐	☐	☐
An allergy.....	☐	☐	☐

And now for **your** views:

	PROBABLY HAS HELPED TO CAUSE	DON'T KNOW	PROBABLY HAS NOT HELPED TO CAUSE
Overwork.....	☐	☐	☐
Not looking after myself properly.....	☐	☐	☐
A part of my body wearing out.....	☐	☐	☐
Something I ate.....	☐	☐	☐
Part of my body not working as well as it used to.....	☐	☐	☐
My moods/emotions.....	☐	☐	☐
Damage to part of my body.....	☐	☐	☐
Stress.....	☐	☐	☐
Body tissues becoming harder or softer.....	☐	☐	☐
Demanding family or friends.....	☐	☐	☐
My personality.....	☐	☐	☐
Worn joints.....	☐	☐	☐

	PROBABLY HAS HELPED TO CAUSE	DON'T KNOW	PROBABLY HAS NOT HELPED TO CAUSE
The food that I eat	☐	☐	☐
An accident	☐	☐	☐
Body tissues less firm or less supple	☐	☐	☐
My job/housework	☐	☐	☐
Something out of place in my body	☐	☐	☐
Working or living conditions	☐	☐	☐
Pressure building up somewhere in my body	☐	☐	☐
"Nerves"	☐	☐	☐
Part of my body slowing down	☐	☐	☐
Being rundown	☐	☐	☐
Warning from my body to change the way I treat it	☐	☐	☐
Personal, financial or domestic problems	☐	☐	☐
Being over/under weight	☐	☐	☐
Part of my body is strained	☐	☐	☐

COPE

Name:.....

Date:..... **Record Number:**.....

We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. This questionnaire asks you to indicate what you generally do and feel when you experience stressful events. Obviously, different events bring out somewhat different responses, but think about what you usually do when you are under a lot of stress.
Then respond to each of the following items by choosing one number for each, using the response choices listed just below.

1 = I usually don't do this at all.	2 = I usually do this a little bit.
3 = I usually do this a medium amount.	4 = I usually do this a lot.

Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Please answer every item. There are no 'right' or 'wrong' answers, so choose the most accurate answer for YOU – not what you think 'most people' would say or do. Indicate what YOU usually do when YOU experience a stressful event.

1. I try to grow as a person as a result of the experience. ☐
2. I turn to work or other substitute activities to take my mind off things. ☐
3. I get upset and let my emotions out. ☐
4. I try to get advice from someone about what to do. ☐
5. I concentrate my efforts on doing something about it. ☐
6. I say to myself "this isn't real". ☐
7. I put my trust in God. ☐
8. I laugh about the situation. ☐
9. I admit to myself that I can't deal with it, and give up trying. ☐
10. I restrain myself from doing anything too quickly. ☐

11. I discuss my feelings with someone. ☐
12. I use alcohol or drugs to make myself feel better. ☐
13. I get used to the idea that it happened. ☐
14. I talk to someone to find out more about the situation. ☐
15. I keep myself from getting distracted by other thoughts or activities. ☐
16. I daydream about things other than this. ☐
17. I get upset, and am really aware of it. ☐
18. I seek God's help. ☐
19. I make a plan of action. ☐
20. I make jokes about it. ☐

2

21. I accept that this has happened and that it can't be changed. ☐
22. I hold off doing anything about it until the situation permits. ☐
23. I try to get emotional support from friends and relatives. ☐
24. I just give up trying to reach my goal. ☐
25. I take additional action to try to get rid of the problem. ☐
26. I try to lose myself for a while by drinking alcohol or taking drugs. ☐
27. I refuse to believe that it has happened. ☐
28. I let my feelings out. ☐
29. I try to see it in a different light, to make it seem more positive. ☐
30. I talk to someone who could do something concrete about the problem. ☐

31. I sleep more than usual. ☐
32. I try to come up with a strategy about what to do. ☐
33. I focus on dealing with this problem and, if necessary, let other things slide a little. ☐
34. I get sympathy and understanding from someone. ☐
35. I drink alcohol or take drugs, in order to think about it less. ☐
36. I kid around about it. ☐
37. I give up the attempt to get what I want. ☐
38. I look for something good in what is happening. ☐
39. I think about how I might best handle the problem. ☐
40. I pretend that it hasn't really happened. ☐

41. I make sure not to make matters worse by acting too soon. ☐
42. I try hard to prevent other things from interfering with my efforts at dealing with this. ☐
43. I go to the cinema or watch television, to think about it less. ☐
44. I accept the reality of the fact that it happened. ☐
45. I ask people who have had similar experiences what they did. ☐
46. I feel a lot of emotional distress and I find myself expressing those feelings a lot. ☐
47. I take direct action to get around the problem. ☐
48. I try to find comfort in my religion. ☐
49. I force myself to wait for the right time to do something. ☐
50. I make fun of the situation. ☐

51. I reduce the amount of effort I'm putting into solving the problem. ☐
52. I talk to someone about how I feel. ☐
53. I use alcohol or drugs to help me get through it. ☐
54. I learn to live with it. ☐
55. I put aside other activities in order to concentrate on this. ☐
56. I think hard about what steps to take. ☐
57. I act as though it hasn't even happened. ☐
58. I do what has to be done, one step at a time. ☐
59. I learn something from the experience. ☐
60. I pray more than usual. ☐

PAIN COPING STRATEGIES QUESTIONNAIRE

Name:.....

Date:..... **Record Number:**.....

Individuals who experience pain have developed a number of ways to cope or deal with their pain. These include saying things to themselves when they experience pain, or engaging in different activities. Below are a list of things that people have reported doing when they feel pain. For each activity, I would like you to indicate, using the scale below, how much you engage in that activity when you feel pain. An 0 indicates that you never do that activity when you are experiencing pain, a 3 indicates you sometimes do it when you are experiencing pain, and a 6 indicates you always do it when you are experiencing pain. Remember, you can use any point along the scale. Write the appropriate number in the box beside each question.

0	1	2	3	4	5	6
Never do			*Sometimes do that*			*Always do that*

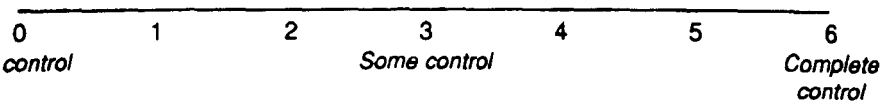
When I feel pain . . .

☐ 1. I try to feel distant from the pain, almost as if the pain was in somebody else's body.
☐ 2. I leave the house and do something, such as going to the cinema or shopping.
☐ 3. I try to think of something pleasant.
☐ 4. I don't think of it as pain but rather as a dull or warm feeling.
☐ 5. It is terrible and I feel it is never going to get any better.
☐ 6. I tell myself to be brave and carry on despite the pain.
☐ 7. I read.
☐ 8. I tell myself that I can overcome the pain.
☐ 9. I count numbers in my head or run a song through my mind.
☐ 10. I just think of it as some other sensation, such as numbness.
☐ 11. It is awful and I feel that it overwhelms me.
☐ 12. I play mental games with myself to keep my mind off the pain.
☐ 13. I feel my life isn't worth living.
☐ 14. I know someday someone will be here to help me and it will go away for a while.
☐ 15. I pray to God it won't last long.
☐ 16. I try not to think of it as my body, but rather as something separate from me
☐ 17. I don't think about the pain.
☐ 18. I try to think years ahead, what everything will be like after I've got rid of the pain.
☐ 19. I tell myself it doesn't hurt.
☐ 20. I tell myself I can't let the pain stand in the way of what I have to do.
☐ 21. I don't pay any attention to it.
☐ 22. I have faith in doctors that someday there will be a cure for my pain.

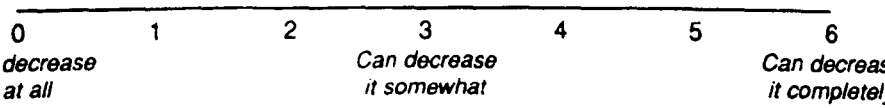
When I feel pain . . .

- ☐ 23. No matter how bad it gets, I know I can handle it.
- ☐ 24. I pretend it is not there
- ☐ 25. I worry all the time about whether it will end.
- ☐ 26. I replay in my mind pleasant experiences in the past.
- ☐ 27. I think of people I enjoy doing things with.
- ☐ 28. I pray for the pain to stop.
- ☐ 29. I imaging that the pain is outside of my body.
- ☐ 30. I just go on as if nothing happened.
- ☐ 31. I see it as a challenge and don't let it bother me.
- ☐ 32. Although it hurts, I just keep on going.
- ☐ 33. I feel I can't stand it any more.
- ☐ 34. I try to be around other people.
- ☐ 35. I ignore it.
- ☐ 36. I rely on my faith in God.
- ☐ 37. I feel like I can't go on.
- ☐ 38. I think of things I enjoy doing.
- ☐ 39. I do anything to get my mind off the pain.
- ☐ 40. I do something I enjoy, such as watching television or listening to music.
- ☐ 41. I pretend it is not part of me.
- ☐ 42. I do something active, like household chores or projects.

Based on all the things you do to cope or deal with your pain, on an average day, how much control do you feel you have over it? Please circle the appropriate number. Remember, you can circle any number along the scale.



Based on all the things you do to cope or deal with your pain, on an average day, how much are you able to decrease it? Please circle the appropriate number. Remember, you can circle any number along the scale.



SOCIAL SUPPORT SURVEY

Next are some questions about the support that is available to you.

1. About how many close friends and close relatives do you have (people you feel at each with and can to talk to about what is on your mind)?

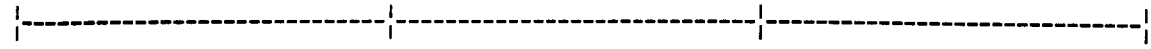
Write in number of close friends and close relatives: ☐☐

People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it?

(Circle One Number on Each Line)

		None of the Time	A Little of the Time	Some of the Time	Most of the Time	All of of the Time
2.	Someone to help you if you were confined to bed.....	1	2	3	4	5
3.	Someone you can count on to listen to you when you need to talk.....	1	2	3	4	5
4.	Someone to give you good advice about a crisis.....	1	2	3	4	5
5.	Someone to take you to the doctor if you needed it....	1	2	3	4	5
6.	Someone who shows you love and affection.....	1	2	3	4	5
7.	Someone to have a good time with.....	1	2	3	4	5
8.	Someone to give you information to help you understand a situation.....	1	2	3	4	5
9.	Someone to confide in or talk to about yourself or your problems.....	1	2	3	4	5
10.	Someone who hugs you.....	1	2	3	4	5
11.	Someone to get together with for relaxation.....	1	2	3	4	5
12.	Someone to prepare your meals if you were unable to do it yourself.....	1	2	3	4	5
13.	Someone whose advice you really want.....	1	2	3	4	5
14.	Someone to do things with to help you get your mind off things.....	1	2	3	4	5
15.	Someone to help with daily chores if you were sick....	1	2	3	4	5
16.	Someone to share your most private worries and fears with.....	1	2	3	4	5
17.	Someone to turn to for suggestions about how to deal with a personal problem.....	1	2	3	4	5
18.	Someone to do something enjoyable with.....	1	2	3	4	5
19.	Someone who understands your problems.....	1	2	3	4	5
20.	Someone to love and make you feel wanted.....	1	2	3	4	5

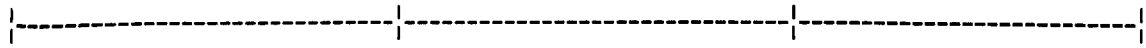
Pre-group prediction
How helpful do you think this will group will be to you?



Very helpful | A little bit helpful | Not very helpful | Not at all helpful

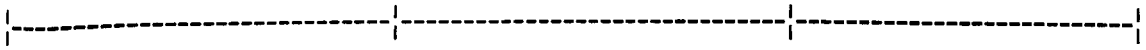
QUESTIONS TO BE ASKED AT THE END OF SESSION 1 AND SESSION 4

1. How helpful has the group been for you?



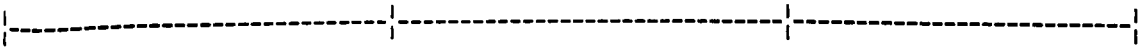
Very helpful | A little bit helpful | Not very helpful | Not at all helpful

2. How easy has the group been to understand?



Very easy | Mostly easy | Not very easy | Not at all easy

3. How much have you enjoyed the group?



Very much | A little bit | Not very much | Not at all

Appendix 3: Study Two: Mean scores on each measure

Table 3.1 Mean scores on WOMAC at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

WOMAC	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
WOMAC Total Initial interview	66.5	23.0	3.6	40	65.0	17.5	2.7	41	65.8	20.3	2.3	81
WOMAC Total post group	67.8	19.3	3.1	38	70.1	15.7	2.5	40	69.0	17.5	2.0	78
1 month follow up												
WOMAC Total Initial interview	68.8	22.8	4.0	32	65.3	16.9	2.8	35	66.9	19.8	2.4	67
WOMAC Total post group	68.0	19.2	3.5	30	70.9	15.3	2.6	35	69.6	17.1	2.1	65
WOMAC Total 1mFU	69.3	18.9	3.3	32	65.9	16.5	2.8	35	67.5	17.7	2.2	67
6 month follow up												
WOMAC Total	71.5	26.1	6.0	19	64.8	18.9	4.0	22	67.9	22.5	3.5	41
WOMAC Total post group	68.4	17.8	4.2	18	69.6	17.0	3.6	22	69.1	17.1	2.7	40
WOMAC Total 1mFU	70.3	20.3	4.7	19	67.0	16.3	3.5	22	68.5	18.1	2.8	41
WOMAC Total 6mFU	68.5	15.2	3.5	19	60.5	19.7	4.2	22	64.2	18.0	2.8	41

Table 3.2 Mean scores on FLP at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

FLP	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
FLP Physical dimension	34.9	17.1	2.7	40	36.8	12.9	2.0	41	35.8	15.0	1.7	81
FLP Physical dimension post group	25.9	17.5	2.8	39	31.8	25.9	4.1	40	28.9	22.2	2.5	79
1 month follow up												
FLP Physical dimension	35.3	15.9	2.8	32	37.0	12.9	2.2	35	36.2	14.3	1.8	67
FLP Physical dimension post group	23.0	14.3	2.6	31	32.2	27.3	4.6	35	27.9	22.5	2.8	66
FLP Physical Dimension 1mFU	30.5	17.9	3.2	31	29.2	15.9	2.7	35	29.8	16.7	2.1	66
6 month follow up												
FLP Physical dimension	34.6	17.2	4.0	19	39.0	12.6	2.7	22	36.9	14.9	2.3	41
FLP Physical dimension post group	23.5	16.1	3.8	18	31.0	15.7	3.3	22	27.6	16.1	2.5	40
FLP Physical Dimension 1mFU	34.1	16.4	3.8	19	32.7	16.9	3.6	22	33.3	16.5	2.6	41
FLP Physical Dimension 6mFU	28.7	16.1	3.7	19	31.9	15.7	3.3	22	30.4	15.8	2.5	41

Table 3.3 Mean scores on COOP at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

COOP Physical Condition	CB&SS				E&E				Both interventions			
End of intervention												
COOP Physical Condition	4.1	0.8	0.1	40	4.1	0.8	0.1	41	4.1	0.8	0.1	81
COOP Physical Condition post group	3.5	1.2	0.2	35	3.9	1.1	0.2	38	3.7	1.2	0.1	73
1 month follow up												
COOP Physical Condition	4.1	0.8	0.1	32	4.1	0.8	0.1	35	4.1	0.8	0.1	67
COOP Physical Condition post group	3.5	1.2	0.2	27	4.0	1.0	0.2	33	3.8	1.1	0.1	60
COOP Physical Condition 1mFU	4.0	0.9	0.2	31	4.1	0.8	0.1	35	4.1	0.9	0.1	66
6 month follow up												
COOP Physical Condition	4.1	0.8	0.2	19	4.1	0.7	0.2	22	4.1	0.7	0.1	41
COOP Physical Condition post group	3.8	1.2	0.3	16	4.1	1.1	0.3	20	4.0	1.1	0.2	36
COOP Physical Condition 1mFU	4.1	0.8	0.2	19	4.1	0.7	0.2	22	4.1	0.8	0.1	41
COOP Physical Condition 6mFU	4.3	0.7	0.2	19	4.0	0.7	0.2	22	4.1	0.7	0.1	41

Table 3.4 Mean scores on HADS Anxiety at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

HADS Anxiety	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
HADS Anxiety initial interview	7.4	5.0	0.8	40	6.8	4.0	0.6	41	7.1	4.5	0.5	81
HADS Anxiety post group	8.5	4.4	0.7	40	7.3	3.4	0.5	40	7.9	4.0	0.4	80
1 month follow up												
HADS Anxiety initial interview	7.3	4.7	0.8	32	7.1	3.9	0.7	35	7.2	4.3	0.5	67
HADS Anxiety post group	8.3	4.6	0.8	32	7.5	3.4	0.6	35	7.9	4.0	0.5	67
HADS Anxiety 1mFU	7.9	4.6	0.8	32	7.2	4.3	0.7	35	7.6	4.4	0.5	67
6 month follow up												
HADS Anxiety initial interview	5.8	3.5	0.8	19	8.2	3.5	0.7	22	7.1	3.7	0.6	41
HADS Anxiety post group	7.0	4.5	1.0	19	8.1	3.3	0.7	22	7.6	3.9	0.6	41
HADS Anxiety 1mFU	7.2	3.8	0.9	19	7.8	4.2	0.9	22	7.5	4.0	0.6	41
HADS Anxiety 6 month	7.5	4.6	1.0	19	7.2	3.2	0.7	22	7.3	3.9	0.6	41

Table 3.5 Mean scores on HADS Depression at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

HADS Depression	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
HADS Depression initial interview	5.5	3.2	0.5	40	5.0	2.9	0.4	41	5.2	3.0	0.3	81
HADS Depression post group	5.1	2.9	0.5	40	5.0	2.1	0.3	40	5.1	2.6	0.3	80
1 month follow up												
HADS Depression initial interview	5.6	3.1	0.6	32	5.1	2.8	0.5	35	5.3	3.0	0.4	67
HADS Depression post group	5.3	3.0	0.5	32	5.1	2.2	0.4	35	5.2	2.6	0.3	67
HADS Depression 1mFU	5.8	4.2	0.7	32	4.9	2.4	0.4	35	5.3	3.4	0.4	67
6 month follow up												
HADS Depression initial interview	4.7	1.9	0.4	19	5.7	2.7	0.6	22	5.2	2.4	0.4	41
HADS Depression post group	4.9	2.5	0.6	19	5.4	2.2	0.5	22	5.1	2.3	0.4	41
HADS Depression 1mFU	4.8	2.4	0.6	19	5.2	2.1	0.4	22	5.0	2.2	0.4	41
HADSDepression 6mFU	5.6	2.9	0.7	19	5.3	3.4	0.7	22	5.4	3.2	0.5	41

Table 3.6 Mean scores on General Well-Being Schedule at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

General Well-Being Schedule	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
General Well-Being Schedule Total initial interview	82.0	20.6	3.3	40	84.8	16.1	2.5	41	83.4	18.4	2.0	81
General Well-Being Schedule Total post group	79.8	21.2	3.5	37	88.0	14.0	2.2	40	84.1	18.2	2.1	77
1 month follow up												
General Well-Being Schedule Total	81.4	20.9	3.7	32	83.5	15.1	2.5	35	82.5	18.0	2.2	67
General Well-Being Schedule Total post group	81.0	20.2	3.8	29	87.2	14.0	2.4	35	84.4	17.2	2.2	64
General Well-Being Schedule Total 1mFU	82.1	21.2	3.8	31	84.9	21.7	3.7	35	83.6	21.4	2.6	66
6 month follow up												
General Well-Being Schedule Total	83.7	16.7	3.8	19	81.1	12.2	2.6	22	82.3	14.4	2.2	41
General Well-Being Schedule post group Total	84.7	18.8	4.6	17	85.9	14.2	3.0	22	85.4	16.2	2.6	39
General Well-Being Schedule Total 1mFU	84.1	16.9	3.9	19	78.9	22.8	4.9	22	81.3	20.2	3.2	41
General Well-Being Schedule Total 6mFU	82.9	17.0	3.9	19	83.7	13.5	2.9	22	83.3	15.1	2.4	41

Table 3.7 Mean scores on PGCMS at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

PGCMS	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
PGMS Total (not other) initial interview	10.4	4.5	0.7	40	11.2	3.6	0.6	41	10.8	4.0	0.4	81
PGMS Total (not other) post group	10.1	5.2	0.8	38	11.5	3.7	0.6	40	10.8	4.5	0.5	78
1 month follow up												
PGMS Total (not other)	10.7	4.5	0.8	32	11.3	3.5	0.6	35	11.0	4.0	0.5	67
PGMS Total (not other) post group	10.8	4.9	0.9	30	11.5	3.6	0.6	35	11.2	4.2	0.5	65
PGMS Total (not other) 1mFU	11.0	5.0	0.9	31	11.7	3.9	0.7	35	11.3	4.4	0.5	66
6 month follow up												
WOMAC Total	71.5	26.1	6.0	19	64.8	18.9	4.0	22	67.9	22.5	3.5	41
WOMAC Total post group	68.4	17.8	4.2	18	69.6	17.0	3.6	22	69.1	17.1	2.7	40
WOMAC Total 1mFU	70.3	20.3	4.7	19	67.0	16.3	3.5	22	68.5	18.1	2.8	41
WOMAC Total 6mFU	68.5	15.2	3.5	19	60.5	19.7	4.2	22	64.2	18.0	2.8	41
PGMS Total (not other)	11.7	3.6	0.8	19	10.7	3.2	0.7	22	11.2	3.4	0.5	41
PGMS Total (not other) post group	11.4	4.4	1.0	18	11.0	3.4	0.7	22	11.2	3.8	0.6	40
PGMS Total (not other) 1mFU	11.4	4.0	0.9	19	11.1	3.5	0.7	22	11.2	3.7	0.6	41
PGMS Total (not other) 6mFU	11.0	3.9	0.9	19	10.7	4.0	0.9	22	10.9	3.9	0.6	41

Table 3.8 Mean scores on MOS Social Support Total at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

MOS Social Support Survey Total	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
MOS social support survey	68.4	21.6	3.4	40	79.9	14.8	2.3	41	74.2	19.3	2.1	81
total (-20) mos social support scale post group	61.2	24.4	3.9	39	72.7	19.8	3.2	39	66.9	22.8	2.6	78
1 month follow up												
MOS social support survey	66.5	22.6	4.0	32	81.9	12.6	2.1	35	74.6	19.5	2.4	67
MOS social support survey post group	60.3	25.6	4.6	31	73.1	19.6	3.3	35	67.1	23.3	2.9	66
MOS social support survey 1mFU	73.0	20.2	3.6	31	79.4	16.7	2.8	35	76.4	18.5	2.3	66
6 month follow up												
MOS social support survey	66.3	20.8	4.8	19	81.0	14.1	3.0	22	74.2	18.8	2.9	41
MOS social support survey post group	63.6	24.9	5.7	19	71.1	22.5	4.8	22	67.6	23.6	3.7	41
MOS social support survey 1mFU	75.7	16.7	3.8	19	76.3	18.4	3.9	22	76.0	17.4	2.7	41
MOS social support survey 6mFU	79.4	14.7	3.4	19	77.5	21.1	4.5	22	78.4	18.2	2.8	41

Table 3.9 Mean scores on MOS Social Support Social Support Survey number of relatives/friends at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

MOS Social Support Survey n of relatives/friends etc	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
n of relatives/friends etc - MOS Social Support Scale	7.7	4.8	0.8	39	10.1	9.1	1.4	41	8.9	7.4	0.8	80
n of relatives/friends etc - MOS Social Support Scale post group	10.7	11.3	1.9	34	9.1	7.6	1.3	36	9.9	9.5	1.1	70
1 month follow up												
n of relatives/friends etc - MOS Social Support Scale	7.5	4.7	0.8	32	9.8	8.1	1.4	35	8.7	6.7	0.8	67
n of relatives/friends etc - MOS Social Support Scale post group	10.0	10.2	2.0	27	9.5	7.9	1.4	32	9.7	9.0	1.2	59
n of relatives/friends etc - MOS Social Support Scale 1mFU	8.4	7.4	1.4	30	12.0	10.4	1.8	35	10.3	9.3	1.2	65
6 month follow up												
n of relatives/friends etc - MOS Social Support Scale	7.5	5.2	1.2	19	9.8	7.7	1.6	22	8.7	6.7	1.0	41
n of relatives/friends etc - MOS Social Support Scale post group	12.8	11.7	2.8	17	9.0	5.4	1.2	20	10.8	8.9	1.5	37
n of relatives/friends etc - MOS Social Support Scale 1mFU	10.9	8.4	2.0	18	11.2	9.9	2.1	22	11.1	9.1	1.4	40
n of relatives/friends etc - MOS Social Support Scale 6mFU	10.5	6.7	1.5	19	10.3	5.6	1.2	22	10.4	6.1	0.9	41

Table 3.10 Mean scores on COOP Social Support at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

COOP Social Support	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
Social Support (COOP)	2.5	1.5	0.2	40	1.8	1.1	0.2	41	2.1	1.4	0.2	81
Social Support (COOP) post group	2.3	1.3	0.2	38	2.3	1.3	0.2	39	2.3	1.3	0.2	77
1 month follow up												
Social Support (COOP)	2.6	1.5	0.3	32	1.7	1.0	0.2	35	2.1	1.4	0.2	67
Social Support (COOP) post group	2.4	1.4	0.2	30	2.2	1.3	0.2	34	2.3	1.3	0.2	64
Social Support (COOP) 1mFU	2.3	1.4	0.3	31	1.9	1.1	0.2	35	2.1	1.2	0.2	66
6 month follow up												
Social Support (COOP)	2.4	1.5	0.4	19	1.7	1.0	0.2	22	2.0	1.3	0.2	41
Social Support (COOP) post group	2.2	1.4	0.3	18	2.3	1.3	0.3	21	2.3	1.3	0.2	39
Social Support (COOP) 1mFU	2.4	1.4	0.3	19	2.1	1.1	0.2	22	2.2	1.2	0.2	41
Social Support (COOP) 6mFU	2.2	1.1	0.2	18	2.0	1.1	0.2	22	2.1	1.1	0.2	40

Table 3.11 Mean scores on IPQ Consequences at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

IPQ Consequences	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
Consequences (IPQ)	21.0	4.7	0.7	40	20.0	5.2	0.8	41	20.5	5.0	0.6	81
Consequences (IPQ) post group	18.7	5.6	0.9	38	19.1	5.2	0.8	39	18.9	5.4	0.6	77
1 month follow up												
Consequences (IPQ)	20.6	4.7	0.8	32	20.1	5.1	0.9	35	20.4	4.9	0.6	67
Consequences (IPQ) post group	19.1	5.7	1.0	31	19.1	5.3	0.9	34	19.1	5.4	0.7	65
Consequences (IPQ) 1mFU	19.8	4.9	0.9	31	19.5	4.8	0.8	35	19.6	4.8	0.6	66
6 month follow up												
Consequences (IPQ)	21.2	4.6	1.1	19	18.4	5.0	1.1	22	19.7	5.0	0.8	41
Consequences (IPQ) post group	19.1	6.3	1.4	19	17.2	4.3	0.9	21	18.1	5.4	0.9	40
Consequences (IPQ) 1mFU	19.7	4.5	1.0	19	18.7	4.8	1.0	22	19.2	4.6	0.7	41
Consequences (IPQ) 6mFU	20.6	5.2	1.2	19	19.8	5.7	1.2	22	20.1	5.4	0.8	41

Table 3.12 Mean scores on IPQ Control/Cure at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

IPQ Control/Cure	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
Control/Cure (IPQ)	19.1	2.7	0.4	40	18.6	3.0	0.5	41	18.9	2.9	0.3	81
Control/Cure (IPQ) post group	18.3	2.8	0.5	37	18.2	3.1	0.5	39	18.3	2.9	0.3	76
1 month follow up												
Control/Cure (IPQ)	18.9	2.6	0.5	32	18.4	3.2	0.5	35	18.7	2.9	0.4	67
Control/Cure (IPQ) post group	18.1	2.6	0.5	29	18.0	3.1	0.5	35	18.1	2.9	0.4	64
Control/Cure (IPQ) 1mFU	18.5	2.7	0.5	31	18.5	3.0	0.5	35	18.5	2.9	0.4	66
6 month follow up												
Control/Cure (IPQ)	19.1	3.1	0.7	19	19.0	3.5	0.8	22	19.0	3.3	0.5	41
Control/Cure (IPQ) post group	18.7	2.5	0.6	17	18.0	3.2	0.7	22	18.3	2.9	0.5	39
Control/Cure (IPQ) 1mFU	18.3	2.3	0.5	19	19.0	3.1	0.7	22	18.7	2.8	0.4	41
Control/Cure (IPQ) 6mFU	19.9	1.8	0.4	19	18.6	2.8	0.6	22	19.2	2.4	0.4	41

Table 3.13 Mean scores on IPQ Timeline at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

IPQ Timeline	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
Time-Line (IPQ)	5.8	2.2	0.4	40	5.8	2.2	0.3	41	5.8	2.2	0.2	81
Time-Line (IPQ) post group	5.8	1.8	0.3	37	6.7	3.8	0.6	40	6.2	3.0	0.3	77
1 month follow up												
Time-Line (IPQ)	5.8	2.0	0.4	32	6.0	2.3	0.4	35	5.9	2.2	0.3	67
Time-Line (IPQ) post group	5.8	1.6	0.3	30	6.7	3.9	0.7	35	6.3	3.1	0.4	65
Time-Line (IPQ) 1mFU	4.8	1.7	0.3	31	5.3	2.2	0.4	35	5.1	2.0	0.2	66
6 month follow up												
Time-Line (IPQ)	5.8	2.5	0.6	19	6.1	2.2	0.5	22	6.0	2.3	0.4	41
Time-Line (IPQ) post group	5.4	1.6	0.4	18	7.3	4.4	0.9	22	6.5	3.6	0.6	40
Time-Line (IPQ) 1mFU	4.3	1.6	0.4	19	5.2	2.1	0.4	22	4.8	1.9	0.3	41
Time-Line (IPQ) 6mFU	4.8	1.9	0.4	19	5.3	2.1	0.4	22	5.1	2.0	0.3	41

Table 3.14 Mean scores on Active Coping (COPE) at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

Active Coping (COPE)	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
Active Coping (COPE)	12.3	2.2	0.3	39	13.0	2.4	0.4	41	12.6	2.3	0.3	80
Active Coping (COPE) post group	12.5	2.5	0.4	38	13.1	2.6	0.4	40	12.8	2.5	0.3	78
1 month follow up												
Active Coping (COPE)	12.5	2.1	0.4	31	12.8	2.5	0.4	35	12.6	2.3	0.3	66
Active Coping (COPE) post group	12.4	2.6	0.5	30	12.9	2.6	0.4	35	12.7	2.6	0.3	65
Active Coping (COPE) 1mFU	12.6	2.7	0.5	30	12.6	3.0	0.5	35	12.6	2.8	0.4	65
6 month follow up												
Active Coping (COPE)	12.7	1.9	0.4	19	12.9	2.1	0.5	22	12.8	2.0	0.3	41
Active Coping (COPE) post group	12.8	2.0	0.5	18	13.5	2.4	0.5	22	13.2	2.2	0.3	40
Active Coping (COPE) 1mFU	12.5	2.6	0.6	19	13.3	2.6	0.6	22	12.9	2.6	0.4	41
Active Coping (COPE) 6mFU	13.3	1.9	0.5	18	12.6	2.4	0.5	22	12.9	2.2	0.3	40

Table 3.15 Mean scores on Planning (COPE) at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

Planning (COPE)	CB&SS				E&E				Both interventions			
End of intervention	Mean	SD	SE	N	Mean	SD	SE	N	Mean	SD	SE	N
Planning (COPE)	11.3	3.1	0.5	39	11.6	3.2	0.5	41	11.5	3.1	0.3	80
Planning (COPE) post group	12.4	3.0	0.5	38	12.5	2.8	0.4	40	12.5	2.9	0.3	78
1 month follow up												
Planning (COPE)	11.6	2.8	0.5	31	11.8	3.2	0.5	35	11.7	3.0	0.4	66
Planning (COPE) post group	12.3	3.1	0.6	30	12.3	2.8	0.5	35	12.3	2.9	0.4	65
Planning (COPE) 1mFU	11.7	3.0	0.5	30	12.4	2.8	0.5	35	12.1	2.9	0.4	65
6 month follow up												
Planning (COPE)	11.7	2.5	0.6	19	12.2	2.8	0.6	22	12.0	2.7	0.4	41
Planning (COPE) post group	12.8	2.8	0.7	18	13.1	2.6	0.6	22	13.0	2.7	0.4	40
Planning (COPE) 1mFU	11.6	3.1	0.7	19	13.0	2.6	0.6	22	12.3	2.9	0.4	41
Planning (COPE) 6mFU	12.6	2.9	0.7	18	12.7	2.7	0.6	22	12.7	2.7	0.4	40

Table 3.16 Mean scores on Positive Reinterpretation And Growth (COPE) at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

Positive reinterpretation and growth (COPE)	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
Positive reinterpretation and growth (COPE)	12.5	2.5	0.4	39	12.9	2.3	0.4	41	12.7	2.4	0.3	80
Positive reinterpretation and growth (COPE) post group	12.6	2.8	0.4	38	12.5	2.2	0.3	40	12.5	2.5	0.3	78
1 month follow up												
Positive reinterpretation and growth (COPE)	12.5	2.6	0.5	31	13.0	2.2	0.4	35	12.8	2.4	0.3	66
Positive reinterpretation and growth (COPE) post group	12.3	3.0	0.5	30	12.5	2.3	0.4	35	12.4	2.6	0.3	65
Positive reinterpretation and growth (COPE) 1mFU	11.7	3.2	0.6	30	12.6	2.4	0.4	35	12.2	2.8	0.3	65
6 month follow up												
Positive reinterpretation and growth (COPE)	12.4	2.5	0.6	19	13.1	1.8	0.4	22	12.8	2.2	0.3	41
Positive reinterpretation and growth (COPE) post group	12.7	2.5	0.6	18	12.8	2.2	0.5	22	12.8	2.3	0.4	40
Positive reinterpretation and growth (COPE) 1mFU	11.7	3.1	0.7	19	13.1	2.3	0.5	22	12.5	2.7	0.4	41
Positive reinterpretation and growth (COPE) 6mFU	12.6	2.4	0.6	18	12.5	2.5	0.5	22	12.5	2.4	0.4	40

Table 3.17 Mean scores on Suppression of Competing Activities (COPE) at each data collection time point for participants in CB&SS intervention alone, participants in E&E alone and for each type of intervention and for all participants across both interventions

Suppress Competing Activities (COPE)	CB&SS				E&E				Both interventions			
End of intervention	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**	**Mean**	**SD**	**SE**	**N**
Suppress Competing Activities (COPE)	10.3	2.8	0.4	39	11.4	2.6	0.4	41	10.9	2.8	0.3	80
Suppress Competing Activities (COPE) post group	11.3	2.7	0.4	38	11.8	2.2	0.3	40	11.6	2.5	0.3	78
1 month follow up												
Suppress Competing Activities (COPE)	10.5	2.8	0.5	31	11.5	2.7	0.5	35	11.0	2.8	0.3	66
Suppress Competing Activities (COPE) post group	11.1	2.9	0.5	30	11.7	2.2	0.4	35	11.4	2.5	0.3	65
Suppress Competing Activities (COPE) 1mFU	12.1	2.7	0.5	30	11.3	2.5	0.4	35	11.7	2.6	0.3	65
6 month follow up												
Suppress Competing Activities (COPE)	10.8	2.7	0.6	19	12.1	2.6	0.5	22	11.5	2.7	0.4	41
Suppress Competing Activities (COPE) post group	11.2	2.9	0.7	18	12.5	1.9	0.4	22	11.9	2.5	0.4	40
Suppress Competing Activities (COPE) 1mFU	12.1	2.6	0.6	19	12.1	2.3	0.5	22	12.1	2.4	0.4	41
Suppress Competing Activities (COPE) 6mFU	11.7	2.6	0.6	18	11.8	2.4	0.5	22	11.8	2.5	0.4	40

Appendix 4: Details of Cognitive Behavioural and Social Support Intervention used in Study Two

Cognitive Behavioural And Social Support Intervention

1. Trainer's notes
2. Plan of sessions
3. Participants' manual (4 parts)
4. Handouts (4)
5. Overhead projector slides (47)

Psychological Factors In Osteoarthritis In Older People In Primary Care

Trainer's notes

Rationale

This is a group for older people who suffer from osteoarthritis in primary care normally of the hip or knee but other joints may also be affected. The aim of this intervention group is to:

- Educate the participant about cognitive behavioural coping techniques
- Facilitate the participant in using cognitive behavioural coping techniques.
- Encourage the participant to use cognitive behavioural techniques regularly.
- Educate the participant in problem solving techniques
- Facilitate the participant in using problem solving techniques.
- Encourage the participant to use problem solving techniques regularly.

The format is designed to utilise a range of teaching and learning techniques. Some information is presented didactically by the trainer using the acetates (OHPs) included in this pack. This material is supported by handouts for the participants. Participants are also expected to use the diaries and recording sheets provided both in the group and as part of homework tasks. The group may be split into small groups for exercises with feedback if the group is large. This may be used to ensure that ideas are discussed and group leaders should ensure that the concepts are fully understood. The group is intended to be interactive.

The group is designed to last for four 2 hour sessions usually on a weekly basis. The number of participants is intended to be between 8 and 12. The sessions are designed that minimal equipment is required. Access to a comfortable room of reasonable size and accessibility for the participants is required. The equipment required will include an overhead projector and flipchart, paper and pens. In addition, handouts and leaflets must be prepared and obtained in advance. The provision of light refreshments including biscuits is a wise move and is to be recommended.

Introduction

Psychology is the study of human behaviour, thoughts and feelings. It seeks to explain how human beings interact with the world around them. Psychology is used by everyone as they go about their daily life in interacting with the inanimate and animate world around them. An individual's interaction with their family or cultivating their plants can come under this heading.

As a subject of study, psychology aims to study these interactions and explain how human beings engage with the world. This is done by scientific investigations which aim to examine theories and principles and to come up with explanations for this which are based on evidence.

Clinical psychology aims to reduce psychological distress and enhance psychological well-being by the systematic application of psychological knowledge. One particular application of this is known as cognitive behavioural therapy (CBT).

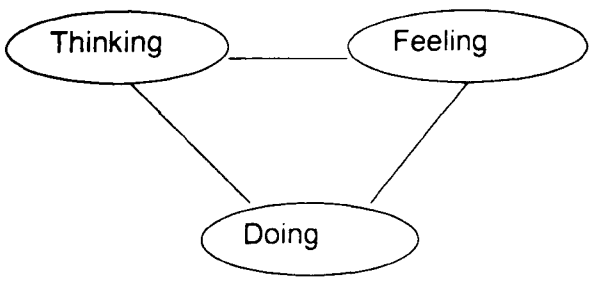
Introduction to cognitive behaviour therapy principles

While it is assumed that the facilitator of the groups will be familiar with the concepts of cognitive behaviour therapy (CBT), a brief summary may be helpful.

CBT has developed out of a wide academic background investigating human and animal behaviour over the past 100 years. It has its origins in behavioural experiments conducted by many researchers (e.g. Watson, Wolpe, Marks etc.). The development of cognitive theories of behaviour (e.g. Bandura, Lazarus & Folkman) and the work on cognitive approaches by Ellis and Beck has lead to an explosion in the use of techniques incorporating the principles of both in the treatment of a range of psychological disorders. Research has the shown these to be effective for a wide range of problems (BABCP, 2001).

CBT is widely used in the treatment of psychological distress. It has been applied to a range of problems both on an individual and group intervention basis. CBT focuses on the interaction between thoughts, feelings and behaviours. Often, people who are depressed have thoughts like 'I'm useless', 'I'm a complete failure. Feelings refer to the person's emotional experience e.g. sad, angry, frightened etc. Behaviours are actions which may be the simple – drinking a cup of tea to the more complex – baking a cake. Figure 1 displays this interaction (OHP 3).

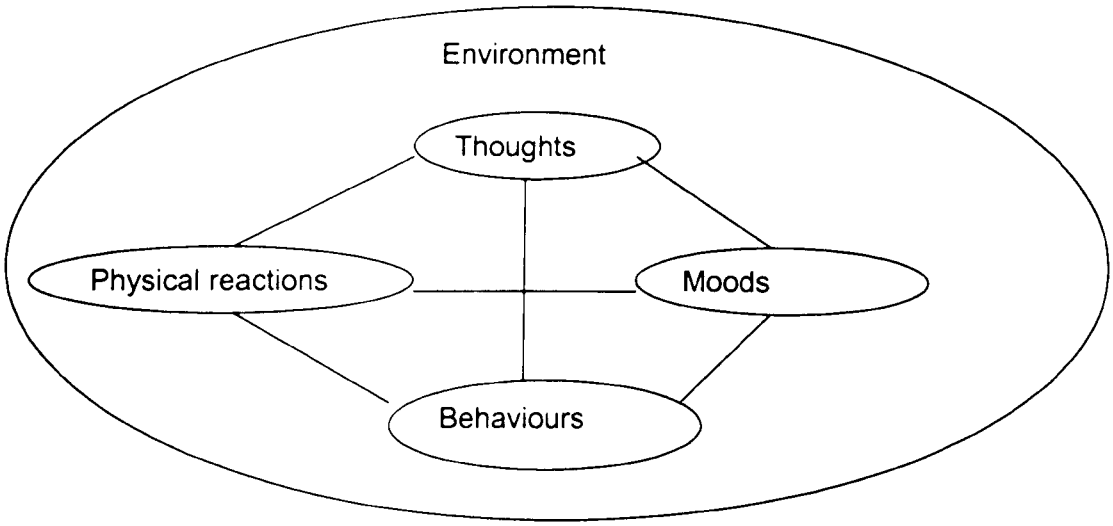
Figure 1 Thoughts, Feelings and Behaviours



In CBT, the therapist and clients work together collaboratively to identify and understand problems in this way. This shared view of a problem allows for the identification of goals and strategies to achieve these goals which are monitored and evaluated. This can allow the client the opportunity to change the aspects of these which are unhelpful and/or causing distress.

This can be extended to include a further two aspects of life experience – physical reactions and the environment in which this takes place (Figure 2) (OHP 6).

Figure 2



(Five aspects of your life experiences. 1986 Center for Cognitive Therapy, Newport Beach, CA.)

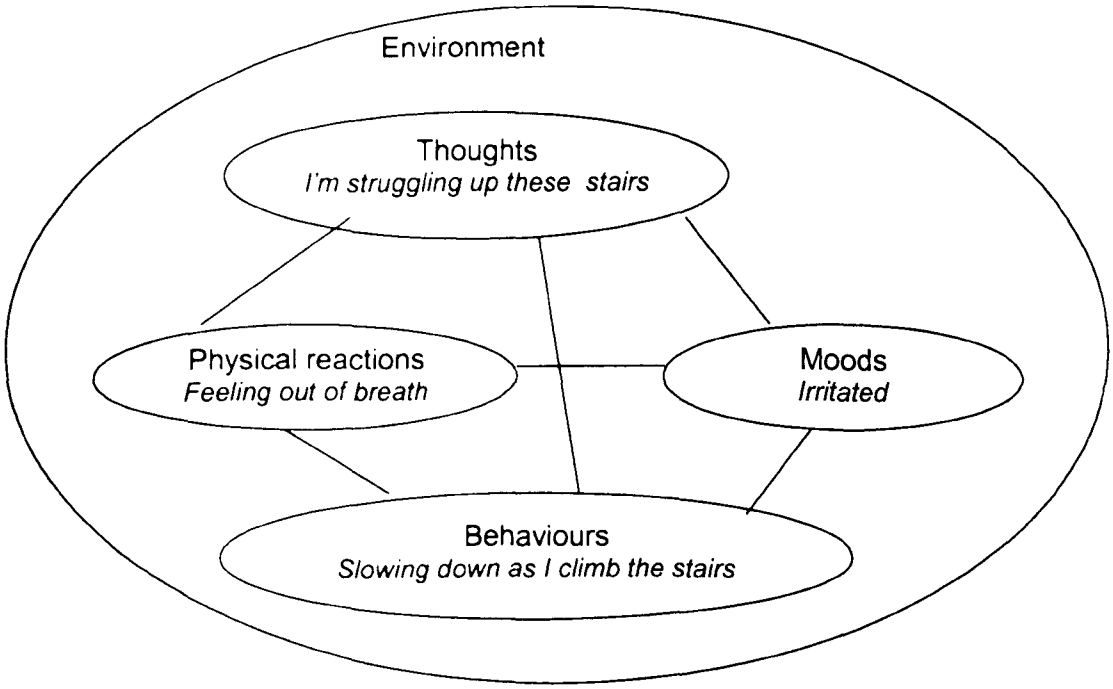
Physical reactions refer to how your body responds to a situation. For example, if someone had to run somewhere then their heart rate would increase, their gait would change and their breathing would be faster. The environment or situation in which this takes place could be in the street running to catch a bus.

Session 1 introduction to the cognitive behavioural model

The purpose of session 1 is to explore with participants the five aspects of life experiences and encourage them to identify personal examples. The aim is to think of everyday examples that the participants are likely to have experienced. It is helpful if the facilitator has a number of his or her own examples to draw on. One example has been provided below. It is helpful to incorporate the examples into the diagram in Figure 1. OHPs 7 to 13 provide additional examples.

Example 1 (OHP 7)

Feeling out of breath	Physical reaction
I'm struggling up these stairs	Thoughts
Feeling irritated	Mood
Slowing down as I climb the stairs	Behaviour
Climbing stairs quickly	Environment/Situation



It is also useful to use some osteoarthritis specific examples so that the participants also start to conceptualise their experiences with osteoarthritis using the model above. An example is provided below. Further examples are available on OHPs 14 to 16.

Example 7 (OHP 13)

Pain in hips	Physical reaction
It really hurts just now	Thoughts
Standing	Behaviour
Feel fed up	Mood
In the queue at the bus stop	Environment/situation

It is important that facilitators are confident about labelling these five different aspects of life experience but also allowing for variations in interpretation. At the end of session 1, participants are asked to keep a diary (handout 1.1) to record up to five situations where they have practiced the identification of thoughts, feelings, behaviours, physical reactions and environment exercise. At the beginning of session 2, it is important that these examples are discussed and clarification made as necessary.

Session 2 Identifying, recording and modifying unhelpful automatic thoughts 1

Session 1 focused on the identification of the five aspects of experience. Session 2 will focus on making the link between thoughts and behaviours and feelings and getting participants to rate their emotions. Participants are asked to consider times when they have felt various emotions and describe the related thoughts, physical feelings, behaviours and the situation. The rationale behind these examples is to enable the participants to say that they could experience a range of emotions in response to their examples. These could be anger, frustration, sadness, irritation, relief, hopeless etc. It is helpful to have a few additional examples to clarify this also. Table 1 (OHP 17) is used to facilitate this.

Table 1 Emotions list (OHP 17)

Feeling	Thought	Physical feeling	Behaviour	Situation
Happy				
Cheerful				
Excited				
Nervous				
Anxious				
Sad				
Angry				
Irritated				
Frustrated				

Once the participants are comfortable with the identification of feelings, thoughts and behaviours as a consequence of each other, the facilitators should move on to the rating of feelings. The purpose behind this exercise is to enable participants to be able to rate their own mood states in order monitor their selves. Furthermore, when learning to challenge their thinking, the rating of mood states before and after thought challenging facilitates the evaluation of the success of each particular challenge. Therefore, it is important that the participants become familiar with rating emotions on a scale (OHP 18).

The examples used in the OHPs 7 to 16 may be used again or examples provided by the participants in this session may also be used. An introductory statement to the participants should explain the rationale. For example:

'Previously, we learned to identify how we might feel when certain things happen. However, we don't always feel the same way when we feel say angry or sad. Our emotions vary in how strong they can be. We can feel slightly angry or very angry or somewhere in between. Also, we may feel very pleased or moderately pleased. Sometimes, it can be difficult to decide between slightly and moderately. It can be useful then to use a scale. It may not seem so obvious at first but you'll find that you can soon decide the difference between say 4 and 5 on scale of 0 to 10.'

Then, the scale should be used to rate the emotions on the previous examples as well as examples provided by the participants. Examples from OHPs 7 to 16 can be used again with suggestions as to the emotional intensity rated. Clearly, there will be variation between participants and also facilitators in how they may rate each emotion.

The second half of session 2 focuses on relaxation training (OHP 19). A sample script is provided in the session plan but facilitators may wish to use their own. In

teaching relaxation it is important that facilitators are flexible with techniques for those with significant pain or mobility problems. The use of guided imagery techniques may be more appropriate for those with significant mobility and pain problems.

At the end of session 2, participants should be comfortable with identifying thoughts, feelings, actions. In addition, the participants should be able to allocate percentages to rate the intensity of their emotions. The homework at the end of session 2 is aimed at allowing participants to identify thoughts, feelings and actions and rating them using their own experiences in the week between the sessions. The emphasis is on the participants' own experiences.

Session 3 Identifying, recording and modifying unhelpful automatic thoughts 2

In the previous two sessions, the concepts of identifying thoughts, feelings and moods and rating moods were discussed. The session will focus on the identification of participants' thoughts and how these can affect the rating of their mood state. The purpose of the session is to encourage the participants' to generate alternative ways of thinking and examine the effects on their mood state.

The first part of the session will focus on the generation of alternative thoughts. The session commences with a couple of examples from OHPs 18 to 36. The question that participants are asked to focus on is 'how could I think differently?' Participants are encouraged to generate different thoughts in the discussion of the examples below.

The facilitators should encourage the participants to give their own homework examples which can be used in the session. The homework focused on the identification of thoughts and the rating of feelings. Participants should be asked to think of an alternative thought. Alternative thoughts could be negative or unbalanced at this stage, the aim is the generation of alternative thoughts by the participants. The facilitators should start encouraging the participants to rate the helpfulness or otherwise of the alternative thoughts generated. This should merely be part of the discussion at this stage as a precursor to the rating of the responses later on in the session. Examples with alternative thoughts are available in OHPs 20 to 38) to aid the facilitators.

Participants should be encouraged to use their homework examples either in pairs, small groups or in the larger group. Participants should be encouraged to provide each other with alternative constructive responses. Usually, it is more useful to start in pairs or small groups which the facilitators can then monitor and clarify in turn. This will allow the facilitators to clarify any misunderstandings, identify good examples for wider discussion and encourage constructive comments by participants on the other's examples.

After this exercise has been completed, the facilitators can move on to the rating of feelings after the generation of an alternative thought. The examples in OHPs 39 to 45 illustrate this and can be used in the discussion with the participants. Participants' should be encouraged to think of alternative thoughts and how these may affect how they rate their feelings.

After discussion of the above examples, participants' should be encouraged to discuss their own examples from their homework or previous experiences. This can be done either in pairs, small groups or in the larger group.

After completion of this exercise, participants' should be provided handout 3.1 (daily thought record) and asked to enter two examples prior to the next session. Any points on clarification should also be addressed.

Session 4 Techniques of problem-solving including identifying social support and stages of planning

Problem-solving has been included in this group programme as an additional tool for allowing participants to tackle future problems. Cognitive behavioural strategies are of benefit in identifying and modifying the relationships between feelings, thoughts and behaviours which are unique to the individual. However, individuals with osteoarthritis may face other difficulties which result from their illness. The problem-solving method is a more goal focused approach which will encourage participants to generate, evaluate and initiate solutions to their problems. The emphasis is problem-solving as a general process which can be used in a wide range of situations but osteoarthritic specific examples should be incorporated to demonstrate the applicability of the method.

Problem-solving approaches have been used with a wide range of psychological problems including adjustment, trauma and generalised anxiety (Andrews et al, 1994). In addition, problem-solving has been used successfully with suicidal attempts or ideation in younger adults (Salkovskis, 1990).

There are 6 steps in the problem-solving approach. These will be described below.

Step 1 Identifying the problem, task or goal

It is important to focus on this to avoid being side-tracked and also to be able to recognise the success or not of the approach. It is helpful to focus on only one problem at a time. It is helpful to be specific rather than vague. For example, 'I wish I felt better' is not specific whereas 'I want to get rid of this headache' is more specific. In addition, the focus is on future action and planning. Some problems also need to be broken down into smaller goals. For example, 'I would like new curtains for the house' could be broken down into 'I will look for the fabric I like' and 'I will look for a style I like'.

Step 2 Generating thoughts

This may be a familiar technique but to ensure clarity, thought generation can be defined as a method of coming up with as many different answers as possible. The purpose here is not to think of the best solution but to come up with as many different ones as possible. This could include the useless and the absurd. For example, 'I would like some tomatoes' could include the following solutions: 'buy fresh tomatoes from the greengrocer', 'buy a tin of tomatoes from the supermarket', 'go for a meal and order something which has some tomatoes in it', 'buy some seeds and plant them', 'buy tomato plants', 'buy some plastic tomatoes', etc.

Step 3 Looking at your solutions

Each solution generated is likely to have its strengths and weaknesses and the examples used should be quickly examined for this. It may be helpful to use a flipchart to list strengths and weaknesses for the first two solutions but then it is likely to be as easy and quicker to run through these verbally. The 'tomato' example is described below in full to aid the facilitators.

Solution	Possible strength	Possible weakness
Buy fresh tomatoes from the greengrocer	Quick	May not have any in store
Buy a tin of tomatoes from the supermarket	Cheap	Not fresh
Go for a meal and order something which has some tomatoes in it	Going out	Cost
Buy some seeds and plant them	More flavour	Time and season
Buy tomato plants	More flavour	Hate gardening
Buy some plastic tomatoes	Durable	Inedible

Stage 4 Choosing the appropriate solution

The appropriate solution to an apparently identical problem may vary under the circumstances. The aim is to choose the solution or combination of solutions that could solve the problem. Other factors to take into account are the ease in which the solution can be carried out – this may mean that the 'ideal' solution is not selected. However, the solution selected has the advantages of being able to be carried out without significant delay and it will have at least a partial desired effect on the outcome.

Stage 5 Planning

Any task or action needs planning. This may be so automatic or unconscious that one does not notice it e.g. scratching one's nose. However, to scratch one's nose, the brain has to send a signal to the hand and arm to lift it and tell it what to do. Furthermore, even the most everyday tasks require planning – making a cup of tea requires the availability of hot water, tea leaves or bags, cups, and milk and sugar if required. Therefore, it is important that the planning takes into account the stages required to complete the solution.

Stage 6 Review

Finally, the solution has been identified and the plan has been carried out. Did it work? It is helpful to review what has been done and achieved. Perhaps things did not quite work out the way that was required but some difference was made. It is important to reward oneself for this and also to look at ways of improving things next time which may change the plan or the actions.

The structure of this session is to focus participants into generating problems or tasks and then following the steps above in generating solutions and action plans. The group should go through a couple of examples together at the start. Then,

small groups or pairs may facilitate the generation of more participant specific goals. Finally, participants should be encouraged to practice these techniques in future. A mnemonic is provided and discussed with participants' to support this. This is detailed below.

Social support

Social support is included in this session to focus the participants' minds on their current social support networks and how they rate them. Participants are then asked about their current activities and opportunities to interact socially. The aim is for participants to think of who supports them and what activities are available to them. Sharing this in the group will allow participants opportunities to learn about each other and what alternative activities are available. Participants are then asked to generate responses to two questions. This may be done in small groups and feedback discussion should be facilitated by the group leader.
The two questions are as follows:

- If you were move to a new area, how would you ensure that you met people and made friends?
- If you knew someone who had been discharged from hospital, what do you think that individual should do to get support?

The Five Ps

The final part of this session is to introduce participants to mnemonic which summarises the aspects of CBT and problem solving and how they can use this to cope better.

Pacing	Don't rush to do everything at once
Planning	What's the best order/ way/ system to do this?
Prioritising	Bread before cake
Practice	I did too much yesterday, how could I do it differently today
ImPerfection	I don't have to do things perfectly all the time

Finally, the session ends with a brief review of the four sessions which will briefly mention: the cognitive behavioural model; feelings, thoughts and behaviours; alternative thinking; and problem-solving.

Plan of Sessions

- The format of this intervention will be as follows.
- The timings suggested are approximate and may vary according to each group's knowledge and priorities

Session 1 introduction to the cognitive behavioural model

Introduction and Outline 0.00

Welcome the participants to the group
Group leader(s) should introduce themselves
Go through housekeeping arrangements: fire exits, toilets, refreshments, timings.
Introductions: ask the participants to introduce themselves
Ground Rules
Ask the group to set out ground rules but ensure that the following are included: turning up, being on time, confidentiality, listen to each other, do not interrupt, constructive criticism, honesty

Introduction to group (OHP 1) 0.10

This group has been designed to look at how psychology affects osteoarthritis (use OHP 1). We are interested in learning from your experiences with osteoarthritis so we can use this to help other people with osteoarthritis. How we feel affects how we think and behave and this will affect how we cope with our lives. You are the experts in coping with your osteoarthritis and we would like to learn from that.

Aims of the group (OHP 2) 0.15

Over the next four weeks, we will look at the following areas:
OHP 2 Aims of the group

- Sharing your experience of osteoarthritis
- Looking at the relationship between osteoarthritis and thinking, feeling and doing
- Sharing how you manage different tasks you have to do
- Learning how to relax
- Learning how thoughts and feelings affect how we do things
- Looking at how we solve problems in our everyday lives

Use OHP1 to discuss with participants their aims.

Your experience of osteoarthritis 0.20

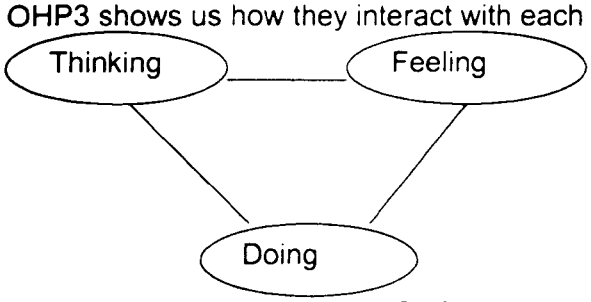
Group leaders to use flipchart or write on OHPs and ask participants the following questions. Tell participants that no word is wrong and write up exactly what is said. This shows respect for the group.

- How would you describe your osteoarthritis?
- What words come to mind when someone says osteoarthritis to you?
- e.g. pain, sore, stiff
- When do you find the osteoarthritis the worst and when is it better?
- e.g. morning, afternoon, doing a particular activity
- How would you describe osteoarthritis to someone who doesn't know what it is?

Session 1 introduction to the cognitive behavioural model

Psychological Factors in Osteoarthritis/physical illness 0.35

What does psychology have to do with osteoarthritis?
Introduction to psychological models – use OHP 3
Describe psychology and human behaviour.
What is psychology? Study of human behaviour
What is human behaviour? How we feel, act and think and how our body responds to our surroundings.
OHP3 shows us how they interact with each other as described below:



One way of looking at this is (OHP 3)

It would be useful if we could look at a few examples of how this relationship works. Ask the group for examples but use those listed below if examples are not forthcoming. Use OHP 4 with overlay write on OHP to illustrate examples. A few example are listed below.

Feeling	Stomach rumbling
Thinking	I'm hungry
Doing	Go to the cupboard to get some food
Feeling	In pain
Thinking	This hurts
Doing	Bending down
Feeling	Frightened
Thinking	I don't like this
Doing	Looking down from a height
Feeling	Happy
Thinking	I like being here
Doing	Lying in bed

BREAK 1.00

Adding to the model 1.20

In addition to the feeling, thinking and doing, we also have physical reactions to different events e.g. indigestion. Also, our environment (where we are) can be important too. This is illustrated in the next 2 slides: OHP 5 and 6. Spend 10 to 15 minutes discussing this to ensure participants fully understand the concepts.

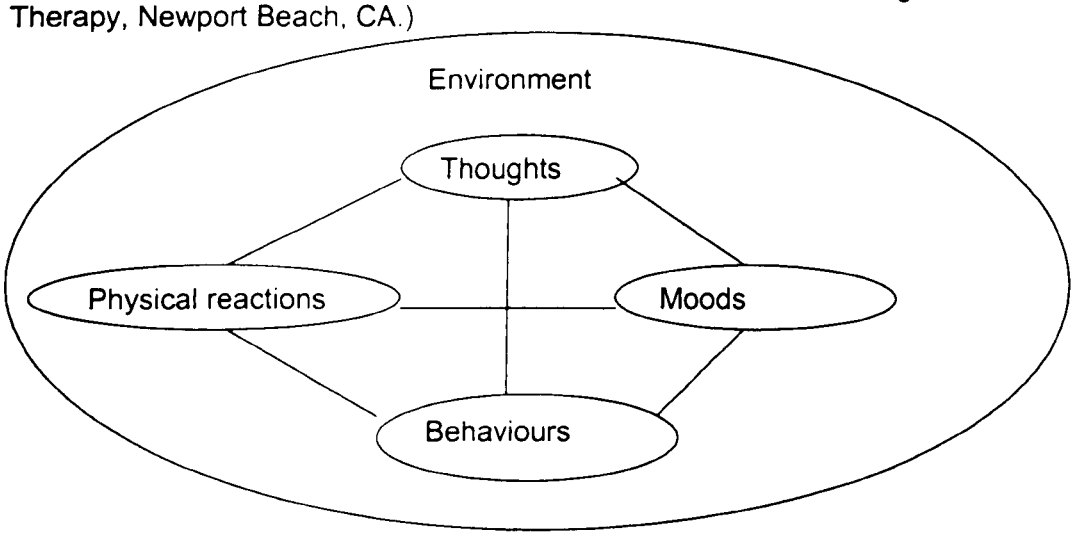
Session 1 introduction to the cognitive behavioural model

OHP 5

1. How our body feels	Physical reaction
2. What we think	Thoughts (Thinking)
3. How we feel	Mood (Feeling)
4. What we do	Behaviour (Doing)
5. What is happening around us	Environment

OHP 6

(Five aspects of your life experiences. 1986 Center for Cognitive Therapy, Newport Beach, CA.)



Group Exercise and Discussion 1.35

For the next 10 to 15 minutes, get participants to undertake following exercises. Depending on the size of the group, split into twos or threes.

1. Ask the participants to think of different situations that they find themselves in every day to illustrate the environment e.g. in bed, in the kitchen, at the bus stop, in the post office etc.
2. Also what physical reactions do we sometimes have?
3. e.g. warm, cold, sick, pain, breathless, headache, comfortable etc.
4. Ask the participants to embellish with the group leader using write-on ohps or flipchart with the following headings

- Environment
- Physical reaction
- Thinking
- Feeling
- Doing
-

1. Use some of examples below but in addition, ask the participants to think of situations they are often in.
2. It is better to choose 3 to 4 slides from OHPs 6 to 15 to suit the group.
3. This reduces the number of slides and gives more time for discussion.

Session 1 introduction to the cognitive behavioural model

OHP 7 Example 1 Stairs

1. Feeling out of breath	Physical reaction
2. I'm struggling up these stairs	Thoughts
3. Feeling irritated	Mood
4. Slowing down as I climb	Behaviour
5. Climbing stairs	Environment

OHP 8 Example 2 Birthday

1. Feel warm and comfortable	Physical reaction
2. I love getting presents	Thoughts
3. Feel happy	Mood
4. Accepting a present from a friend	Behaviour
5. It's my birthday	Environment

OHP 9 Example 3 Large hall

1. Feeling hot and sweaty	Physical reaction
2. It's very hot in here	Thoughts
3. Feel unhappy and uncomfortable	Mood
4. Take some clothes off	Behaviour
5. In a large hall with lots of people	Environment

OHP 10 Example 4 Out for a meal

1. Feeling sick	Physical reaction
2. I don't feel very well – maybe the food is off	Thoughts
3. Feel unhappy	Mood
4. Eating	Behaviour
5. Out for a meal	Environment

OHP11 Example 5 Friend in supermarket

1. Smiling	Physical reaction
2. I'm glad I've bumped into her, I meant to phone her	Thoughts
3. Relief	Mood
4. Saying hello	Behaviour
5. Meeting a friend in the supermarket	Environment

OHP12 Example 6 Dentist

1. Arms folded, shoulders tense	Physical reaction
2. I hate being here	Thoughts
3. Feel frightened, tense	Mood
4. Sitting on a chair, staring at the floor	Behaviour
5. In the dentist's waiting room	Environment

OHP13 Example 7 Bus stop

1. Pain in hips	Physical reaction
2. It really hurts just now	Thoughts
3. Fed up	Mood
4. Standing	Behaviour
5. In the queue at the bus stop	Environment

OHP14 Example 8 At home in pain

1. Knees are aching	Physical reaction
2. I wish the pain would go away	Thoughts
3. Tearful, sad	Mood
4. Sitting in a chair	Behaviour
5. At home	Environment

OHP15 Example 9 Cleaning the bathroom

1. Knees are stiff	Physical reaction
2. It hurts a bit but I can manage	Thoughts

Session 1 introduction to the cognitive behavioural model

3. Feel determined	Mood
4. Bending over the bath	Behaviour
5. Cleaning the bathroom	Environment
OHP16 Example 10 In bed	
1. No pain	Physical reaction
2. I feel very comfortable	Thoughts
3. Feel relaxed	Mood
4. Lying back	Behaviour
5. In bed	Environment
Arthritis related example (Use flipchart or write on OHP to illustrate)	
1. Knees are painful	Physical reaction
2. How will I get out of bed?	Thoughts
3. I feel unhappy	Mood
4. Use arms to push self up	Behaviour
5. In bed in the morning	Environment

- Can anyone think of other examples?

Homework for next week 1.50

- For next week we would like you to look at what we've done today and come up with a few examples of your own using the models. Give handouts 1.1 and 1.2 with two models on it as well as 5 point list for individuals to fill in. Allow time for examples and clarification.
- Next week will review the homework and what we have learnt so far and introduce relaxation training.

CLOSE 2.00

Session 2 Identifying, recording and modifying unhelpful automatic thoughts 1

How does how I think affect my osteoarthritis? 0.00

- Remind participants of housekeeping arrangements
- Review of previous session – general feedback and clarification
- Use OHPs 2 to 5 as necessary.
- Review of homework but do not criticise if participants have not completed homework.
- Get participants to describe their examples of situations. Spend 10 minutes on this. Use flipchart or write-on ohps

Rating emotions 0.20

The next step is to look at how strongly we feel about different situations and how that affects how we think and behave.

Also, we know that people differ in how they feel about the same things. What may be very annoying to one person is less so to another.

Also, what may be very annoying one day may be less annoying on another day.

What we would like to do is think of situations where we have felt some different emotions and then we can try to rate how strongly we may feel.

Ask participants to think of situations where they have experienced the emotions in OHP 17, and ask them to describe the associated thoughts, physical feelings, behaviours and situation.

Table 1 Emotions list (OHP 17)

Feeling	Thought	Physical feeling	Behaviour	Situation
Happy				
Cheerful				
Excited				
Nervous				
Anxious				
Sad				
Angry				
Irritated				
Frustrated				

Then ask how happy each participant would feel in each of the situations described – go round the group and get ratings on the scale of 1 – 10 (OHP 18)

Use these to illustrate how people differ. Then go round the group again and ask how they would feel if they had a bad cold and then again when their arthritis is bad.

BREAK 1.00

Relaxation Training (OHP 19) 1.20

Session 2 Identifying, recording and modifying unhelpful automatic thoughts 1

This section will include the following:

- What is relaxation training/relaxation exercises?
- Ask participants about any particular physical difficulties
- Important points about relaxation
- Breathing
- Relaxation exercises

What is relaxation training/ are relaxation exercises?

When you become tense, or upset, or nervous, certain muscles in the body tighten.
When this happens you may also feel on edge or uptight. Sometimes, when you are in pain, you may also tense up certain muscles in your body. This can lead to pain and discomfort in areas which don't suffer from osteoarthritis.

By learning how to relax your muscles can help you feel more relaxed. Also, it can help you feel less tired. When you tense a muscle, you are making it work and if you keep it tense for a period of time then you will be more likely to feel tired. Also, if you learn how to relax your muscles, then you relax when you want to.

So what are relaxation exercises?

Relaxation exercises are a way of helping your learn the difference between a tense muscle and a relaxed one. Therefore, we ask you to deliberately tense and relax the muscles of your body. By tightening and relaxing your muscles, you will become aware of the difference between tension and relaxation. Relaxation exercises are not exercise in the same way as walking, swimming in that they are not designed to exercise your muscles.

Important things to remember when doing relaxation exercises

- When you are doing relaxation exercises, you should start to feel two physical sensations: heaviness and warmth.
- You should never feel pain or discomfort when doing these exercises so make sure you do not tense up too hard.
- If a particular exercise is uncomfortable then miss it out. If you find something uncomfortable then it makes you less likely to relax.
- The purpose of the exercises is to learn the difference between tension and relaxation so release the tension suddenly NOT slowly.

Breathing

Breathing is also important when doing relaxation exercises. You should try to breathe slowly and regularly.

1. Breathe in slowly as you count to five, then breathe out slowly while you count to five.
2. Pause before you breathe in again to the count of five.
3. Continue this breathing slowly and steadily for a couple of minutes.
4. Just breathe in and out and in and out. Now take just one really deep breath in.
5. Feel your chest move as much as possible and very slowly let the air out. Try to feel the tension going out with the air you breathe out.
6. Every time you breathe out relax a little bit more.
7. Let yourself relax.

Session 2 Identifying, recording and modifying unhelpful automatic thoughts 1

Relaxation Exercises 1.25

Now let us try some relaxation exercises as a group. The script below can be used as a prompt to aid relaxation. The relaxation protocol should take between 20 and 25 minutes to complete. The phrases in brackets are not to be read out but indicate to the group leader which area of the body is involved.

(Relaxation of arms)

Settle back as comfortably as you can. Let yourself relax to the best of your ability... Now as you relax like that, clench your right fist, just clench your fist tighter and tighter, and study the tension as you do. Keep it clenched and feel the tension in your right fist, hand, forearm...and now relax. Let the fingers of your right hand become loose and observe the contrast in your feelings...Now let yourself go and try and become more relaxed all over... Once more, clench your right fist really tight... hold it, and notice the tension again... Now, let go, relax; your fingers straighten out, and you notice the difference once more... Now repeat that with your left fist. Clench your left fist while the rest of your body relaxes; clench that fist tighter and feel the tension and now relax. Again enjoy the contrast... Repeat that once more, clench the left fist, tight and tense...Now do the opposite of tension – relax and feel the difference. Continue relaxing like that for a while. Clench both fists tighter and tighter, both fists tense, forearms tense, study the sensations... and relax; straighten out your fingers and feel that relaxation. Continue relaxing your hands and forearms more and more... Now bend your elbows and tense your biceps, tense them harder and study the tension feelings... all right, straighten out your arms, let them relax and feel that difference again. Let the relaxation develop... Once more, tense your biceps; hold the tension and observe it carefully... Straighten the arms and relax; relax to the best of your ability... Each time, play close attention to your feelings when you tense up and when you relax. Now straighten your arms, straighten them so that you feel most tension in the triceps muscles along the back of your arms; stretch your arms and feel that tension... And now relax, get your arms back into a comfortable position. Let the relaxation proceed on its own. The arms should feel comfortably heavy as you allow them to relax... Straighten the arms once more so that you feel the tension in the triceps muscles; straighten them. Feel that tension... and relax. Now let's concentrate on pure relaxation in the arms without any tension. Get your arms comfortable and let them relax further and further. Continue relaxing your arms even further. Even your arms seem fully relaxed, try to go that extra bit further; try to achieve deeper and deeper levels of relaxation.

(Relaxation of facial area with neck, shoulders and upper back)

Let your muscles go loose and heavy. Just settle back, quietly and comfortably. Wrinkle up your forehead now; wrinkle it tighter... And now stop wrinkling your forehead, relax and smooth it out. Picture the entire forehead and scalp become smoother as the relaxation increases.... Now frown and crease your brows and study the tension.... Let go of the tension again. Smooth out the forehead once more.... Now, close your eyes, tighter and tighter... feel the tension... and relax your eyes. Keep your eyes closed, gently, comfortably, and notice the relaxation.... Now clench your jaws, bite your teeth together; study the tension throughout the jaws. Relax

your jaws now. Let your lips part slightly... Appreciate the relaxation... Now press your tongue hard against the roof of your mouth. Look for the tension... All right, let your tongue return to a comfortable and relaxed position... Now purse your lips, press your lips together tighter and tighter.... Relax your lips. Note the contrast between tension and relaxation. Feel the relaxation all over your face, all over your forehead and scalp, eyes, jaws, lips, tongue and throat. The relaxation progresses further and further... Now attend to your neck muscles, Press your head back as far as it can go and feel the tension in the neck; roll it to the right and feel the tension shift; now roll it to the left.. Straighten your head and bring it forward, press your chin against your chest. Let your head return to a comfortable position, and study the relaxation. Let the relaxation develop.... Shrug your shoulders, right up. Hold the tension.... Drop your shoulders and feel the relaxation. Neck and shoulders relaxed... Shrug your shoulders again and move them around. Bring your shoulders up and forward and back. Feel the tension in your shoulders and in your upper back.... Drop your shoulders once more and relax. Let the relaxation spread deep into the shoulders, right into your back muscles; relax your neck and throat, and your jaws and other facial areas as the pure relaxation takes over and grows deeper... deeper... ever deeper.

(Relaxation of chest, stomach and lower back)

Relax your entire body to the best your ability. Feel that comfortable heaviness that accompanies relaxation. Breathe easily and freely in and out. Notice how the relaxation increases as you exhale.... as you breathe out just feel that relaxation... Now breathe right in and fill your lungs; inhale deeply and hold your breath. Study the tension... Now exhale, let the walls of your chest grow loose and push air out automatically. Continue relaxing and breathe freely and gently. Feel the relaxation and enjoy it... with the rest of your body as relaxed as possible, fill your lungs again. Breathe in deeply and hold it again... That's fine, breathe out again and appreciate the relief. Just breathe normally. Continue relaxing your chest and let the relaxation spread to your back, shoulders, neck and arms. Merely let go... and enjoy the relaxation. Now let's pay attention to your abdominal muscles, your stomach area. Tighten the stomach muscles, make your abdomen hard. Notice the tension... And relax. Let the muscles loosen and notice the contrast... Once more, press and tighten your stomach muscles. Hold the tension and study it.... And relax. Notice the general well-being that comes with relaxing your stomach... Now draw your stomach in, pull the muscles right in and feel the tension this way.... Now relax again. Let your stomach out. Continue breathing normally and easily and feel the gently massaging action all over your chest and stomach.... Now pull your stomach in again and hold the tension. Now push out and tense like that; hold the tension... Once more pull in and feel the tension... Now relax your stomach fully, let the tension dissolve as the relaxation grows deeper. Each time you breathe out, notice the rhythmic relaxation both in your lungs and in your stomach. Notice thereby how your lungs and stomach relax more and more... Try and let go of all contractions anywhere in your body... Now direct your attention to your lower back. Arch up your back, make your lower back quite hollow and feel the tension along your spine... and settle down comfortably again relaxing the lower back... Just arch your back up and feel the tension as you do so. Try to keep the rest of your body as relaxed as possible. Try to localise the tension throughout

your lower back area... Relax once more, relaxing further and further. Relax your lower back, relax your upper back, spread the relaxation to your stomach, chest, shoulders, arms and facial areas.... These parts relaxing further and further and further and ever deeper.

(Relaxation of hips, thighs and calves followed by complete body relaxation)

Let go of all tensions and relax... Now flex your buttocks and thighs. Flex your thighs by pressing down on your heels as hard as you can... Relax and note the difference.... Straighten your knees and flex your thigh muscles again. Hold the tension... Relax your hips and thighs. Allow the relaxation to proceed on its own... Press your feet and toes downwards, away from your face, so that your calf muscles become tense. Study that tension... and relax your fee and calves... this time, bend your feet towards your face so that you feel tension along your shins. Bring your toes right up... Relax again. Keep relaxing for a while.... Now let yourself relax further all over. Relax your feet, ankles, calves, and shins, knees, thighs, buttocks and hips. Feel the heaviness of your lower body as you relax still further. Now spread the relaxation to your stomach, waist and lower back. Let go more and more. Feel that relaxation all over. Let it proceed to your upper back, chest, shoulders and arms, and right to the tips of your fingers. Keep relaxing more and more deeply. Make sure not tension has crept into your throat; relax your neck and your jaws and all your facial muscles. Keep relaxing your whole body like that for a while. Let yourself relax.

Now you can become twice as relaxed as you are merely by taking a really deep breath and slowly exhaling. With your eyes closed so that you become less aware of objects and movements around you and thus prevent any surface tension from developing, breathe in deeply and feel yourself becoming heavier. Take in a long, deep breath and let it out very slowly... Feel how heavy and relaxed you have become.

In a state of perfect relaxation you should feel unwilling to move a single muscle in your body. Think about the effort that would be required to raise your right arm. As you think about raising your right arm, see if you can notice any tensions that might have crept into your shoulder and your arm. Now you decide not to lift the arm but to continue relaxing. Observe the relief and the disappearance of tension.... Just carry on relaxing like that. When you wish to get up, count backwards from 4 to 1. You should feel fine and refreshed, wide awake and calm.

Completion of relaxation exercises 1.50

Discuss how the group found this and particular useful or useless exercises.

Use the flipchart to record comments.

Homework 1.55

Give participants handout 2.1 and ask them to complete the sheet for at least three emotions including the rating of the emotion.

Discuss use of particular relaxation exercises and say we will repeat next week and participants will receive a copy of a relaxation tape at the end of session 4.

CLOSE 2.00

Session 3 Identifying, recording and modifying unhelpful automatic thoughts 2

I know how I think affects my osteoarthritis but so what? 0.00

- Remind participants of housekeeping arrangements
- Review of previous session – general feedback and clarification
- Use OHP 17 and 18 as necessary.

Review of homework – general feedback by participants 0.15

- Review of homework
- but do not criticise if participants have not completed homework.
- Spend approximately 20 to 25 minutes on this.
- Use flipchart or write on OHPs to discuss particular examples provided by the participants.
- Have examples ready to discuss if participants shy. Examples are available in OHPs 20 to 38. Select few slides from OHPs 20 to 38 to suit the group. This reduces the number of slides and gives more time for discussion.
- Review of rating emotions.
- Discuss how participants can rate their emotions (OHP 19).

Introduce challenging thoughts 0.40

- Use OHPs 39 to 45 to illustrate how changing thinking can affect emotions.
- Ask participants to generate alternative thoughts and discuss how these could impact on the situation and the emotion, behaviour and physical reaction.
- Ask participants for their own examples.

BREAK 1.05

Relaxation Training 2 1.10

Use OHP 17 as a prompt. Remind participants of the areas discussed in session 2. This will include the following:

- What is relaxation training/relaxation exercises?
- Ask participants about any particular physical difficulties
- Important points about relaxation
- Breathing
- Relaxation exercises

Relaxation Exercises 1.15

The go through the relaxation exercises as detailed in session 2. This will take between 20 and 25 minutes.

Group Discussion and Homework Planning 1.40

- Allow some time for participants to discuss what they have learned so far and clarify any points as necessary.
- For homework, give handouts 3.1 and 3.2.
- Ask participants to identify 3 situations and record thoughts, physical feelings, behaviours, and feelings, and a rating of the latter.
- For handout 3.2 ask participants to record thoughts and feelings from a recent situation and ask them think of an alternative thought and to rate

their emotions.

CLOSE 2.00

Session 4 Techniques of problem-solving including identifying social support and stages of planning

How can I manage everything I have to do? 0.00

- Remind participants of housekeeping arrangements
- Review of previous session – general feedback and clarification
- Use OHP 39 to 45 as necessary.
- Review of homework – discussion using flipchart
- Allow 15 minutes to discuss this and use small groups/pairs as necessary

Problem-solving introduction 0.15

What is problem-solving?

Everyday, we all solve problems. Usually, these are simple ones like what to have breakfast, lunch etc. Sometimes, we have bigger problems to solve like decorating our homes, moving house, retiring from work. Sometimes, problems can be difficult to solve because of how we feel. Also, when suffering from an illness, the simplest task or problem can seem very difficult. Sometimes this affects how we interact with other people and sometimes we may not get as much support as we think we need. What we'd like to discuss now is a way of helping you to find ways of solving your problems despite the osteoarthritis.

The first step in problem solving is identifying the problem. 0.20

- Task: Use flipchart. Get the group to identify problems either generally or personally that need to be solved. This can include washing the windows to world peace. Ensure one is related to social support.

The next stage is to think about all the possible solutions. 0.25

At this point, we are not worried about the best solution. So let's try some of the problems you have identified.

- Task: Use flipchart. Facilitators to remember to include some ridiculous solutions e.g. break the windows and get new ones, come up with a way to make all nuclear weapons ineffective etc.

The next stage is to evaluate the solutions. 0.30

- Task: Evaluate solutions in discussion using flipchart. Get group to rate strengths and weaknesses. Perhaps reduce list of problems to three – one mundane, one serious (e.g. social support), one unrealistic (world peace?).
- Now that we have identified a solution, we need to plan the stages to that solution. What could these be?
- Task: Get group to generate stages to three examples using flipchart. Need to have different flipchart sheets available in room to review the sequence.
- Finally, we have solved the problem. However, it doesn't end there. Sometimes, it is not so straightforward. Maybe the solution doesn't go right first time or there is a hitch that we had not thought of. So we need to review. Even if things do go to plan, maybe they can be improved upon.
- Task: Get group to look at plan for three selected examples and

Session 4 Techniques of problem-solving including identifying social support and stages of planning

identify hitches, improvements etc. Ensure one example is related to social support and social interactions.

BREAK 0.45

Group Exercise 1.00

Now, we have done that as a group, I'd like you to think about a task or problem that is ahead of you in the next week. It should be something you are comfortable in discussing in this group. Use OHP 46 to remind participants of stages.

- Task: In pairs, to identify a task. For example: washing the curtains.
- Using the sheet, write down the stages of the task and how you would manage it.
- Use handout 4.1
- Feedback from group about tasks. Discussion.
- Emphasise only working on two problems at a time.
- Ask group to consider why that is more sensible.

How can I get the support I need? 1.15

- Ask participants who gives them the support they need. Use flipchart to write the categories of individuals participants provide, e.g. husband, wife, children, sister, brother, friends etc.
- Ask participants what activities they do socially and how they have found about them. Use flipchart to record these.
- Task: Ask participants to work in pairs for 10 minutes to answer the following questions:
- If they move to a new area, how would they ensure they met people and made friends?
- If they knew someone who had been discharged from hospital, what do they think that individual should do to get support?
- Spend 10 minutes on this and then get feedback from the group. Use flipchart to record responses. Discuss with group the pros and cons of the responses.

Pacing, planning, prioritising, practice and imperfection 1.40

Now things do not go perfectly all the time and it is important to remember that changing the way you think and how to solve problems can take time. Also, some days will be better than others. It may be helpful to think of the five Ps (OHP 47)

Pacing:	Don't rush to do everything at once
Planning:	What's the best order/way/system to do this?
Prioritising:	Bread before cake
Practice:	I did too much yesterday, how could do I do it differently today.
ImPerfection:	I don't have to do things perfectly all the time.

Ending and Planning Ahead 1.50

- Review of homework
- Discuss with group.

Session 4 Techniques of problem-solving including identifying social support and stages of planning

- Summary/review of sessions
    a. Use OHP 48
- Discussion of relapse prevention
    b. Use 5 Ps (OHP 47)
- Final handouts etc. e.g. useful addresses and contacts
- Finally, thank the group for attending over the past four weeks. Say that you welcome any feedback from them about how we can do things differently.

CLOSE **2.00**

Handbook for Participants

The handouts will be provided at each session and they will summarise what is discussed in each session. They can be used as a reference for you. If you are not sure about something then please ask one of the group leaders to explain.

Session 1 Introduction

The purpose of this group is to help you cope better with your arthritis. At the beginning of today's session, we will have discussed some of the ground rules, which are important for you and your fellow group members to feel comfortable in a group.

These include:

- Turning up to each session
- Being on time
- Listening to each other
- Not interrupting
- Keeping it confidential
- Being honest
- Making comments constructive

Then we discussed some of your expectations and aims. You can list some of these below if it would help you remember important points.

The aims we have suggested are:

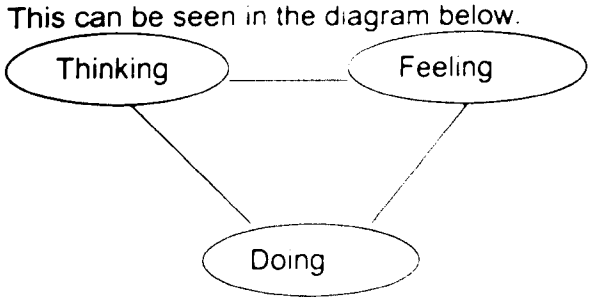
- To improve how you cope with osteoarthritis
- To learn about how you think affects your arthritis
- To learn about how you behave affects your arthritis
- To practice changing the way you think and behave in relation to your osteoarthritis
- To plan how you are going to continue to manage your osteoarthritis

How would you describe your arthritis?

What does psychology have to do with osteoarthritis?

You may wonder what psychology has to do with your arthritis. Psychology is the study of how we feel, think and behave. What psychologists do is to try and understand how people are and identify ways of helping them cope better. This can involve looking at how we feel, think and behave and learning to make changes which can help.

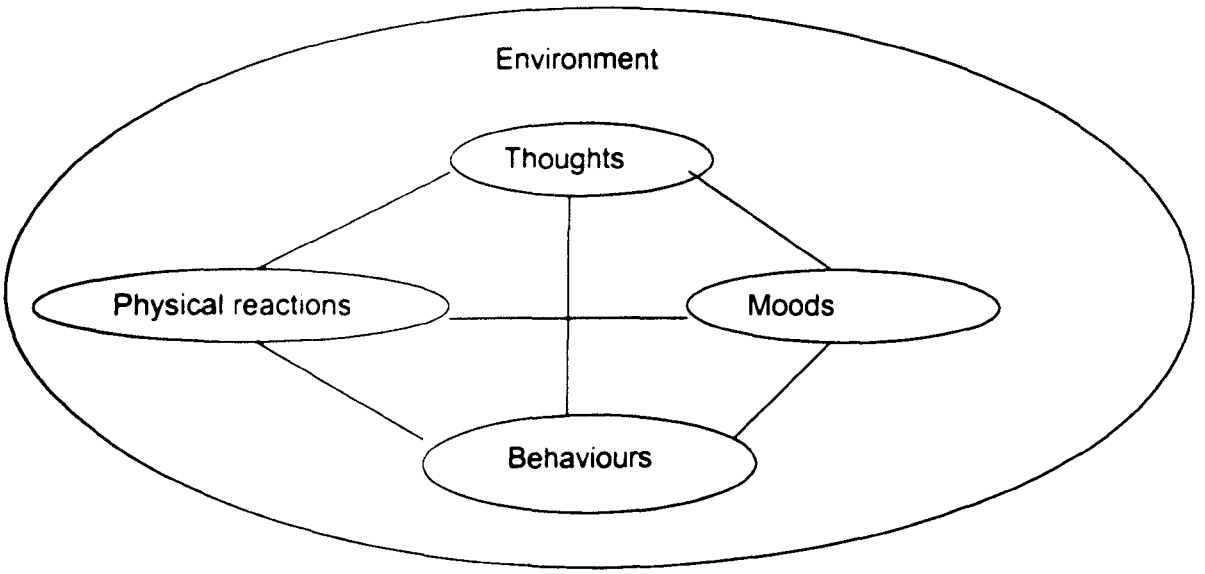
One way of doing this is to look at how our thoughts, feelings and actions interact. This can be seen in the diagram below.



What examples do you have? Please write these in the table below.

Feeling	Thinking	Doing

However, we also have physical reactions to things and we are affected by the environment or situation we are in. This is described in the diagram below:



(Five aspects of your life experiences. 1986 Center for Cognitive Therapy, Newport Beach, CA.)

This can be described as follows:

1. How our body feels	Physical reaction
2. What we think	Thoughts
3. How we feel	Mood
4. What we do	Behaviour
5. What is happening around us	Environment

An example of this would be:

1. Feeling hot and sweaty	Physical reaction
2. It's very hot in here	Thoughts
3. Feel unhappy and uncomfortable	Mood
4. Take some clothes off	Behaviour
5. The room is very warm with all these people	Environment

Arthritis related example:

1. Knees are painful	Physical reaction
2. How will I get out of bed?	Thoughts
3. I feel unhappy	Mood
4. Use arms to push self up	Behaviour
5. I have osteoarthritis	Environment

Your example

1.	Physical reaction
2.	Thoughts
3.	Mood
4.	Behaviour
5.	Environment

Your example

1.	Physical reaction
2.	Thoughts
3.	Mood
4.	Behaviour
5.	Environment

To do for next week

For next week, what we would like you to do is to put into practice what we have tried out today. This means that on the sheet where you have listed your own examples, please list a further 4 examples. There will be extra sheets available for you also.

Session 2 How does how I think affect my osteoarthritis?

Last week we looked at our thoughts, feelings, behaviours, physical reactions and environment. We were able to list examples of these in the format below.

Physical reaction (how our body feels) _____
Thoughts (what we think) _____
Feelings or moods (how we feel) _____
Behaviour or doing (what we do) _____
Environment (what is happening around us) _____

Today we will look at how our emotions interact with our thoughts, physical feelings, behaviour and situation. This is described in the table below. You can list your examples for each feeling in the table.

Emotions list

Feeling	Thought	Physical feeling	Behaviour	Situation
Happy				
Cheerful				
Excited				
Nervous				
Anxious				
Sad				
Angry				
Irritated				
Frustrated				

Session 3: I know how I think affects my osteoarthritis but so what?

The purpose this session is to allow you to practice more in changing the way you think.
We will discuss the examples from your diaries first. Let's look at how you could think differently.

Your thought	Your alternative thought	Any better suggestions

If it is useful, you can write down with your partner some of the alternative thoughts you have generated. You can write these below.

Your thought	Your alternative thought	Any better suggestions

For next week, try to put into practice what you have tried out on these sheets. Think of two situations where you could try these out and write them below. It doesn't matter if you change your mind later.

Two situations that I could try changing the way I think

1

2

Don't forget to fill in your diary sheet for next week.

Session 4: How can I manage everything I have to do?

What is problem-solving?

Everyday, we all solve problems. Usually, these are simple ones like what to have breakfast, lunch etc. Sometimes, we have bigger problems to solve like decorating our homes, moving house, retiring from work. Sometimes, problems can be difficult to solve because of how we feel. Sometimes this affects how we interact with other people and sometimes we may not get as much support as we think we need. Also, when suffering from an illness, the simplest task or problem can seem very difficult.

Steps in problem solving

- What is the problem?
- What are all possible solutions?
- What are the strengths and weaknesses of each solution?
- What is the preferred solution?
- What are the steps to this solution?
- How did it go?
- What went right?
- What went wrong?
- What could I have done differently?

It is better to work on only two problems at a time. Why do you think that is?

How can I get the support I need?

Social support is important for all of us. We all need people who we can rely on and who support us. We also meet people through our day to day activities whether that is shopping, leisure activities or through work.

We would like you to think about who provides you with support and who is the most important person to support you?

People who provide support

Who is the most important?

We would now like you to think about what social activities you are involved with. Please write these below.

If you were move to a new area, how would you ensure that you met people and made friends?

If you knew someone who had been discharged from hospital, what do you think that individual should do to get support?

Pacing, planning, prioritising, practice and imperfection

Now things do not go perfectly all the time and it is important to remember that changing the way you think and how to solve problems can take time. Also, some days will be better than others. It may be helpful to think of the five Ps

Pacing:	Don't rush to do everything at once
Planning:	What's the best order/way/system to do this?
Prioritising:	Bread before cake
Practice:	I did too much yesterday, how could do I do it differently today
ImPerfection:	I don't have to do things perfectly all the time

Useful addresses and contacts:

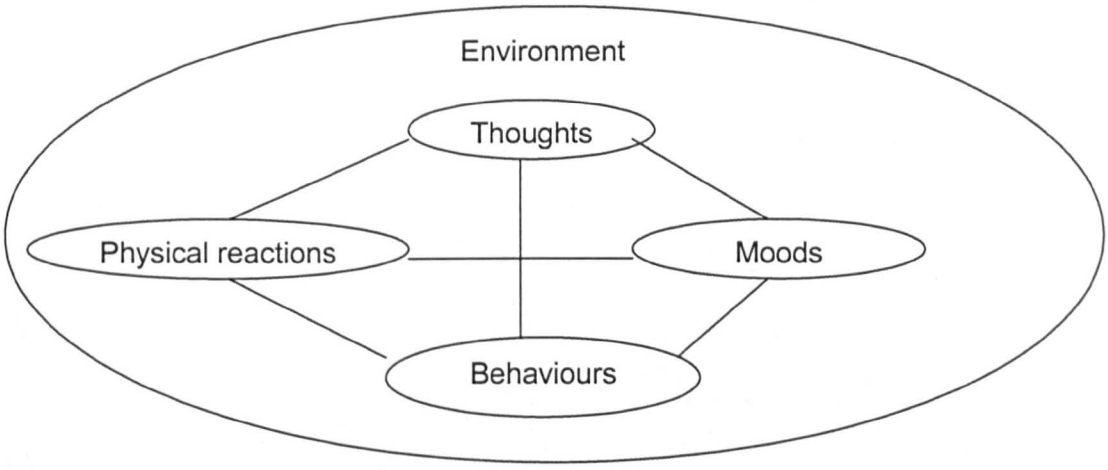
Arthritis Research Campaign
St Mary's Court
St Mary's Gate
Chesterfield S41 7TD
Tel: 0146 5558033
Fax: 0146 5558007
Email: info@arc.org.uk
Website: www.arc.org.uk

They do a wide range of leaflets.

Arthritis Care
18 Stephenson Way
London NW1 2HD
Tel: 020 7380 6500
Fax: 020 7380 6505
Website: www.arthritiscare.org.uk

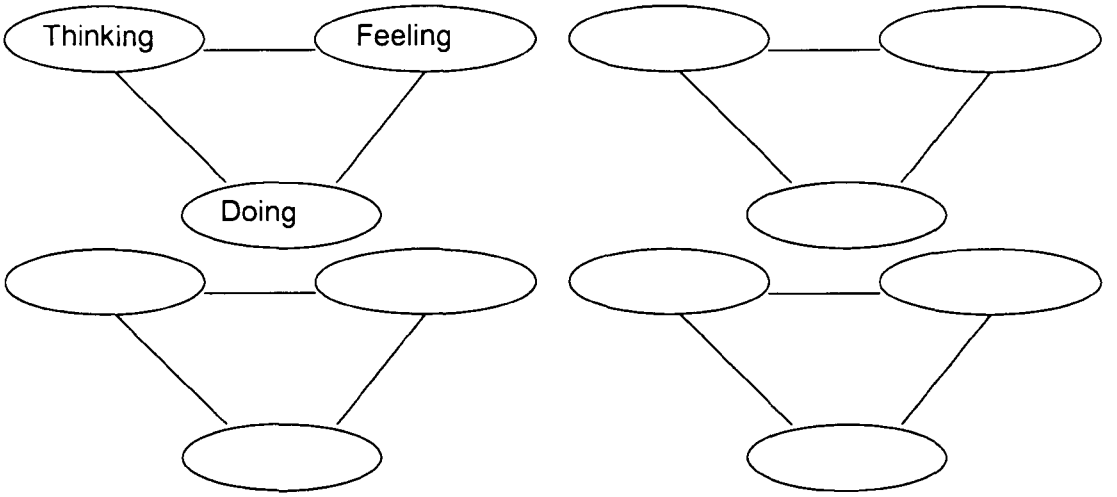
Arthritis helpline:
080 8800 4050 (free) 12.00 - 16.00 week days
020 7380 6555 (standard rates) 10.00 - 16.00 week days

Handout 1.1



Physical reaction	Thoughts	Mood	Behaviour	Situation
Knees are painful	How will I get out of bed?	I feel unhappy	Use arms to push myself up	I have osteoarthritis

Handout 1.2



Physical reaction (how our body feels)

Thoughts (what we think)

Feelings or moods (how we feel)

Behaviour or doing (what we do)

Environment (what is happening around us)

Physical reaction (how our body feels)

Thoughts (what we think)

Feelings or moods (how we feel)

Behaviour or doing (what we do)

Environment (what is happening around us)

Physical reaction (how our body feels)

Thoughts (what we think)

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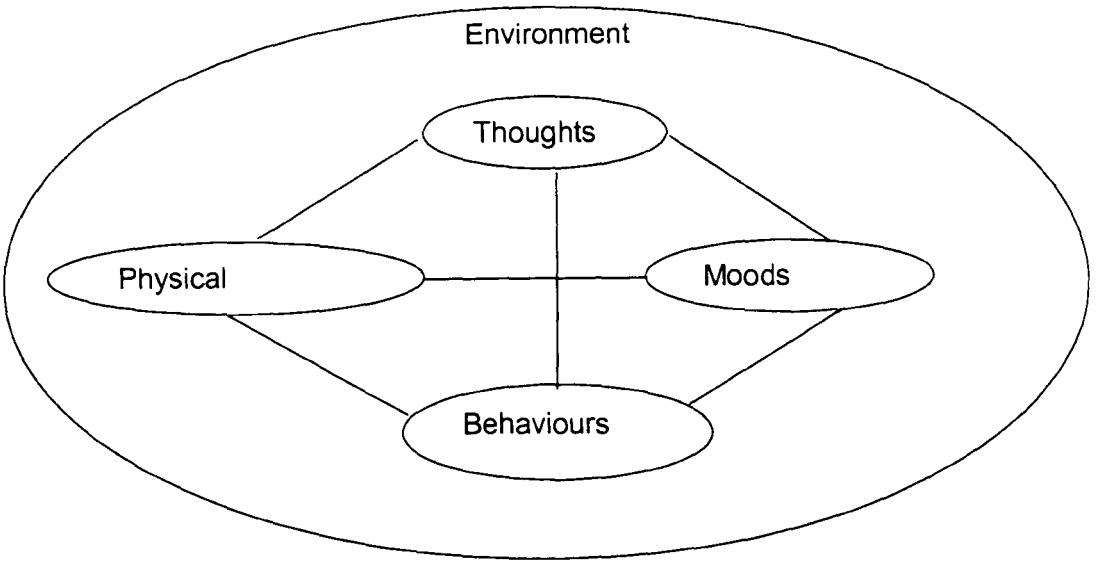
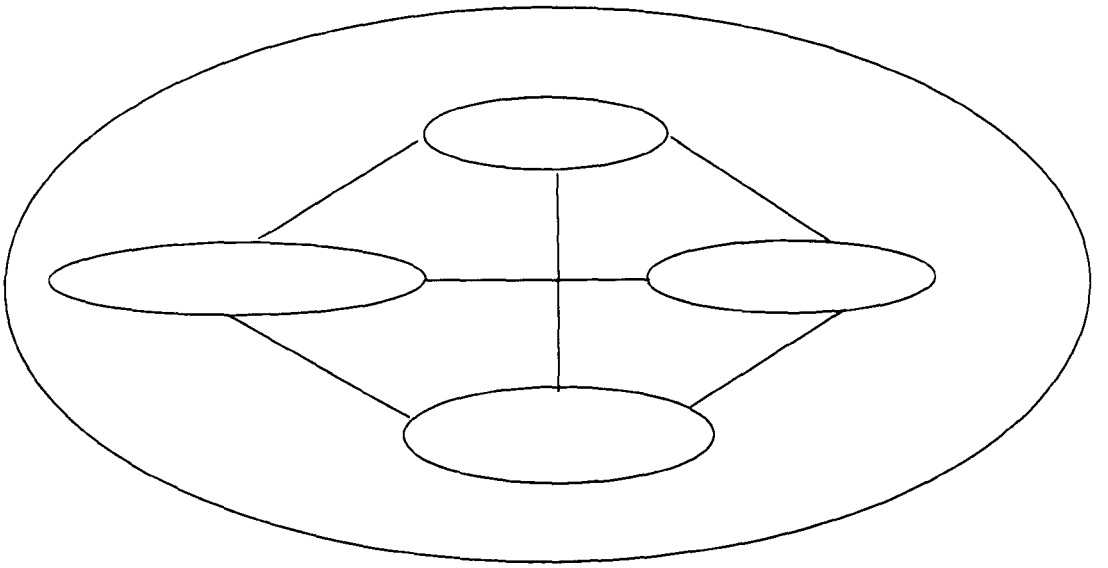
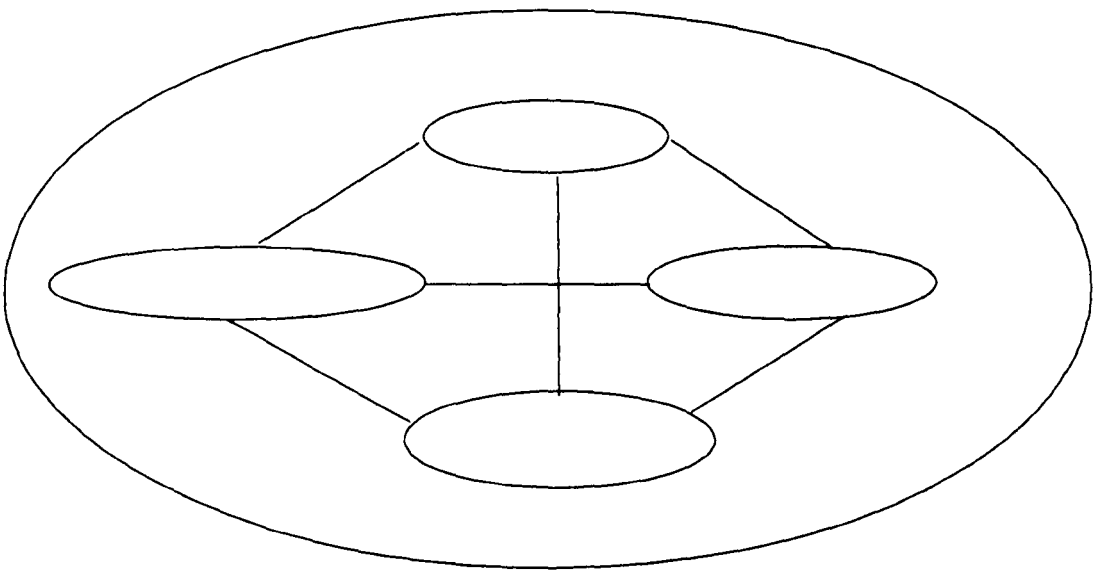
Behaviour or doing (what we do)

Environment (what is happening around us)


Environment
Thoughts
Physical
Moods
Behaviours





Handout 2.1

For next week, we would like you to select three of the feelings on the list below and complete the boxes beside them.

For example, if you felt happy that it was your birthday, then you might fill it out like this.

	Thought	Physical feeling	Behaviour	Situation	How much (1-10)?
Happy	It's my birthday	Warm inside	Opening a card	At home with the family	8

Feeling	**Thought**	**Physical feeling**	**Behaviour**	**Situation**	**How much (1- 10)?**
Happy					
Cheerful					
Excited					
Nervous					
Anxious					
Sad					
Angry					
Irritated					
Frustrated					

Handout 3.1 Diary to record challenging thoughts

Date/Time	What was happening?	What were you feeling? On a scale of 0 –100?	What were you thinking?	What could be more helpful to think?	What did you do? How did you feel? On a scale of 0 – 100?

Handout 3.2

For next week, we would like you to think of two situations and then fill in how you felt, behaved and thought about it and then how you could think differently about it.

For example, if you felt happy that it was your birthday, then you might fill it out like this.

	Thought	Physical feeling	Behaviour	Feeling	How much (1-10)?
At home with the family	It's my birthday	Warm inside	Opening a card	Happy	8

Situation	Thought	Physical feeling	Behaviour	Feeling	How much (1- 10)?

Handout 4.1 Problem-solving sheet

Questions	Task 1	Task 2
What is the problem/task?		
What are the possible solutions?		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
What is the preferred solution?		
What are the steps to this solution?		
1.		
2.		
3.		
4.		
5.		
6.		
7.		
How did it go?		
What went right?		
What went wrong?		
What could I have done differently?		

Overhead projector slides

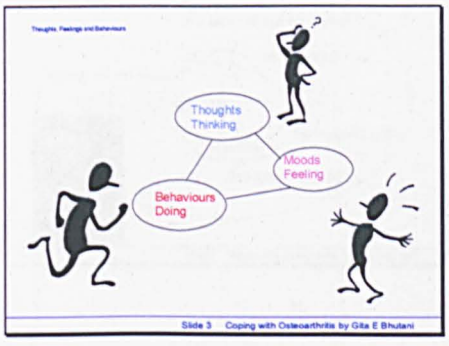
Coping with Osteoarthritis

Gita E Bhutani

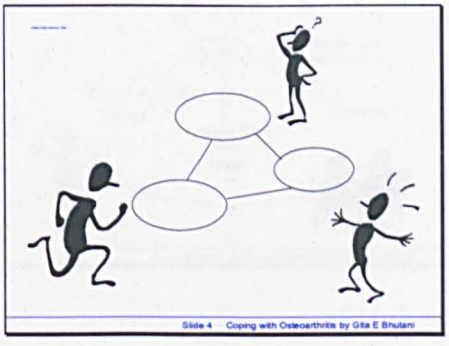
Aims of group

- Sharing your experience of osteoarthritis
- Looking at the relationship between osteoarthritis and thinking, feeling and doing
- Sharing how you manage different tasks you have to do
- Learning how to relax
- Learning how thoughts and feelings affect how we do things
- Looking at how we solve problems in our everyday lives

Slide 2 Coping with Osteoarthritis by Gita E Bhutani



Slide 3 Coping with Osteoarthritis by Gita E Bhutani

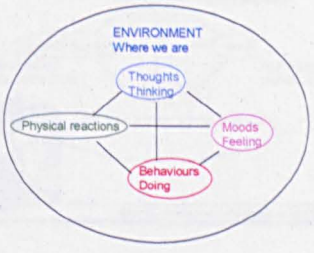


Slide 4 Coping with Osteoarthritis by Gita E Bhutani

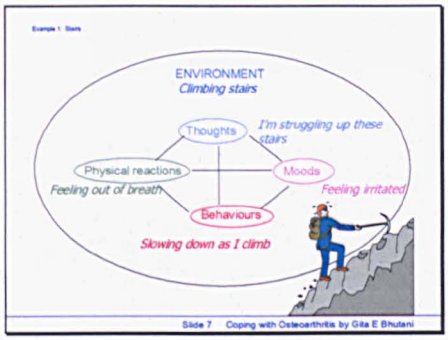
- How our body feels
- What we think
- How we feel
- What we do
- What is happening around us

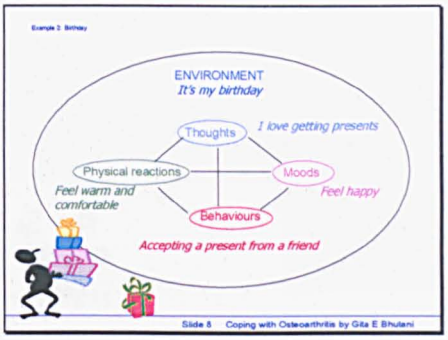
- Physical reaction
- Thoughts (Thinking)
- Mood (Feeling)
- Behaviours (Doing)
- Environment

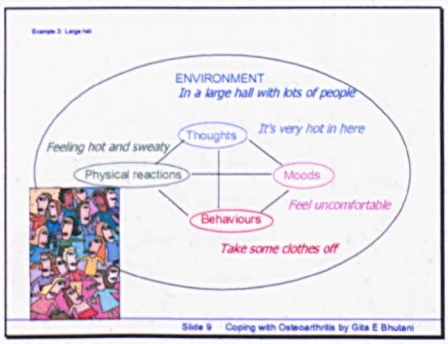
Slide 5 Coping with Osteoarthritis by Gita E Bhutani

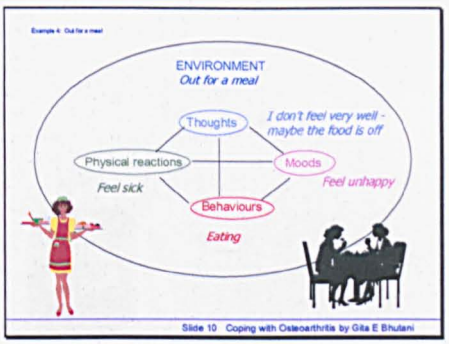


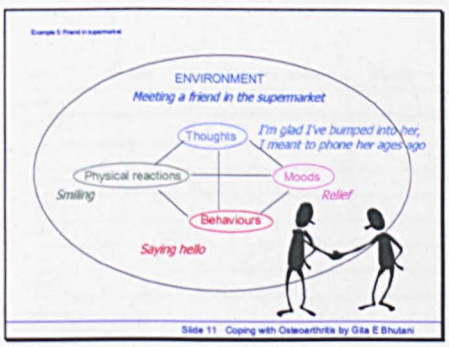
Slide 6 Coping with Osteoarthritis by Gita E Bhutani

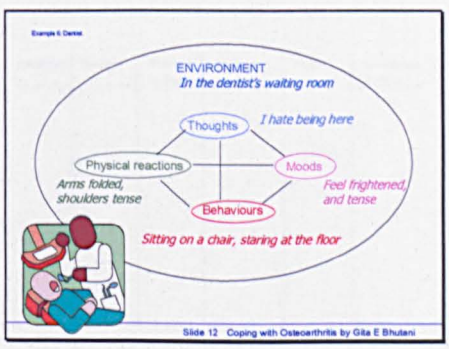

Example 1: Stairs
ENVIRONMENT
Climbing stairs
Thoughts
I'm struggling up these stairs
Physical reactions
Feeling out of breath
Moods
Feeling irritated
Behaviours
Slowing down as I climb
Slide 7 Coping with Osteoarthritis by Gita E Bhutani

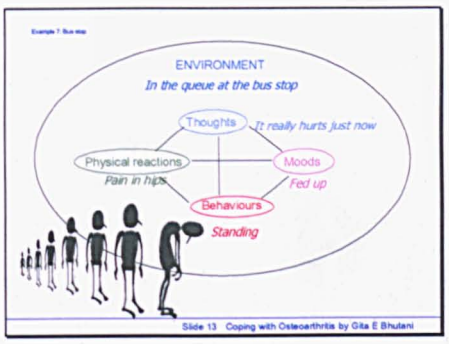

Example 2: Birthday
ENVIRONMENT
It's my birthday
Thoughts
I love getting presents
Physical reactions
Feel warm and comfortable
Moods
Feel happy
Behaviours
Accepting a present from a friend
Slide 8 Coping with Osteoarthritis by Gita E Bhutani

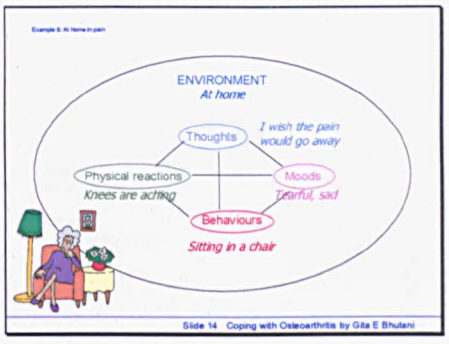

Example 3: Large hall
ENVIRONMENT
In a large hall with lots of people
Thoughts
It's very hot in here
Feeling hot and sweaty
Physical reactions
Moods
Feel uncomfortable
Behaviours
Take some clothes off
Slide 9 Coping with Osteoarthritis by Gita E Bhutani

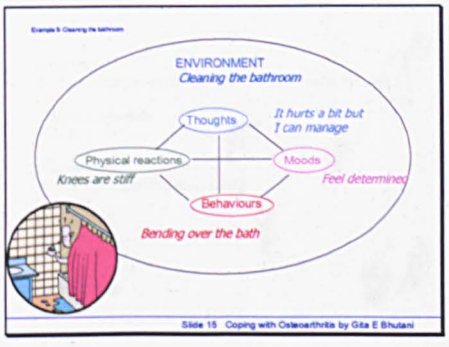

Example 4: Out for a meal
ENVIRONMENT
Out for a meal
Thoughts
I don't feel very well - maybe the food is off
Physical reactions
Feel sick
Moods
Feel unhappy
Behaviours
Eating
Slide 10 Coping with Osteoarthritis by Gita E Bhutani

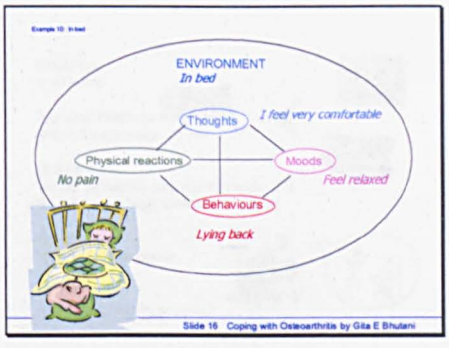

Example 5: Friend in supermarket
ENVIRONMENT
Meeting a friend in the supermarket
Thoughts
I'm glad I've bumped into her, I meant to phone her ages ago
Physical reactions
Smiling
Moods
Relief
Behaviours
Saying hello
Slide 11 Coping with Osteoarthritis by Gita E Bhutani


Example 6: Dentist
ENVIRONMENT
In the dentist's waiting room
Thoughts
I hate being here
Physical reactions
Arms folded, shoulders tense
Moods
Feel frightened, and tense
Behaviours
Sitting on a chair, staring at the floor
Slide 12 Coping with Osteoarthritis by Gita E Bhutani









Feeling	Thought	Physical feeling	Behaviour	Situation
Happy				
Cheerful				
Excited				
Nervous				
Anxious				
Sad				
Angry				
Irritated				
Frustrated				

Slide 17 Coping with Osteoarthritis by Gita E Bhutani

Situation	Thought	Physical feeling	Behaviour	Feeling	How much (1-10)?

Slide 18 Coping with Osteoarthritis by Gita E Bhutani

Relaxation

Relaxation

Tension

Slide 19 Coping with Osteoarthritis by Gita E Bhutani

Medication 1

Situation
- My medication isn't making any difference to my pain

Physical reaction
- In pain

Behaviour
- Body tense

Thought
- It's getting worse

Feeling
- Upset

Slide 20 Coping with Osteoarthritis by Gita E Bhutani

Medication 2

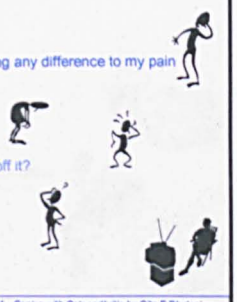
Situation
- My medication isn't making any difference to my pain

Physical reaction
- In pain

Thought
- How can I take my mind off it?

Behaviour
- Watch TV

Feeling
- Less upset



Slide 21 Coping with Osteoarthritis by Gita E Bhutani

Alone with pain 1

Situation
- At home

Physical reaction
- Lot of pain, weak

Thought
- I am alone, it's only me that is like this
- I wish there was someone to talk to

Behaviour
- Sitting in the house

Feeling
- Irritated, fed up, snappy

Slide 22 Coping with Osteoarthritis by Gita E Bhutani

Alone with pain 2

Situation
- At home

Physical reaction
- Pain

Thought
- It's good to talk to someone, it takes your mind off it

Behaviour
- I'll phone a friend

Feeling
- Less fed-up

Slide 23 Coping with Osteoarthritis by Gita E Bhutani

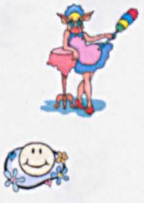
Dusting

Situation
- Dusting

Thought
- I must finish the dusting today

Behaviour
- I dust

Feeling
- Pleased that I managed it



Slide 24 Coping with Osteoarthritis by Gita E Bhutani

Going to a meeting 1

Situation
- Ready to go to a meeting

Physical reaction
- Feeling in a lot of pain

Thought
- I'm in too much pain to go

Behaviour
- Ready to pick up the phone

Feeling
- Annoyed, fed up

Slide 25 Coping with Osteoarthritis by Gita E Bhutani

Going to a meeting 2

Situation
- Ready to go to a meeting

Physical reaction
- Pain

Thought
- If I go then I could distract myself from the pain a bit

Behaviour
- Get ready to go

Feeling
- Happier, less fed up

Slide 26 Coping with Osteoarthritis by Gita E Bhutani

Post office 1

Situation
- At home but you need to get to the post office

Physical reaction
- Very stiff

Thought
- I'm too stiff to go to the post office today

Behaviour
- Sit at home

Feeling
- Irritated

Slide 27 Coping with Osteoarthritis by Gita E Bhutani

Post office 2

Situation
- At home but you need to get to the post office

Physical reaction
- Stiff

Thought
- If I walk around a bit, the stiffness wears off and then I'll go

Behaviour
- Moving around the house

Feeling
- Hopeful

Slide 28 Coping with Osteoarthritis by Gita E Bhutani

Queue 1

Situation
- In the queue at the post office

Physical reaction
- Very stiff knees

Thought
- I can't stand here much longer

Behaviour
- Standing still

Feeling
- Fed up

Slide 29 Coping with Osteoarthritis by Gita E Bhutani

Queue 2

Situation
- In the queue at the post office

Physical reaction
- Knees very stiff

Thought
- How can I take my mind off it?

Behaviour
- Read my magazine/paper

Feeling
- Less fed up

Slide 30 Coping with Osteoarthritis by Gita E Bhutani

Queue 2

Situation
- In the queue at the post office

Behaviour
- Sit on my folding seat

Physical reaction
- Knees less sore

Thought
- It's much better if I can sit down

Feeling
- Generally OK

Mealtime 1

Situation
- Mealtime

Thought
- I'm too tired to make a meal today

Behaviour
- I don't cook

Feeling
- Annoyed and hungry

Mealtime 2

Situation

Thought
- Maybe I could reheat something

Behaviour
- I put something in the oven

Feeling
- Still hungry but less annoyed

Hospital 1

Situation
- Night before hospital appointment

Thought
- I wish I didn't have to go to hospital tomorrow

Behaviour/Reaction
- My body is getting tense

Feeling
- Anxious

Hospital 2

Situation

Thought
- I could phone and cancel

Behaviour/Reaction
- Feel less tense

Feeling
- Bit less anxious

Hospital 3

Situation

Thought
- I'll try and take my mind off it, what could I do?

Behaviour/Reaction
- Still a bit tense

Feeling
- Still a bit anxious

Jar 1

Situation
- In the kitchen with a jar that needs opening

Thought
- I can't get this jar unscrewed

Behaviour
- Trying to unscrew the lid

Feeling
- Annoyed

Slide 37 Coping with Osteoarthritis by Gita E Bhutani

Jar 2

Situation

Thought
- What could I do to make this easier?

Behaviour
- Run the jar under a hot tap and then open it

Feeling
- Pleased with finding a solution

Slide 38 Coping with Osteoarthritis by Gita E Bhutani

On Hold 1

Situation
- Telephoned about an item I'd ordered and been put on hold

Thought
- I wish they'd hurry up and answer - after all they told me it would arrive last week and I hate listening to this music

Behaviour
- Holding the phone

Feeling
- Irritated 40%

Slide 39 Coping with Osteoarthritis by Gita E Bhutani

On Hold 2

- **Situation**

The person answers the phone

- **Thought**

It's not the fault of the person on the end of the phone but I need to be clear that I want her to chase it

- **Behaviour**

I asked her to chase it and didn't get angry

- **Feeling**

Less irritated 10%

Slide 40 Coping with Osteoarthritis by Gita E Bhutani

On Hold 3

Situation
- Still on hold

Thought
- I suppose it's not the person's fault that they have to check

Behaviour

Feeling
- Irritated 35%

Slide 41 Coping with Osteoarthritis by Gita E Bhutani

Supermarket 1

Situation
- In the supermarket

Thought
- I want to get out of here - I wish they'd hurry up

Behaviour
- Standing in the queue

Feeling
- Still irritated 75%

Slide 42 Coping with Osteoarthritis by Gita E Bhutani

Supermarket 2

Situation

Thought
- I expect they're doing their best, I'll try and think about something else while I wait

Behaviour
- Still standing in the queue

Feeling
- Still irritated 30%

Slide 43 Coping with Osteoarthritis by Gita E Bhutani

Plug 1

Situation
- At home, trying to change a plug

Thought
- My fingers won't work properly, it's taking forever

Behaviour
- Plug in one hand, screwdriver in the other

Feeling
- Annoyed 80%

Slide 44 Coping with Osteoarthritis by Gita E Bhutani

Plug 2

Situation

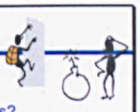
Thought
- I know I'm a bit stiff in the morning, I'll need to take it slowly or do it later

Behaviour
- Took my time

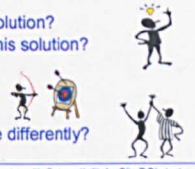
Feeling
- Less annoyed 30%

Slide 45 Coping with Osteoarthritis by Gita E Bhutani

Steps in Problem Solving



1. What is the problem?
2. What are all the possible solutions?
3. What are the strengths and weaknesses of each solution?
4. What is the preferred solution?
5. What are the steps to this solution?
6. How did it go?
7. What went right?
8. What went wrong?
9. What could I have done differently?



Slide 46 Coping with Osteoarthritis by Gita E Bhutani

The Five Ps

- Pacing
  - Don't rush to do everything at once
- Planning
  - What's the best order/ way/ system to do this?
- Prioritising
  - Bread before cake
- Practice
  - I did too much yesterday, how could I do it differently today
- ImPerfection
  - I don't have to do things perfectly all the time

Slide 47 Coping with Osteoarthritis by Gita E Bhutani

Review

1. What does psychology have to do with osteoarthritis?
2. How does how I think affect my osteoarthritis?
3. I know how I think affects my osteoarthritis but so what?
4. How can I manage everything I have to do?

Slide 48 Coping with Osteoarthritis by Gita E Bhutani

Appendix 5: Details of Education and Exercise Intervention used in Study Two

Education and Exercise Intervention

- Trainer's notes
- Plan of sessions
- Participants' manual (1 part)
- Handouts (4)
- Leaflets from ARC (not included)
- Overhead projector slides (29)

Education and Exercise Intervention: Trainers' notes

Rationale

This is a group for older people who suffer from osteoarthritis in primary care normally of the hip or knee but other joints may also be affected. The aim of this intervention group is to:

- Educate the participant about osteoarthritis
- Educate the participant about how osteoarthritis is treated
- Educate the participant in how osteoarthritis can be managed by physical therapy and drug therapy and surgery
- Educate the participant on where they can obtain help.

The format is designed to utilise a range of teaching and learning techniques using a range of media. Some information is presented didactically by the trainer using the acetates (OHPs) included in this pack. This material is often supported by videotaped information which is used by the trainer to illustrate points as directed in the pack. In addition, the group is encouraged to engage in discussion of the material provided as an aid to improving their knowledge of it. Thus, participants are asked which joints are affected, what medication they have taken/are taking, what exercise and activities they undertake etc. The aim is to make the group interactive.

The group is designed to last for four 2 hour sessions usually on a weekly basis. The number of participants is intended to be between 8 and 12. The sessions are designed that minimal equipment is required. However access to a comfortable room of reasonable size and accessibility for the participants is required. The equipment required will include an overhead projector, TV and video recorder (and physiotherapy equipment if included). In addition, handouts and leaflets must be prepared and obtained in advance. The provision of light refreshments including biscuits is a wise move and is to be recommended.

The aims and structure of the sessions

The aims of the intervention are to educate the participant about osteoarthritis. The participants should be encouraged to say what they would like to learn about. OHP 1 and 2 should be used as introductory OHPs.

Session 1 What is osteoarthritis?

Osteoarthritis is a type of arthritis that is caused by breakdown of cartilage with eventual loss of the cartilage of the joints. Cartilage is a protein substance that serves as a "cushion" between the bones of the joints. Osteoarthritis is also known as degenerative arthritis, 'wear and tear' arthritis or degenerative joint disease.

How common is osteoarthritis?

In the past (OHPs 3 to 5)

Osteoarthritis was found in Neanderthals and has thus been around for a very long time. It has been found in the skeletons of Roman Britons, Saxons and through the mediaeval period into the 18th and 19th century upto the present day. The rates at

which it was found varied from period to period but ranged from 10% to 46% depending on which joint was affected. The most common joints affected are hips, knees and lower spine. These are the main weight-bearing joints. It is also found in the big toe, thumb, fingers, shoulders, neck.

Now?

These days, osteoarthritis is most common in people aged 50 and above. In the United Kingdom, the number of people with any form of arthritis (not including back pain) is 8 million people (8,060,000). This is over 10% of the total population. More people in the older age group are affected. Around 4.1 million people aged 65 and above will suffer from some form of arthritis. This accounts for just under 50% of the population at this age. For osteoarthritis specifically, the rates are thought to be around 5 million people in the UK (ARC leaflet).

What happens in osteoarthritis?

To answer this question we must first understand how our joints work. Use pictures of joints in OHPs 6 to 9

Synovial joint

A joint is a structure between bones which allows movement. The ends of the bones are covered by cartilage. This is a tissue with a very smooth surface allowing easy movement. The joint is held in place by a joint capsule. This is a strong fibrous structure that allows a certain amount of movement. The joint is also surrounded by ligaments which provide extra support. The joint capsule and the ligaments control the amount of movement in the joint and prevent excessive movement which could cause damage. The joint capsule is lined by the joint lining called either the synovium or the membrane. The synovium produces the fluid which provides lubrication for the joint. Examples of such joints are the elbow, knee, hip.

Cartilage joint

These joints have very little movement and differ in structure to the above. The bone ends are covered by cartilage and there is very little or no synovium. However, there are very strong ligaments supporting the joints which restrict movement. Examples of these joints are found in the bones in the spine – between the vertebrae, and also the bones that join the lower part of the spine (the sacrum) to the pelvis.

In osteoarthritis, the cartilage becomes worn and rough. It will also become thinner and thinner and may even wear away completely. The body does not make new cartilage and will make new bone around the joint. These are bony prominences and are called osteophytes. Sometimes, the synovial membrane may become inflamed and produce excess lubrication so that you get swelling (The Arthritis Handbook 2nd edition – Arthritis Foundation of New South Wales).

What causes osteoarthritis?

Primary osteoarthritis is mostly related to ageing. With ageing, the water content of the cartilage increases and the protein makeup of cartilage degenerates. Repetitive use of the joints over the years irritates and inflames the cartilage, causing joint pain and swelling. Eventually, cartilage begins to degenerate by flaking or forming tiny crevasses. In advanced cases, there is a total loss of the cartilage cushion between the bones of the joints. Loss of cartilage cushion causes friction between the bones,

leading to pain and limitation of joint mobility. Inflammation of the cartilage can also stimulate new bone outgrowths (spurs) to form around the joints. Osteoarthritis occasionally can be found in multiple members of the same family, implying a heredity (genetics) basis for this condition.

Secondary osteoarthritis is caused by another disease or condition. Conditions that can lead to secondary osteoarthritis include obesity, repeated trauma or surgery to the joint structures, abnormal joints at birth (congenital abnormalities), gout, diabetes, and other hormone disorders.

Obesity causes osteoarthritis by increasing the mechanical stress on the cartilage. The early development of osteoarthritis of the knees among weight lifters is believed to be in part due to their high body weight. Repeated trauma to joint tissues (ligaments, bones and cartilage) is believed to lead to early osteoarthritis of the knees in soccer players. Interestingly, recent studies have not found an increased risk of osteoarthritis in long-distance runners.

Crystal deposits in the cartilage can cause cartilage degeneration, and osteoarthritis. Uric acid crystals cause arthritis in gout, while calcium pyrophosphate crystals cause arthritis in pseudogout (Focus on arthritis.com).

How is it diagnosed?

Arthritis is usually made on the basis of the history given and examination. A careful analysis of the location, duration, and character of the joint symptoms and the appearance of the joints helps the doctor in diagnosing osteoarthritis. Bony enlargement of the joints from spur formations is characteristic of osteoarthritis. Therefore, Heberden's nodes, Bouchard's nodes, and bunions of the feet can help the doctor make a diagnosis of osteoarthritis.

X-rays can be very helpful in the diagnosis and may be the only test performed. . The common X-ray findings of osteoarthritis include loss of joint cartilage, narrowing of the joint space between adjacent bones, and bone spur formation. In some cases of early osteoarthritis, the X-rays may not show changes typical of osteoarthritis. It is not always clear where the pain is coming from. Knee pain from osteoarthritis may be confused with other common causes of knee pain such as a knee cap problems or a torn meniscus.

There is no blood test for the diagnosis of osteoarthritis. Blood tests are performed to exclude diseases that can cause secondary osteoarthritis, as well as to exclude other arthritis conditions that can mimic osteoarthritis. Arthrocentesis can be also be performed. During arthrocentesis, a sterile needle is used to remove joint fluid for analysis. Joint fluid analysis is useful in excluding gout, infection, and other causes of arthritis. Removal of joint fluid and injection of corticosteroids into the joints during arthrocentesis can help relieve pain, swelling, and inflammation.

Sometimes, a Magnetic Resonance Image (MRI) scan may ordered to look at the knee more closely. This is a special type of X-ray where magnetic waves are used to create pictures that look like slices of the knee. However, the scan does not show just bones, it can show the ligaments and cartilage also.

If the diagnosis is still unclear, arthroscopy may be necessary to actually look inside the knee and see if the joint surfaces are beginning to develop changes from wear and tear. Arthroscopy is a surgical procedure where a small fiberoptic television camera is inserted into the knee joint through a very small incision, about a 1/4 inch.

The surgeon can then move the camera around inside the joint while watching the pictures on a TV screen. The structures inside the joint can be poked and pulled with small surgical instruments to see if there is any damage. Abnormalities of and damage to the cartilage and ligaments can be detected and sometimes repaired through the arthroscope. If successful, patients can recover from the arthroscopic surgery much more quickly than from open joint surgery (www.focusonarthtris.com, www.medicine.net.com).

What are the symptoms?

Osteoarthritis tends to creep up on you, gradually increasing over months or years. Stiff and painful joints are the main symptoms. The pain tends to be worse on exercising the joint and at the end of the day. Stiffness after resting usually 'works off' in just a minute or two. The joint may not move as freely or as far as normal, and often 'creaks' or 'cracks' when moved. Occasionally the joint seems to give way because of weak muscles or loss of stability. Muscle exercises can strengthen the muscle and help prevent this.

Symptoms often vary for no obvious reason with bad spells of a few weeks or months being broken by much better periods. Changes in the weather (especially damp, low pressure) can make joint pain worse for some people - others find it depends on how much physical activity they do.

Often the joint appears a little swollen, due to hard bony osteophytes, or extra synovial fluid (which will feel soft), while the muscles around the joint look a little thinner.

In a few advanced cases, more severe and constant pain may develop and occur not only after exercise but even at rest or at night. Certain daily tasks and activities may then prove difficult, depending on which joint is affected. For example, osteoarthritis of the knee or hip may cause difficulties going down and up stairs, getting in or out of the car, getting up from sitting, walking far, or putting on shoes and socks. These difficulties can restrict what you can do and limit your independence (ARC leaflet What is osteoarthritis?).

How is it treated?

There is no cure for the disease and treatment will focus on relieving symptoms and trying to maintain or improve the individual's quality of life.

Medication (OHPs 11 to 13)

Medication is used in osteoarthritis. The main types of drugs used are analgesics (painkillers) and/or anti-inflammatory drugs such as non-steroidal anti-inflammatory medication. These medicines are used to relieve the symptoms.

Analgesics/Painkillers

These are used to relieve pain. They are usually the first line of treatment in osteoarthritis unless there is inflammation of the joint. For most people, paracetamol is very effective in pain relief but there is a need to take it regularly. Aspirin has also been used but it can irritate the stomach lining and it is thought that paracetamol is just as good without the irritation. Sometimes these drugs are combined with other drugs as well. Examples of these are co-codamol, co-proxamol, co-dydramol (Table 1).

Table 1 Analgesics and opioids used in the management of osteoarthritis

Analgesic	Opioid	Compound analgesic
Paracetamol	codeine phosphate	co-codamol
Paracetamol	dextropropoxyphene hydrochloride	co-proximol
Paracetamol	dihydrocodeine tartrate	codydramol

There are a large range of drugs for sale over the counter. Examples include: Anadin, Alka-Seltzer, Beechams Powders, Disprin, Hedex, Lemsip, Panadol, Resolve, Solpadeine etc. Appendix 1 has a list.

Topical preparations (OHPs 14 to 17)

These are medicines which are applied to the skin as either a rub or embrocation. They may be helpful for some people but not for others. Sometimes the action of rubbing can help in pain relief but for others that makes them feel worse. Some are known as rubefacients because they contain ingredients which may make the area rubbed feel warm whereas may make it feel cool. Some of these ingredients can include capsicum, camphor or menthol. Appendix 2 includes a list of preparations that can be bought over the counter.

Some names you may have come across on prescriptions are listed in Table 2

Table 2 Topical preparations including NSAIDs and counter-irritants

Algesal	Fenbid Forte Gel	Intralgin	Proflex
Balmosa	Ibugel	Movelat	Transvasin
Difflam	Ibumousse	Oruvail	Traxam
Feldene	Ibuspray	Powergel	Voltarol Emugel

Capsaicin is a cream made from hot chillies. Due to the fact it is made from hot chillies, care needs to be taken in using it and around 46% of people who use it experience a stinging and burning sensation. It is thought to act by reducing a protein in the body known as Substance P which is involved in pain. By reducing these levels, some people have found reduced pain. Other names for it include Axsain or Zacin.

Non-steroidal anti-inflammatory drugs (NSAIDs) (OHPs 18 to 21)

These reduce inflammation of the joint as well as pain. They are used for many different types of arthritis, often with other drugs. If one type does not work, your doctor may try another. They are usually given by mouth but may also be given by suppository or in slow-release preparation (also called 'retard'). 'Slow-release' means that the drug is gradually absorbed by the body a little at a time, rather than all at once. NSAIDs can damage the lining of the stomach and cause bleeding, particularly if taken in higher doses or over a long period of time. They should therefore only be used with caution and only continue to be used if they are controlling your symptoms. You should not take them if you have a history of indigestion or stomach ulcers.

These drugs have both a painkilling effect and anti-inflammatory effect. Until recently it was thought that osteoarthritic joints did not become inflamed but now it is thought that there may be some mild changes and these may well vary over time. (Hosie and Dickson)

In single doses, NSAIDs are thought to be comparable to painkillers like paracetamol. However, the full dosage gives both a lasting analgesic and anti-inflammatory effect. This is why they are useful in osteoarthritis as they help with continuous or regular pain. They are thought to be very useful when stiffness is a problem (Hosie & Dickson).

The differences between the different NSAIDs are small but people vary a lot in how they respond and tolerate different drugs. About 60% of patients will respond to any NSAID; of the others, those who do not respond to one may well respond to another. A full effect should normally be obtained within a week, whereas an anti-inflammatory effect may not be achieved for up to 3 weeks. If the medicine doesn't help in this time then another NSAID should be tried.

The main differences between the drugs are in the possible side effects. Side effects can include stomach upsets, heartburn, indigestion, rashes and wheeziness. If someone has experienced stomach problems or asthma, it is important to discuss this with the doctor. There is a huge range of NSAIDs some of which are available over the counter and others are available by prescription only. Table 3 gives some examples of prescription medication. Some examples of over the counter drugs are: Advil, Anadin, Arthofen, Cuprofen, Galprofen, Hedex, Nurofen, Lemsip, Pacifene, Obifen, Migrafen.

Further details can be found in Appendix 3.

Table 3 NSAIDs on prescription

Drug name	Trade name
Ibuprofen	Ibuprofen
Celecoxib	Celebrex

Diclofenac Sodium	Diclofenac
	Sodium Voltarol
	Voltarol retard
Etodolac	Lodine SR
Indometacin	Indometacin
Mefenamic Acid	Mefenamic Acid
Meloxicam	Mobic
Nabumetone	Nabumetone
	Relifex
Naproxen	Naproxen
	Naprosyn
	Nycopren
	Synflex
	Napratec
Piroxicam	Piroxicam
	Feldene
	Brexidol
Rofecoxib	Vioxx
Tenoxicam	Mobiflex

Some of the newer drugs are known as COX 2 inhibitors. These means that they are less likely to have gastric side effects. Two of the most effective are rofecoxib and celecoxib.

Antidepressants

Some antidepressants are known to be helpful in pain relief especially in low doses and sometimes they may help sleep.

Injections (OHP 22)

Some people will benefit from injections which can have a lasting effect of around 4 – 5 weeks. Not everyone will benefit and some people may experience side-effects which could include flare-ups and pain, reactions to the drug or local anaesthetic before the injection. Also injections are not usually recommended for those with diabetes, hypertension, osteoporosis or hypothyroidism. The steroids used in the injection are known as:

Hydrocortisone acetate	Hydrocortistab
Methylprednisolone acetate	Depo-Medrone
Triamcinolone hexacetonide	Lederspan

Other types of injections can include hyaluronic acid which can help the pain and stiffness in the joint for up to 6 months can give some reactions to the injection such as pain and swelling.

Diet and weight (OHP 23)

It is known that people who are overweight are more likely to develop osteoarthritis. Studies conducted in the United States have shown that people who are obese are more likely to develop osteoarthritis in later life. The osteoarthritis in obese people is not just restricted to the weight-bearing joints such as the knees and hips. It also occurs in the fingers and hands.

Therefore, being the right weight and maintaining a healthy, balanced diet are important in managing your osteoarthritis. There is no evidence that by including or excluding particular items in your diet the osteoarthritis will improve. What is recommended is a low fat diet which cuts out red meat, full-fat milk, buttery and confectionery made with butter and includes more oily fish, and some vegetable oils can be helpful by promoting general health and reducing heart disease.

Surgery (OHPs 24 to 26)

Joint replacement

This is known as arthroplasty. Joint replacements are much more common these days than they used to be. Hips were the first joints to be replaced but knee replacements are also very successful these days. Artificial joints are not perfect and do not work as well as a natural joint and may not last longer than 15 years or so. However, they may provide enough range of movement without pain for most daily activities.

Around 50 000 hip replacements were performed in 1994-5. The number of knee replacements is increasing. Like many operations in the UK, there is likely to be a waiting list for the operation. After the operation, the time will vary before a person is expected to be getting up and starting preliminary physiotherapy.

Other surgical procedures

Osteotomy

This is when a piece of bone next to the joint causing pain is cut and refixed in a different position.

Arthrodesis

This is where a joint is fixed permanently in one position. When the joint is fixed it can no longer move but it is no longer painful.

Synovectomy

This is not very common but it means that the lining of the joint is removed if it is very inflamed and causing damage.

The last three procedures are more likely to be performed if there has been some trauma involved e.g. an accident or injury to the joint. These days, joint replacement is by far the most common form of treatment.

Video – Arthritis and the Family to be shown here.

This video is produced by the ARC and available free from them. The video describes the impact of osteoarthritis on individuals at different stages of life and how they cope.

Session 3 Exercise and rest

This session is delivered by a physiotherapist to ensure that any exercises undertaken by participants are safely and appropriately carried out. Specialist equipment required includes a step, walking stick, balance board with ball and theraband. However, non-physiotherapy staff can undertake a facilitative role.

The session commences with a facilitated discussion of the pros and cons of exercise. Participants are encouraged to give reasons why they should or should not exercise. If reasons are not forthcoming, group leaders could prompt with one or two of the Pros and Cons listed in Table 4

Table 4 Pros and Cons of Exercise

For	Against
Keep moving	Pain
Lose weight	Tired
Fitness	Increased stiffness
Achievement	Don't know what to do
Well-being	Don't know how much to do
Feeling that you're doing something	How much is too much?
Feel happier	
Strength	

When participants have generated some pros and cons, ask participants which of the above relates to them and their osteoarthritis.

Describe the main aims of exercise in osteoarthritis which is to maintain mobility, strength and fitness.

Ask participants what else can make a difference. Some of them may use walking sticks and the physiotherapist can check the ferrules and the appropriate use of the sticks. Users of sticks should have their arms bent a little and the top of the stick level with the hips. The physiotherapist can demonstrate the correct way to walk with a stick, using opposing arms.

Discuss with participants the use of bandages and support and that these should not be used at night. Appropriate insoles can act as shock absorbers which can be helpful. Trainers are good to wear if an individual has osteoarthritis of the hip or knee. Aromatherapy can help some individuals as can rest and relaxation.

The physiotherapist can undertake a short exercise with participants. Participants can be asked to stretch their legs out, flex their toes and ankles. Then they can bend their knees several times and straighten. If both at one time is difficult, then each leg can be done separately. Ask participants to lift their legs up and down and twist feet. Finally ask them to stand up and sit down. Care must be taken with people with poor balance.

The exercise session incorporates six exercises. These include static quads, step up and down onto step station, use of theraband to stretch leg muscles, balance on

the wobble board, sit to standing and step down and bending. Participants should aim to spend one minute on each exercise.

After the exercise session, ask participants for feedback and discuss with them which exercises they could try at home. Suggest that they should aim to try a few exercises 1 to 2 times per day at home.

Session 4 Useful sources of information/contacts

Arthritis and Rheumatism Council produces a wide range of helpful leaflets and a selection of these can be distributed to the participants. Discussion of other useful sources of help should also be undertaken. Participants are often very well informed and may provide you with new information.

Video – Reaching a Balance

Produced by the ARC and distributed freely, it illustrates some of the aids and adaptations available to people with osteoarthritis.

Local help

Helping each other
An important thing to remember is that you are the experts on your own osteoarthritis as you have to live and cope with the symptoms. Therefore, you may find that you can advise other people in the group about ways you have coped. Also, others may have useful suggestions for you in how to manage by perhaps doing things differently.

Handouts to be given out

ARC leaflets
Specify range
BNF appendix sheets
Physiotherapy diaries

References

Books and articles

The Arthritis Handbook 2nd Edition – Arthritis Foundation of New South Wales
Leaflets from the Arthritis and Rheumatism Council
What is osteoarthritis?
The Primary Care Rheumatology Society guidelines
Rheumatology
ABC or Rheumatology
Management of Osteoarthritis in Primary Care

Websites

www.focusonarthritis.com
www.medicine.net.com
www.bnf.org.uk

Videos

Help is at Hand – Arthritis and Rheumatism Council
Reaching a Balance – Arthritis and Rheumatism Council
What You Really Need to Know About...Osteoarthritis? Patient Information Videos

Plan of sessions

The format of this intervention is below.
The timings suggested are approximate and may vary according to each group's knowledge and priorities.

Session 1 Introduction to Osteoarthritis

Welcome the participants to the group **0.00**
Group leader(s) should introduce themselves
Go through housekeeping arrangements: fire exits, toilets, refreshments, timings.
Introductions: ask the participants to introduce themselves
Ground Rules
Ask the group to set out ground rules but ensure that the following are included: turning up, being on time, confidentiality, listen to each other, do not interrupt, constructive criticism, honesty.

Introduction to group (OHP 1) **0.10**

This group has been designed to provide you with information about osteoarthritis and to show you some exercises that you may find helpful. We are interested in learning from your experiences with osteoarthritis so we can use this to help other people with osteoarthritis. You are the experts on your osteoarthritis and we would like to learn from that.
Over the next four weeks, we will look at the following areas:

Aims of group (OHP 2) **0.15**

To learn about osteoarthritis
To learn how it is treated
To learn what can help
To find out about other sources of help

What is osteoarthritis? **0.20**

Describe historical issues and current prevalence of osteoarthritis. Use OHPs 3 & 4 Neanderthal man and OHP 5 Romans to illustrate how ancient osteoarthritis is.

Then show video clip from 'What You Really Need to Know about Osteoarthritis?' (WYRNKO). This video has John Cleese and Rob Buckman explaining osteoarthritis and is a useful prompt for discussion. For this section, show 2 minutes of Rob Buckman explaining osteoarthritis in medical terms which are generally unintelligible to the participants. The discuss the video clip briefly with participants regarding its unintelligibility

Layout of joint **0.25**

Session 1 Introduction to Osteoarthritis

Show video clip from WYRNKO (2'45"). This is where Rob Buckman explains the layout of a joint. After the video clip, show OHPs 6 to 9 and reiterate the layout of the joint. Ask participants to identify different types of joints

BREAK **0.50**

What causes osteoarthritis? **1.10**

Show video clip from WYRNKO (4'05"). This is where Rob Buckman explains the different theories of what causes osteoarthritis. On completion of the video clip, reiterate the points using OHPs 8 and 9.
Ask participants to identify the features of osteoarthritic joints including synovial fluid, osteophytes etc.

How is it diagnosed? **1.20**

Show video clip from WYRNKO (1'21") where Rob Buckman explains the diagnostic process.
Ask participants their experiences of diagnosis and discuss in the group.

What are the symptoms? **1.40**

Show video clip from WYRNKO (4'59") where the main symptoms of pain and stiffness are described. On completion of the video clip, summarise the main points. Ask participants to describe their symptoms and joints affected

Review of session and bullet points **1.50**

(Key points OHP 10
Summarise briefly the points covered in today's session.
Give handout 1.1.

Close **2.00**

Session 2 Treatment of osteoarthritis 0.00

Show pictures/acetates of normal and osteoarthritic joints (OHPs 6 to 9)
Ask participants if they can identify normal and osteoarthritic joints
Discuss with participants what happens in osteoarthritis

Medication 0.10

In this section, participants are given information about different types of medication used in the management of symptoms in osteoarthritis.

Ask participants if they are on medication and write on the flipchart the names of the medications taken. Then use OHP 11 to describe the three main types of medication in osteoarthritis. These are Analgesics, Non-steroidal anti-inflammatories, Injections.

Ask participants if they are familiar with these terms but explain that they will be described. Use OHP 12 to stimulate discussion around analgesics and describe when they are used and why. The use OHP 13 to give examples of analgesics (Paracetamol, Aspirin, Coproxamol, Cocodamol, Codydramol). Ask participants if they have experience of any of these and whether they were of benefit in managing their osteoarthritis.

Give handout of analgesics on sale over the counter (handout 2.1).

Topical preparations: Rubs and embrocations 0.25

Describe rubs and embrocations and how they work. Use OHP 14 and ask participants if they have used these and if they have of benefit. Use OHPs 15 to 17 and ask participants if they recognise any of the preparations listed. Give handout 2.2.

NSAIDS 0.35

Show video clip from WYRNKO (1'15") which explains what NSAIDS are. Then describe NSAIDS covering what they are, why they are prescribed, side effects and the range available and mention COX2 specifically. Use OHPs 18 to 21.
Ask participants if they have used NSAIDS. Ask participants what they have used NSAIDS for and if they have experienced any side effects. Write the responses on the flipchart. Give handouts 2.3 and 2.4 and use OHPs 20 and 21 to discuss what they have received on prescription and what they have purchased over the counter.
Mention use of anti-depressants and why they are used sometimes in osteoarthritis.

Injections 0.55

Ask participants if they have received injections to help their osteoarthritis. Describe the injections available, their use and frequency of use and possible side effects. Use OHP 22

Hydrocortisone acetate	Hydrocortistab
Methylprednisolone acetate	Depo-Medrone
Triamcinolone hexacetonide	Lederspan

BREAK 1.00

Diet and weight (OHP 23) 1.15

Session 2 Treatment of osteoarthritis 0.00

Ask participants why this is important
Describe evidence re increased risk of osteoarthritis
Brainstorm re healthy diet, use the flipchart. Then summarise using OHP 22 and clarify any points the participants raise.

Surgery (OHPs 24 to 26) 1.25

Describe osteotomy, arthrodesis, synovectomy.
Describe joint replacement and benefits and limitations
Show video clip from WYRNKO (30") which shows different joint replacements.
Ask participants if they have had surgery or are waiting for surgery. Ask for their views on surgery and facilitate discussion.

Show Video 1.35

Reaching a Balance – Arthritis and the family (running time 18 minutes)
Summarise Key points from session 2 using OHP 27.

CLOSE 2.00

Session 3 Exercise can help 0.00

Session delivered by a physiotherapist

Introduction 0.05

Benefits of exercise
Ask participants to generate thoughts For and Against exercise. Use the flipchart to record these. Ask them to say which of these are particularly relevant to them and their osteoarthritis.

Aims of exercise 0.20

Describe the aims of exercise.

What else can help? 0.25

Describe what can be helpful with improving mobility and exercise. These can include special insoles provided by a podiatrist, ice and heat, and complementary therapies. Review use of walking sticks, check ferrules and demonstrate correct use of walking sticks.

Exercises 0.45

Outline these and take some initial feedback.
Ask participants what they think about these exercises. Allow them to express their reluctance and encourage them to try one exercise if not all.

BREAK 0.55

Practical exercise session 1.05

Participants to practice exercises supervised by physiotherapist.
There are six exercise points including static quads, step up and down onto step station, use of theraband to stretch leg muscles, balance on the wobble board, sit to standing and step down and bending. Participants should aim to spend one minute on each exercise.

Aids and Adaptations 1.40

Discuss with participants the use of walking aids, lifestyle adaptations, and home adaptations. Have they tried these, do they need them, how can they obtain what they need?

Home exercise programme 1.55

Discuss with participants what exercises they could undertake at home. Suggest they try one activity over the next week.
Give exercise handout.

Close 2.00

Session 4 Useful sources of information 0.00

Review

Review of sessions 1 – 3. Use OHP 28 to remind participants that sessions 1 and 2 focused on what is osteoarthritis? How is it treated? What else can help? Ask participants to describe their experiences and clarify and answer any queries from the participants

What aids and adaptations are available? 0.15

Use OHP 29 which pictures available aids and adaptations. Ask participants if they have tried any of these and if they found them helpful. Enable participants to share experiences within the group.

Where else to get help? 0.25

Use OHP 30 as a prompt and ask participants where they would go to get help or information. Ask participants if they have found it helpful to talk to each other in the group and emphasise sharing information as useful.

Describe appropriate local and national organisations and provide relevant address sheets and handouts. Use ARC leaflets on different types of arthritis, enabling activities and medication.

BREAK 0.50

Video "Help is at Hand" 1.10

Helping each other 1.30

Ask participants what they think they have learned.
Discussion with participants how they are their own experts on their osteoarthritis.
Clarify any final points and thank the participants for attending the group.

CLOSE 2.00

Handbook for Group Participants

Welcome to the group.

Over the next four weeks, we will aim to provide you with more information and understanding about your osteoarthritis. Each week, we will focus on different topics to enable you to understand better how arthritis is diagnosed, managed and treated. Handouts will be provided at each session which cover some of the key points we have discussed.

Session 1 Introduction to Osteoarthritis

At the beginning of today's session, we will have discussed some of the ground rules which are important for you and your fellow group members to feel comfortable in a group.

These include:
- Turning up to each session
- Being on time
- Listening to each other
- Not interrupting
- Keeping it confidential
- Being honest
- Making comments constructive

Aims of group
- To learn about osteoarthritis
- To learn how it is treated
- To learn what can help
- To find out about other sources of help

Today we will have covered the following topics

- What is osteoarthritis?
- Layout of joint
- What causes osteoarthritis?
- How is it diagnosed?
- What are the symptoms?

You may wish to make some notes about what we have discussed

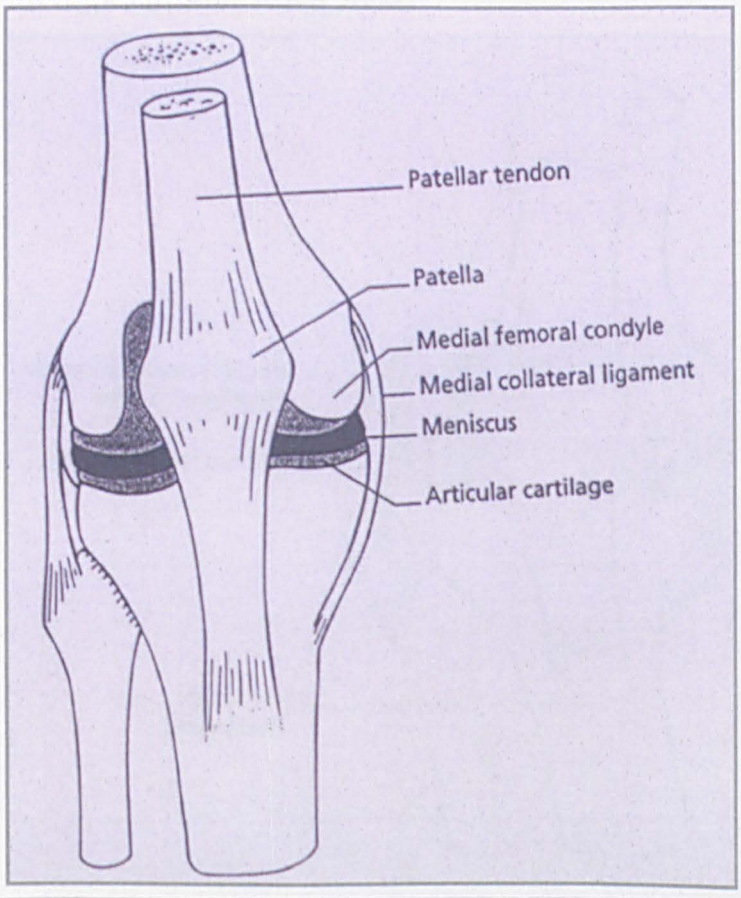
What different types of joints get osteoarthritis?

What happens in osteoarthritis?

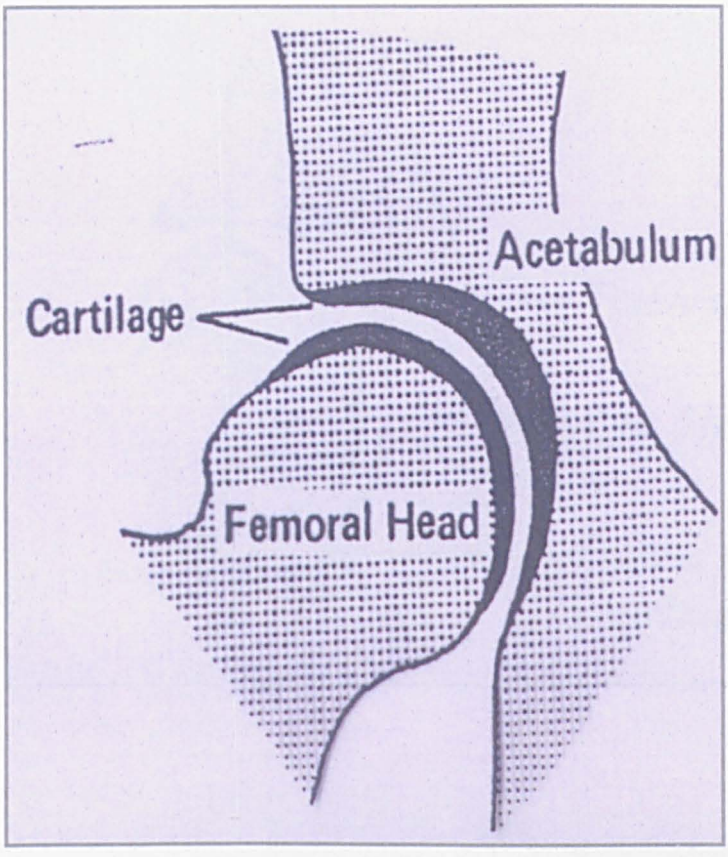
Where do you suffer from osteoarthritis?

What kind of symptoms do you get?

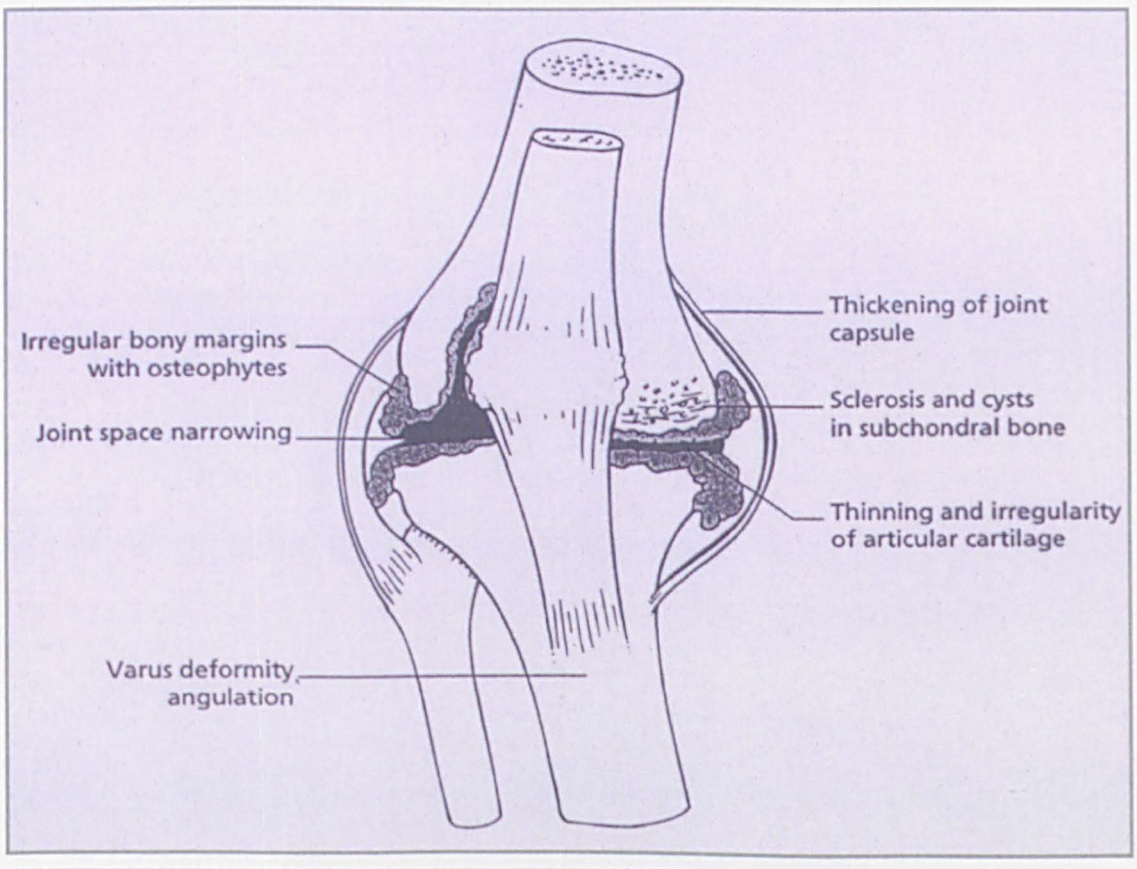
A Knee Joint



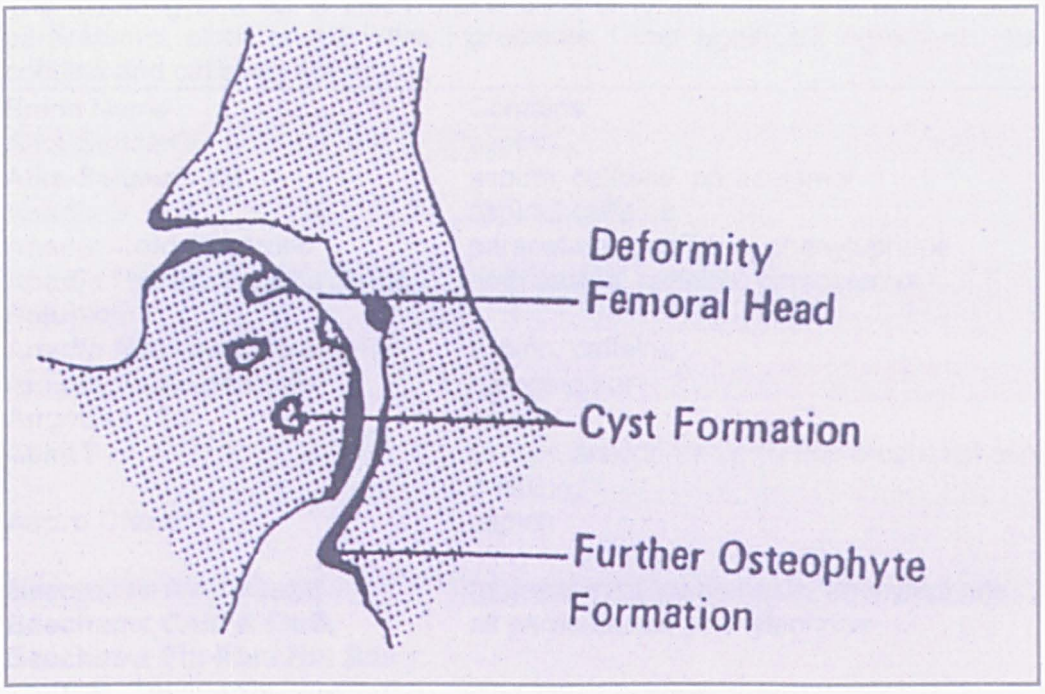
A Hip Joint



An Osteoarthritic Knee Joint



An Osteoarthritic Hip Joint



Handout 2.1: ANALGESIA: Preparations on Sale to the Public

The following is a list of preparations on sale to the public that contain aspirin or paracetamol, alone or with other ingredients. Other significant ingredients (such as codeine and caffeine) are listed.

Brand Name	Contains
Alka-Seltzer®	aspirin
Alka-Seltzer® XS	aspirin, caffeine, paracetamol
Anadin®	aspirin, caffeine
Anadin Cold Control®	paracetamol, caffeine, phenylephrine
Anadin Extra®, Anadin Extra Soluble®	both aspirin, caffeine, paracetamol
Anadin Maximum Strength®	aspirin, caffeine
Anadin Paracetamol®	paracetamol
Angettes 75®	aspirin
Askit®	aspirin, aloxiprin = polymeric product of aspirin, caffeine
Aspro Clear®	aspirin
Beechams-All-In-One®	(paracetamol, guaifenesin, phenylephrine
Beechams Cold & Flu®, Beechams Flu-Plus Hot Berry Fruits®, Beechams Flu-Plus Powder®, Beechams Hot Lemon®, Hot Lemon and Honey®, Hot Blackcurrant®	all paracetamol, phenylephrine
Beechams Flu-Plus Caplets®	paracetamol, caffeine, phenylephrine
Beechams Lemon Tablets®	aspirin
Beechams Powders®	aspirin, caffeine
Benylin 4 Flu®	paracetamol, caffeine, phenylephrine
Beechams Powders Capsules®	paracetamol, diphenhydramine, pseudoephedrine
Benylin Day and Night®	day tablets, paracetamol, phenylpropanolamine, night tablets, paracetamol, diphenhydramine
Boots Cold & Flu Relief Tablets®	paracetamol, caffeine, phenylephrine
Boots Children's 3 Months Plus Pain Relief®	paracetamol
Boots Cold Relief Hot Blackcurrant®, Hot Lemon®	paracetamol
Boots Migraine Relief®	paracetamol, codeine
Boots Seltzer®	aspirin
Boots Tension Headache Relief®	paracetamol, caffeine, codeine, doxylamine
Calpol Infant®, Calpol 6 Plus®	both paracetamol
Caprin®	aspirin
Catarrh-Ex®	paracetamol, caffeine, phenylephrine
Codis 500®	aspirin, codeine
Mrs. Cullen's®	(aspirin
Day Nurse®	paracetamol, dextromethorphan, phenylpropanolamine
De Witt's Analgesic Pills®	paracetamol, caffeine
Disprin®, Disprin CV®, Disprin Direct®	all aspirin

Brand Name	Contains
Disprin Extra®	aspirin, paracetamol
Disprol®	paracetamol
Doans Backache Pills®	paracetamol, sodium salicylate
Dolvan®	paracetamol, diphenhydramine, ephedrine, caffeine
Dozol®	paracetamol, diphenhydramine
Dristan Tablets®	aspirin, caffeine, chlorphenamine, phenylephrine
Feminax®	paracetamol, caffeine, codeine, hyoscine
Fennings Children's Cooling Powders®	(paracetamol
Galpamol®	paracetamol
Hedex®	paracetamol
Hedex Extra®	(paracetamol, caffeine
Infadrops®	(paracetamol
Lemsip Cold + Flu Breathe Easy®	paracetamol, phenylephrine
Lemsip Cold + Flu Combined Relief Capsules®	paracetamol, caffeine, phenylephrine
Lemsip Cold + Flu Max Strength®	paracetamol, phenylephrine
Lemsip Lemon® or Blackcurrant®, Lemsip Max Strength®	all paracetamol, phenylephrine,
Lemsip Power & Paracetamol®	paracetamol, pseudoephedrine
Mandanol®	paracetamol
Maximum Strength Aspro Clear®	aspirin
Medinol®	paracetamol
Medised®	paracetamol, promethazine
Midrid®	paracetamol, isometheptene mucate
Migraleve®	pink tablets, paracetamol, codeine, buclizine, yellow tablets, paracetamol, codeine
Night Nurse®	paracetamol, dextromethorphan, promethazine
Nirolex Day Cold Comfort®	paracetamol, pholcodine, pseudoephedrine
Nirolex Night Cold Comfort®	(paracetamol, pseudoephedrine, diphenhydramine, pholcodeine
Nurse Sykes' Powders®	aspirin, caffeine, paracetamol
Panadol®	paracetamol
Panadol Extra®	paracetamol, caffeine
Panadol Night®	paracetamol, diphenhydramine
Panadol Soluble®	paracetamol
Panadol Ultra®	paracetamol, codeine
Panaleve Junior®, Panaleve 6+®	both paracetamol
Paracets®	paracetamol
Paracets Plus®	paracetamol, caffeine, phenylephrine
Paraclear®	paracetamol
Paracodol®	paracetamol, codeine
Paradote®	co-methiamolparacetamol, DL-methionine

Brand Name	Contains
Paramol®	paracetamol, dihydrocodeine
Phensic®	aspirin, caffeine
Placidex®	paracetamol
Propain®	paracetamol, caffeine, codeine, diphenhydramine
Resolve®	paracetamol
Sinutab®	(paracetamol, phenylpropanolamine
Sinutab Nightime®	paracetamol, phenylpropanolamine, phenyltoloxamine
Solpadeine®	paracetamol, caffeine, codeine
Solpadeine Max®	paracetamol, codeine
Solpadeine Soluble®	paracetamol, caffeine, codeine
Sudafed-Co®	paracetamol, pseudoephedrine
Syndol®	paracetamol, caffeine, codeine, doxylamine
Tixymol®	(paracetamol
Ultramol Soluble®	paracetamol, codeine, caffeine
Uniflu with Gregovite C®	(paracetamol, caffeine, codeine, diphenhydramine, phenylephrine
Veganin®	(aspirin, paracetamol, codeine
Vicks Medinite®	(paracetamol, dextromethorphan, doxylamine, ephedrine

British National Formulary (BNF 41, 2001)

Handout 2.2: Topical NSAIDs and counter-irritants on sale to the public together with their significant ingredients include:

Brand Name	Contains
Algesal®	diethylamine salicylate
Algipan Rub®	capsicum oleoresin, glycol salicylate, methyl nicotinate,
Balmosa®	camphor, capsicum oleoresin, menthol, methyl salicylate
Boots Pain Relief Balm®	ethyl nicotinate, glycol monosalicylate, nonylic acid vanillylamide
Boots Pain Relief Embrocation®	camphor, turpentine oil
Boots Pain Relief Warming Spray®	camphor, ethyl nicotinate, methyl salicylate
Cremalgin®	capsicin, glycol salicylate, methyl nicotinate
Cuprofen® Ibutop® Gel	ibuprofen
Deep Freeze Cold Gel®	menthol
Deep Freeze Spray®	levomenthol
Deep Heat Massage Liniment®, Deep Heat Maximum®	menthol, methyl salicylate
Deep Heat Rub®	eucalyptus oil, menthol, methyl salicylate, turpentine oil
Deep Heat Spray ®	glycol salicylate, ethyl salicylate, methyl salicylate, methyl nicotinate
Deep Relief®	ibuprofen, menthol
Difflam®-P Cream	benzydamine
Dubam Cream®	methyl salicylate, menthol, cineole
Dubam Spray®	ethyl salicylate, methyl salicylate, glycol salicylate, methyl nicotinate
Elliman's Universal Embrocation®	acetic acid, turpentine oil
Feldene P® Gel	piroxicam
Fenbid® Gel	ibuprofen
Fiery Jack Cream®	capsicum oleoresin, diethylamine salicylate, glycol salicylate, methyl nicotinate,
Fiery Jack Ointment®	capsicum oleoresin
Goddard's White Oil Embrocation®	dilute acetic acid, dilute ammonia solution, turpentine oil
Hansaplast® Thermo Plaster	capsaicinoids, colophony
Ibuderm®	ibuprofen
Ibuleve®, Ibuleve Mousse®, Ibuleve Sports Gel®	ibuprofen
Intralgin®	benzocaine, salicylamide
Lloyds Cream®	diethyl salicylate
Mentholatum® Ibuprofen Gel	ibuprofen
Movelat® Relief Cream	mucopolysaccharide polysulphate, salicylic acid, thymol
Movelat® Relief Gel	mucopolysaccharide polysulphate, salicylic acid

Brand Name	Contains
Nasciodine®	camphor, iodine, menthol, methyl salicylate, turpentine oil
Nella Red Oil®	arachis oil, clove oil, mustard oil, methyl nicotinate
Nurofen Muscular Pain Relief Gel®	ibuprofen
Oruvail® Gel	ketoprofen 30-g tube; 100-g tube prescribable on NHS
PR Heat Spray®	ethyl nicotinate, methyl salicylate, camphor
Proflex Pain Relief Gel®	ibuprofen
Radian®-B Ibuprofen Gel	ibuprofen
Radian®-B Muscle Lotion, Radian®-B Heat Spray	ammonium salicylate, camphor, menthol, salicylic acid
Radian®-B Muscle Rub	camphor, capsicin, menthol, methyl salicylate
Ralgex Cream®	capsicin, glycol monosalicylate, methyl nicotinate
Ralgex Freeze Spray®	dimethyl ether, glycol monosalicylate, isopentane
Ralgex® Ibutop® Gel	ibuprofen
Ralgex Low Odour Spray®	glycol monosalicylate, methyl nicotinate
Ralgex Spray®	ethyl salicylate, methyl salicylate, glycol monosalicylate, methyl nicotinate
Ralgex Stick®	capsicin, ethyl salicylate, methyl salicylate, glycol salicylate, menthol
Salonair®	benzyl nicotinate, camphor, glycol salicylate, menthol, methyl salicylate, squalane,
Salonpas Plasters®	glycol salicylate, methyl salicylate
Solpaflex® Gel	ketoprofen
Tiger Balm Red Extra Strength®	camphor, clove oil, cajuput oil, cinnamon oil, menthol, peppermint oil
Tiger Balm®	cajuput oil, camphor, clove oil, menthol, peppermint oil
Transvasin Cream®	ethyl nicotinate, hexyl nicotinate, thurfyl salicylate
Transvasin Spray®	diethylamine salicylate, hydroxyethyl salicylate, methyl nicotinate
Traxam Pain Relief®	felbinac

British National Formulary (BNF 41, 2001)

Handout 2.3: Non Steroidal Anti-Inflammory Drugs (NSAIDs) on sale over the counter - IBUPROFEN

Proprietary brands of ibuprofen preparations are on sale to the public; brand names include,

Advil®
Anadin Ibuprofen®
Anadin Ultra®
Arthrofen®
Boots Children's 6 years Plus Fever & Pain Relief®
Cuprofen®
Galprofen®
Hedex® Ibuprofen
Ibrufhalal®
Ibufem®
Inoven®
Librofem®
Migrafen®
Novaprin®
Nurofen®
Nurofen® Meltlets
Obifen®
Pacifene®
PhorPain®
Relcofen®

Compound proprietary preparations containing ibuprofen include:

Advil® Cold and Sinus (ibuprofen, pseudoephedrine)
Lemsip® Power + (ibuprofen, pseudoephedrine)
Nurofen® Cold & Flu (ibuprofen, pseudoephedrine)
Nurofen® Plus (ibuprofen, codeine)
Solpaflex® (ibuprofen, codeine)

British National Formulary (BNF 41, 2001)

Handout 2.4: Non Steroidal Anti-Inflammatory Drugs (NSAIDs) on prescription

Drug name	Trade name
Ibuprofen	Ibuprofen
Aceclofenac	Preservox
Acetamacin	Emflex
Azapropazone	Rheumox
Celecoxib	Celebrex
Dexketoprofen	Keral
Diclofenac Sodium	Diclofenac, Sodium Voltarol, Voltarol retard
Diflunisal	Dolobid
Etodolac	Lodine SR
Fenbufen	Fenbufen, Lederfen
Fenoprofen	Fenopron
Flurbiprofen	Froben, Froben SR
Indometacin	Indometacin
Ketoprofen	Ketoprofen, Orudis, Oruvail
Mefenamic Acid	Mefenamic Acid
Meloxicam	Mobic
Nabumetone	Nabumetone, Relifex
Naproxen	Naproxen, Naprosyn, Nycopren, Synflex, Napratec
Phenylbutazone	Butacote
Piroxicam	Piroxicam, Feldene, Brexidol
Rofecoxib	Vioxx
Sulindac	Sulindac, Clinoril
Tenoxicam	Mobiflex
Tiaprofenic Acid	Tiaprofenic Acid, Surgam

Appendix 1

British National Formulary (BNF 41, 2001)

ANALGESIA (BNF 41, 2001)

Preparations on Sale to the Public

The following is a list of preparations on sale to the public that contain aspirin or paracetamol, alone or with other ingredients. Other significant ingredients (such as codeine and caffeine) are listed.

Alka-Seltzer® (aspirin), **Alka-Seltzer® XS** (aspirin, caffeine, paracetamol), **Anadin®** (aspirin, caffeine), **Anadin Cold Control®** (paracetamol, caffeine, phenylephrine), **Anadin Extra®**, **Anadin Extra Soluble®** (both aspirin, caffeine, paracetamol), **Anadin Maximum Strength®** (aspirin, caffeine), **Anadin Paracetamol®** (paracetamol), **Angettes 75®** (aspirin), **Askit®** (aspirin, aloxiprin = polymeric product of aspirin, caffeine), **Aspro Clear®** (aspirin)

Beechams-All-In-One® (paracetamol, guaifenesin, phenylephrine), **Beechams Cold & Flu®**, **Beechams Flu-Plus Hot Berry Fruits®**, **Beechams Flu-Plus Powder®**, **Beechams Hot Lemon®**, **Hot Lemon and Honey®**, **Hot Blackcurrant®** (all paracetamol, phenylephrine), **Beechams Flu-Plus Caplets®** (paracetamol, caffeine, phenylephrine), **Beechams Lemon Tablets®** (aspirin), **Beechams Powders®** (aspirin, caffeine), **Beechams Powders Capsules®** (paracetamol, caffeine, phenylephrine), **Benylin 4 Flu®** (paracetamol, diphenhydramine, pseudoephedrine), **Benylin Day and Night®** (*day tablets*, paracetamol, phenylpropanolamine, *night tablets*, paracetamol, diphenhydramine), **Boots Cold & Flu Relief Tablets®** (paracetamol, caffeine, phenylephrine), **Boots Children's 3 Months Plus Pain Relief®** (paracetamol), **Boots Cold Relief Hot Blackcurrant®**, **Hot Lemon®** (paracetamol), **Boots Migraine Relief®** (paracetamol, codeine), **Boots Seltzer®** (aspirin), **Boots Tension Headache Relief®** (paracetamol, caffeine, codeine, doxylamine)

Calpol Infant®, **Calpol 6 Plus®** (both paracetamol), **Caprin®** (aspirin), **Catarrh-Ex®** (paracetamol, caffeine, phenylephrine), **Codis 500®** (aspirin, codeine), **Mrs. Cullen's®** (aspirin)

Day Nurse® (paracetamol, dextromethorphan, phenylpropanolamine), **De Witt's Analgesic Pills®** (paracetamol, caffeine), **Disprin®**, **Disprin CV®**, **Disprin Direct®** (all aspirin), **Disprin Extra®** (aspirin, paracetamol), **Disprol®** (paracetamol), **Doans Backache Pills®** (paracetamol, sodium salicylate), **Dolvan®** (paracetamol, diphenhydramine, ephedrine, caffeine), **Dozol®** (paracetamol, diphenhydramine), **Dristan Tablets®** (aspirin, caffeine, chlorphenamine, phenylephrine)

Feminax® (paracetamol, caffeine, codeine, hyoscine), **Fennings Children's Cooling Powders®** (paracetamol)

Galpamol® (paracetamol)

Hedex® (paracetamol), **Hedex Extra®** (paracetamol, caffeine)

Infadrops® (paracetamol)

Lemsip Cold + Flu Breathe Easy® (paracetamol, phenylephrine), **Lemsip Cold + Flu Combined Relief Capsules®** (paracetamol, caffeine, phenylephrine), **Lemsip Cold + Flu Max Strength®** (paracetamol, phenylephrine), **Lemsip Lemon®** or **Blackcurrant®**, **Lemsip Max Strength®** (all paracetamol, phenylephrine), **Lemsip Power & Paracetamol®** (paracetamol, pseudoephedrine)

Mandanol® (paracetamol), **Maximum Strength Aspro Clear®** (aspirin), **Medinol®** (paracetamol), **Medised®** (paracetamol, promethazine), **Midrid®** (paracetamol, isometheptene mucate), **Migraleve®** (*pink tablets*, paracetamol, codeine, buclizine, *yellow tablets*, paracetamol, codeine)

Night Nurse® (paracetamol, dextromethorphan, promethazine), **Nirolex Day Cold**

Comfort® (paracetamol, pholcodine, pseudoephedrine), **Nirolex Night Cold Comfort**® (paracetamol, pseudoephedrine, diphenhydramine, pholcodeine), **Nurse Sykes' Powders**® (aspirin, caffeine, paracetamol)
Panadol® (paracetamol), **Panadol Extra**® (paracetamol, caffeine), **Panadol Night**® (paracetamol, diphenhydramine), **Panadol Soluble**® (paracetamol), **Panadol Ultra**® (paracetamol, codeine), **Panaleve Junior**®, **Panaleve 6+**® (both paracetamol), **Paracets**® (paracetamol), **Paracets Plus**® (paracetamol, caffeine, phenylephrine), **Paraclear**® (paracetamol), **Paracodol**® (paracetamol, codeine), **Paradote**® (co-methiamol (paracetamol, DL-methionine)), **Paramol**® (paracetamol, dihydrocodeine), **Phensic**® (aspirin, caffeine), **Placidex**® (paracetamol), **Propain**® (paracetamol, caffeine, codeine, diphenhydramine)
Resolve® (paracetamol)
Sinutab® (paracetamol, phenylpropanolamine), **Sinutab Nightime**® (paracetamol, phenylpropanolamine, phenyltoloxamine), **Solpadeine**® (paracetamol, caffeine, codeine), **Solpadeine Max**® (paracetamol, codeine), **Solpadeine Soluble**® (paracetamol, caffeine, codeine), **Sudafed-Co**® (paracetamol, pseudoephedrine), **Syndol**® (paracetamol, caffeine, codeine, doxylamine)
Tixymol® (paracetamol)
Ultramol Soluble® (paracetamol, codeine, caffeine), **Uniflu with Gregovite C**® (paracetamol, caffeine, codeine, diphenhydramine, phenylephrine)
Veganin® (aspirin, paracetamol, codeine), **Vicks Medinite**® (paracetamol, dextromethorphan, doxylamine, ephedrine)

Topical NSAIDs and counter-irritants on sale to the public together with their significant ingredients include:

Algesal® (diethylamine salicylate), **Algipan Rub**® (capsicum oleoresin, glycol salicylate, methyl nicotinate),
Balmosa® (camphor, capsicum oleoresin, menthol, methyl salicylate), **Boots Pain Relief Balm**® (ethyl nicotinate, glycol monosalicylate, nonylic acid vanillylamide), **Boots Pain Relief Embrocation**® (camphor, turpentine oil), **Boots Pain Relief Warming Spray**® (camphor, ethyl nicotinate, methyl salicylate),
Cremalgin® (capsicin, glycol salicylate, methyl nicotinate), **Cuprofen**® **Ibutop**® **Gel** (ibuprofen)
Deep Freeze Cold Gel® (menthol), **Deep Freeze Spray**® (levomenthol), **Deep Heat Massage Liniment**®, **Deep Heat Maximum**® (menthol, methyl salicylate), **Deep Heat Rub**® (eucalyptus oil, menthol, methyl salicylate, turpentine oil), **Deep Heat Spray** ® (glycol salicylate, ethyl salicylate, methyl salicylate, methyl nicotinate), **Deep Relief**® (ibuprofen, menthol), **Difflam**®**-P Cream** (benzydamine), **Dubam Cream**® (methyl salicylate, menthol, cineole), **Dubam Spray**® (ethyl salicylate, methyl salicylate, glycol salicylate, methyl nicotinate)
Elliman's Universal Embrocation® (acetic acid, turpentine oil)
Feldene P® **Gel** (piroxicam), **Fenbid**® **Gel** (ibuprofen), **Fiery Jack Cream**® (capsicum oleoresin, diethylamine salicylate, glycol salicylate, methyl nicotinate), **Fiery Jack Ointment**® (capsicum oleoresin)
Goddard's White Oil Embrocation® (dilute acetic acid, dilute ammonia solution, turpentine oil)
Hansaplast® **Thermo Plaster** (capsaicinoids, colophony)
Ibuderm® (ibuprofen), **Ibuleve**®, **Ibuleve Mousse**®, **Ibuleve Sports Gel**® (ibuprofen), **Intralgin**® (benzocaine, salicylamide)
Lloyds Cream® (diethyl salicylate)
Mentholatum® **Ibuprofen Gel** (ibuprofen), **Movelat**® **Relief Cream** (mucopolysaccharide polysulphate, salicylic acid, thymol), **Movelat**® **Relief Gel** (mucopolysaccharide polysulphate, salicylic acid)

APPENDIX 3 NSAIDS Over The Counter

IBUPROFEN

Note. Proprietary brands of ibuprofen preparations are on sale to the public; brand names include, Advil®, Anadin Ibuprofen®, Anadin Ultra®, Arthrofen®, Boots Children's 6 years Plus Fever & Pain Relief®, Cuprofen®, Galprofen®, Hedex® Ibuprofen, Ibrufhalal®, Ibufem®, Inoven®, Librofem®, Migrafen®, Novaprin®, Nurofen®, Nurofen® Meltlets, Obifen®, Pacifene®, PhorPain®, Relcofen®; compound proprietary preparations containing ibuprofen include Advil® Cold and Sinus (ibuprofen, pseudoephedrine), Lemsip® Power + (ibuprofen, pseudoephedrine), Nurofen® Cold & Flu (ibuprofen, pseudoephedrine), Nurofen® Plus (ibuprofen, codeine), Solpaflex® (ibuprofen, codeine)

NSAIDs on prescription

Drug name	Trade name
Ibuprofen	Ibuprofen
Aceclofenac	Preservox
Acetamacin	Emflex
Azapropazone	Rheumox
Celecoxib	Celebrex
Dexketoprofen	Keral
Diclofenac Sodium	Diclofenac, Sodium Voltarol, Voltarol retard
Diflunisal	Dolobid
Etodolac	Lodine SR
Fenbufen	Fenbufen, Lederfen
Fenoprofen	Fenopron
Flurbiprofen	Froben, Froben SR
Indometacin	Indometacin
Ketoprofen	Ketoprofen, Orudis, Oruvail
Mefenamic Acid	Mefenamic Acid
Meloxicam	Mobic
Nabumetone	Nabumetone, Relifex
Naproxen	Naproxen, Naprosyn, Nycopren, Synflex, Napratec
Phenylbutazone	Butacote
Piroxicam	Piroxicam, Feldene, Brexidol
Rofecoxib	Vioxx
Sulindac	Sulindac, Clinoril
Tenoxicam	Mobiflex
Tiaprofenic Acid	Tiaprofenic Acid, Surgam

Overhead projector slides

Learning about Osteoarthritis

Gita E Bhutani

Slide 1

Aims Of The Course

- To learn about osteoarthritis
- To learn how it is treated
- To learn what can help
- To find about other sources of help

Slide 2 Learning about Osteoarthritis by Gita E Bhutani

Neanderthal Man

Slide 3 Learning about Osteoarthritis by Gita E Bhutani

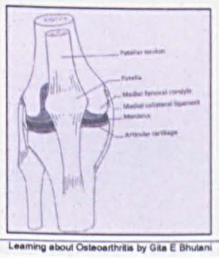
Neanderthal Man 2

Slide 4 Learning about Osteoarthritis by Gita E Bhutani

Romans

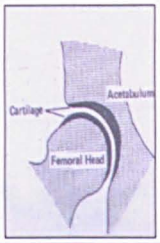
Slide 5 Learning about Osteoarthritis by Gita E Bhutani

A Knee Joint



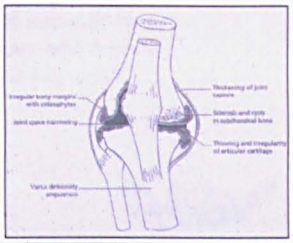
Slide 6 Learning about Osteoarthritis by Gita E Bhutani

A Hip Joint



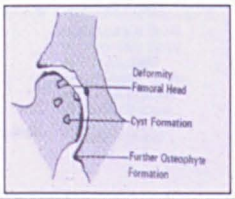
Slide 7 Learning about Osteoarthritis by Gita E Bhutani

An Osteoarthritic Knee Joint



Slide 8 Learning about Osteoarthritis by Gita E Bhutani

An Osteoarthritic Hip Joint



Slide 9 Learning about Osteoarthritis by Gita E Bhutani

Key Points

- Osteoarthritis is very old
- Osteoarthritis affects many people
- Joints commonly affected are:
  - hips, knees and lower spine
- Cause
- Diagnosis
- Symptoms

Slide 10 Learning about Osteoarthritis by Gita E Bhutani

Medicines

- Analgesics
- Non-steroidal anti-inflammatories
- Injections

Slide 11 Learning about Osteoarthritis by Gita E Bhutani

Analgesics

- What are they?
- Why are they used?

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Examples of Analgesics

- Paracetamol
- Aspirin
- Coproxamol
- Cocodomal
- Codydramol

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Topical preparations

- Topical preparations
- Rubs and embrocations
- How do they work?

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Over the Counter Rubs & Embrocations 1

- Algesal®
- Algipan Rub® Balmosa®
- Boots Pain Relief Balm®
- Boots Pain Relief Embrocation®
- Boots Pain Relief Warming Spray® Cremalgin®
- Cuprofen®
- Ibutop® Gel
- Deep Freeze Cold Gel®
- Deep Freeze Spray®
- Deep Heat Massage Liniment®,
- Deep Heat Maximum®
- Deep Heat Rub®
- Deep Heat Spray
- Deep Relief®
- Difflam®-P Cream
- Dubam Cream®
- Dubam Spray®
- Elliman's Universal Embrocation®

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Over the Counter Rubs & Embrocations 2

- Feldene P® gel
- Fenbid® gel
- Fiery jack cream®
- Fiery jack ointment® Goddard's white oil Embrocation®
- Hansaplast® thermo plaster Ibuderm®
- Ibuleve®
- Ibuleve mousse®,
- Ibuleve sports gel®
- Intralgin®
- Lloyds Cream® Mentholatum®
- Ibuprofen Gel
- Movelat® Relief Cream
- Movelat® Relief Gel
- Nasciodine®
- Nella Red Oil®
- Nurofen Muscular Pain Relief Gel®
- Oruvail® Gel
- PR Heat Spray®

Slide 16 Learning about Osteoarthritis by Gita E Bhutani

Over the Counter Rubs & Embrocations 3

- Proflex Pain Relief Gel®
- Radian®-B Ibuprofen Gel
- Radian®-B Muscle Lotion
- Radian®-B Heat Spray
- Radian®-B Muscle Rub
- Ralgex Cream®
- Ralgex Freeze Spray®
- Ralgex® Ibutop® Gel
- Ralgex Low Odour Spray®
- Ralgex Spray®
- Ralgex Stick®
- Salonair®
- Salonpas Plasters®
- Tiger Balm Red Extra Strength®
- Tiger Balm®
- Transvasin Cream®
- Transvasin Spray®
- Traxam Pain Relief®

Slide 17 Learning about Osteoarthritis by Gita E Bhutani

What are NSAIDS ?

NSAIDS =
Non-steroidal anti-inflammatory drug

- Pain killers
- Anti-inflammatory

Slide 18 Learning about Osteoarthritis by Gita E Bhutani

Side Effects

- Stomach
- Rashes
- Breathing

Slide 19 Learning about Osteoarthritis by Gita E Bhutani

Examples of NSAIDS on Prescription

Drug name	Trade Name	
Ibuprofen	Ibuprofen	
Celecoxib	Celebrex	
Diclofenac Sodium	Diclofenac Sodium	
	Voltarol	
Etodolac	Voltarol Retard	
Indometacin	Lodine SR	
Mefenamic Acid	Indometacin	
Meloxicam	Mefenamic Acid	
Nabumetone	Mobic	Relifex
Naproxen	Nabumetone	Naprosyn
	Naproxen	Synflex
	Nycopren	
Piroxicam	Nepratec	
	Piroxicam	

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Examples of NSAIDs over the counter

- Advil
- Anadin
- Arthofen
- Cupofren
- Galprofen
- Hedex
- Nurofen
- Lemsip

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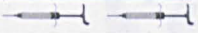
Injections

Drug Name	*Trade Name*
Hydrocortisone acetate	***Hydrocortistab***
Methylprednisolone acetate	***Depo-Medrone***
Triamcinolone hexacetonide	***Lederspan***



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Healthy Diet

- What to include? e.g
- Low fat
- Oily fish
- Green vegetables

- What to exclude? e.g
- Red meat
- Butter
- Confectionery

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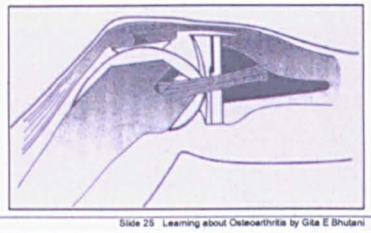
Surgery

- Osteotomy
- Arthrodesis
- Synvectomy
- Arthroplasty

Slide 24 Learning about Osteoarthritis by Gita E Bhutani

Knee Arthroplasty



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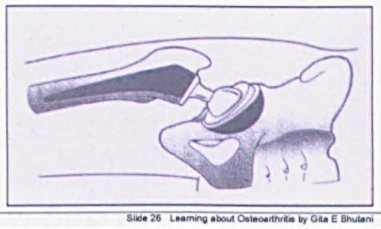
Hip Arthroplasty



Slide 26 Learning about Osteoarthritis by Gita E Bhutani

Key Points

- Medication
  - Uses
  - Types of medication
- Diet and weight
- Surgery

Slide 27 Learning about Osteoarthritis by Gita E Bhutani

Review

- What is osteoarthritis?
- How is it treated?
- What else can help?

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Aids and Adaptations

Slide 29 Learning about Osteoarthritis by Gita E Bhutani

Where else to get help?

- Local help
- National help
- Each other

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Appendix 6: Copies of Ethics Committee Letters of Approval

SALFORD AND TRAFFORD HEALTH AUTHORITY
SALFORD AND TRAFFORD RESEARCH ETHICS COMMITTEE
6th Floor, Peel House, Albert Street, ECCLES, M30 ONJ
Direct Line: 0161-787-0008: Mrs. K. Ellis
Fax: 0161-787-0002

BW/KEE/JV/eth102/1bhut

13 August 1997

Ms G E Bhutani
Project Co-ordinator for Primary Care Older Adults
Department of Psychology
MHSS
Bury New Road
Prestwich
M25 3BL

Dear Ms Bhutani

Project No: 97106 - An investigation into the psychological factors affecting sufferers of osteoarthritis and hypertension in older adults in primary care services.

As you are aware the Ethics Committee met on Tuesday, 12 August 1997 when the above project was discussed. I confirm that the Committee has approved your request to undertake this study and that informed, written consent/assent will be obtained on the Salford and Trafford Forms.

The Committee has no ethical objection to the study.

Please quote the project number and full title on any future correspondence.

Yours sincerely

Betty Wilkinson

Betty Wilkinson (Mrs)
Chairman Salford & Trafford LREC

Encl

SALFORD AND TRAFFORD HEALTH AUTHORITY

SALFORD AND TRAFFORD RESEARCH ETHICS COMMITTEE

5th Floor
Peel House
Albert Street
ECCLES
Manchester M30 ONJ

Tel: 0161 787 0008 Mrs K Ellis
Mrs J Veitch

Fax: 0161-789-7288

BW/KEE/JV/2/bhut

Ms G E Bhutani
Chartered Clinical Psychologist
Salford Psychology Services for older adults
MHSS
Bury New Road
Manchester

Dear Ms Bhutani

Project No: 97016 EXTENSION - An investigation into the psychological factors affecting sufferers of osteoarthritis in older adults in primary care.

Thank you for your letter with enclosures dated 15 May 1998 and may I apologise for the long delay in sending a response.

I confirm that the above extension now has full ethical approval.

Please quote the project number and full title on any future correspondence.

Yours sincerely

Joan Veitch

Betty Wilkinson (Mrs)
Chairman Salford & Trafford LREC