

**An integrated programme of exercise, self-management  
and active coping strategies for patients with knee  
osteoarthritis – a proof-of-concept study for a Hong  
Kong Chinese speaking population**

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## Abstract

Knee osteoarthritis (KOA) is a degenerative joint disorder that affects the whole of the joint unit resulting in pain and decreased function. Current evidence recommends core management strategies of exercise, education for self-management and weight reduction (as appropriate) for KOA at all levels of severity.

ESCAPE pain is evidence based integrated exercise and self-management intervention for KOA developed in the United Kingdom (UK). Previous work has demonstrated it is a clinical and cost-effective intervention in the UK population. There are cultural differences between the UK and Hong Kong (HK) in terms of culture and medical services provision. In the absence of a similar intervention in HK, this work aimed to establish the feasibility of this intervention for a HK Chinese population.

The series of studies included within this thesis included a systematic literature review of combined exercise and self-management programmes; translation and cultural adaptation of an evidenced based programme for KOA; development of a training package for physiotherapists; a proof-of-concept study; and qualitative interviews to determine acceptability of the intervention within the local context.

The systematic literature review of combined exercise and self-management programmes for Chinese populations showed a significant short-term effect in pain relief with long-term evidence limited. There was limited effect demonstrated on disability although self-efficacy improved. Exercise dosage and intensity were variable but of low level in general.

The ESCAPE programme was then adapted for cultural relevance by translating the patient information booklet that supports self-management into Chinese with pictures and text amended to fit local culture. Content validity was tested with local patients with KOA and physiotherapists for relevance and comprehension. The programme was also reduced to 10 sessions in 5 weeks to fit the local delivery context. Relevant outcome measures in Chinese were identified and local physiotherapists were trained to provide the programme.

The preliminary culturally adapted ESCAPE-knee pain was tested in a proof-of-concept study (N=21). Feasibility of this programme in HK was established by

recruitment rate 30.9%, retention rate 82.6% and positive change in self-reported outcomes supported with performance tests after the intervention.

Finally acceptability was determined by satisfaction survey for all participants and a focus group (n=8). The findings showed that participants were burdened by the disease and confused about the cause of their pain. They believed overloading was the cause of their pain and avoided exercise. Through ESCAPE-knee pain programme, they learned active coping strategies through interactive education. They practised exercise with gradual progression. They set goals to increase exercise participation and expressed their willingness to stay active. Increased confidence to undertake exercise and improved function were reported. The therapists functioned to motivate change in patients through nurturing exercise mastery for self-efficacy and creating interactive and collaborative environment. Field observation suggested adjustments to the literacy level of the patient information booklet to improve patient understanding, with further guidance on goal setting at the beginning of the programme.

The findings suggest that the ESCAPE-knee pain programme is feasible and acceptable to the Chinese population in HK. This novel combined programme adds to the evidence that KOA is a chronic disease that should be targeted with lifestyle behavioural change interventions. The next steps will be to conduct a small-scale pilot study to estimate effect-size to inform a fully powered randomised controlled trial.



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# Table of Contents

<b>Abstract</b> .....	<b>i</b>
<b>Acknowledgements</b> .....	<b>iii</b>
<b>Table of contents</b> .....	<b>iv</b>
<b>List of figures</b> .....	<b>xi</b>
<b>List of tables</b> .....	<b>xi</b>
<b>List of abbreviations</b> .....	<b>xiii</b>
<b>Chapter 1: Introduction to the disease of knee osteoarthritis</b> .....	<b>1</b>
1.1 INTRODUCTION TO KNEE OSTEOARTHRITIS .....	1
1.1.1 <i>Definition</i> .....	1
1.1.2 <i>Pathology and aetiology</i> .....	1
1.1.3 <i>Risk factors</i> .....	2
1.1.4 <i>Prevalence</i> .....	4
1.1.5 <i>Problems of individuals with KOA</i> .....	4
1.2 MANAGEMENT OF KNEE OSTEOARTHRITIS .....	6
1.2.1 <i>Pharmacological management</i> .....	6
1.2.2 <i>Surgical management</i> .....	8
1.2.3 <i>Non-pharmacological approaches</i> .....	9
1.2.3.1 <i>Exercise</i> .....	9
1.2.3.2 <i>Self-management</i> .....	11
I <i>Functions and barriers of self-management</i> .....	11
II <i>Theories in self-management</i> .....	11
III <i>Relationship between self-efficacy and functional activity participation</i> .....	12
IV <i>Self-management interventions for KOA</i> .....	12
1.2.3.3 <i>Combined approaches of exercise and self-management</i> .....	13
1.3 CULTURAL ISSUES .....	14
1.4 RATIONALE FOR THE STUDIES .....	14
<b>Chapter 2: Introduction to the thesis – cultural issues and context</b> .....	<b>16</b>
2.1 CULTURAL VALUES OF INDIVIDUALISM VERSUS COLLECTIVISM.....	17
2.1.1 <i>Definition of cultural values</i> .....	17
2.1.2 <i>Hofstede’s theory on culture</i> .....	17
2.1.3 <i>Individualism versus collectivism</i> .....	18
2.1.4 <i>Relevance to the United Kingdom and HK</i> .....	20
2.2 TRADITIONAL CHINESE CULTURAL VALUES .....	21
2.2.1 <i>Confucian philosophy in traditional Chinese culture</i> .....	21
2.2.2 <i>The valued norms and traditions amongst Chinese</i> .....	21
2.2.3 <i>Close families ties and commitment in traditional Chinese culture</i> .....	21
2.3 MODERNISED CULTURAL CHANGE IN HK .....	22
2.3.1 <i>Modernisation and its influence on culture in HK</i> .....	22
2.3.2 <i>The decline of traditional culture</i> .....	22
2.4 THE MEDICAL SYSTEM IN HK .....	23
2.4.1 <i>The development of public and private service</i> .....	23
2.4.2 <i>The western allopathic and traditional Chinese medicine</i> .....	24
2.4.3 <i>Care-seeking behaviour for residents receiving medical care</i> .....	24
2.4.4 <i>Limited self-management approach</i> .....	25

2.4.5 Physiotherapy training and service in HK .....	25
2.5 THE CARE OF MANAGING KNEE OSTEOARTHRITIS .....	26
2.6 Summary .....	27
<b>Chapter 3: Systematic literature review .....</b>	<b>28</b>
3.1 INTRODUCTION .....	28
3.2 BACKGROUND .....	28
3.2.1 Description of the condition.....	28
3.2.2 Description of the intervention.....	28
3.2.2.1 Exercise intervention.....	28
3.2.2.2 Education and Self-management .....	29
3.2.2.3 Integration of exercise and self-management .....	29
3.2.3 The Theoretical basis of intervention .....	29
3.2.4 The importance of this review.....	30
3.3 AIMS AND OBJECTIVES .....	31
3.4 METHODS .....	31
3.4.1 Inclusion and exclusion criteria .....	31
3.4.2 Search strategy .....	32
3.4.2.1 Search keywords.....	32
3.4.2.2 Bibliographic databases.....	33
3.4.3 Data collection and analysis.....	33
3.4.3.1 Selection of studies.....	33
3.4.3.2 Data extraction .....	34
3.4.3.3 Assessment of risk of bias in included studies.....	34
3.4.3.4 Analysis of the included studies.....	34
3.5 RESULTS .....	34
3.5.1 Description of studies.....	34
3.5.1.1 Results of the search.....	34
3.5.1.2 Characteristics of studies and populations.....	37
3.5.1.3 Programme characteristics.....	39
3.5.1.3.1 Format and time duration.....	39
3.5.1.3.2 Exercise component.....	39
3.5.1.3.3 Self-management component.....	39
3.5.1.3.4 Theoretical framework and strategies.....	40
3.5.1.4 Control group.....	40
3.5.2 Effectiveness of integrated exercise and self-management.....	43
3.5.2.1 Types of outcome measures .....	43
3.5.2.2 Effectiveness at reducing pain .....	43
3.5.2.3 Effectiveness at improving function.....	44
3.5.2.4 Effectiveness of psychosocial outcomes.....	44
3.5.3 Risk of bias in included studies .....	45
3.5.3.1 Overall comment.....	45
3.5.3.2 Random sequence generation (check for selection bias) .....	46
3.5.3.3 Allocation concealment (check for selection bias).....	47
3.5.3.4 Blinding of participants & personnel (check for performance bias).....	47
3.5.3.5 Blinding of outcome assessment (check for detection bias).....	47
3.5.3.6 Incomplete outcome data (check for attrition bias) .....	47
3.5.3.7 Selective reporting (check for reporting bias) .....	48
3.5.3.8 Other sources of bias .....	48
3.5.4 Behaviour change theories.....	48
3.6 DISCUSSION.....	49
3.6.1 Summary.....	49
3.6.1.1 The evidence identified.....	49
3.6.1.2 The treatment effectiveness.....	49

3.6.1.3	<i>The use of outcome measures</i>	49
3.6.1.4	<i>Types of exercise and dosage</i>	50
3.6.2	<i>Theoretical framework in the interventions</i>	50
3.6.2.1	<i>Social Cognitive theory</i>	50
3.6.2.2	<i>Self-efficacy theory</i>	51
3.6.3	<i>Key clinical outcomes</i>	51
3.6.3.1	<i>Pain</i>	51
3.6.3.2	<i>Function</i>	52
3.6.3.3	<i>Exercise dosage and intensity</i>	53
3.7	<i>LIMITATION OF THE REVIEW</i>	54
3.8	<i>SUMMARY OF FINDINGS AND IMPLICATIONS FOR FUTURE STUDY DESIGN</i>	55
3.9	<i>FINDINGS OF THE SLR INFLUENCING THE SUBSEQUENT DOCTORAL WORK</i>	56
<b>Chapter 4: Programme adaptation of ESCAPE-knee pain programme for HK</b>		<b>58</b>
4.1	<i>AIM AND OBJECTIVES</i>	58
4.2	<i>PHASE 1 – LINGUISTIC TRANSLATION AND CROSS-CULTURAL ADAPTATION OF THE BOOKLET</i>	59
4.2.1	<i>Background</i>	59
4.2.2	<i>Forward translation</i>	61
4.2.2.1	<i>Methodology</i>	61
4.2.2.2	<i>Results</i>	61
I	<i>Prevalence of KOA in HK</i>	61
II	<i>Food pyramid</i>	62
III	<i>Health care service provider in HK</i>	62
IV	<i>Local community resources for long-term exercise</i>	63
V	<i>New illustrations</i>	63
4.2.3	<i>Reconciliation and synthesis</i>	63
4.2.3.1	<i>Methodology</i>	64
4.2.3.2	<i>Results</i>	64
4.2.4	<i>Qualitative review &amp; validation – Think-Aloud interview with patient-partners</i>	66
4.2.4.1	<i>Methodology</i>	67
4.2.4.2	<i>Results</i>	68
4.2.5	<i>Quantitative cognitive debriefing with staff and patients</i>	69
4.2.5.1	<i>Methodology</i>	69
4.2.5.2	<i>Data analysis</i>	70
4.2.5.3	<i>Results</i>	71
4.3	<i>PHASE 2 – REPLICATING ESCAPE-KNEE PAIN – FIDELITY AND ADAPTATION</i>	72
4.3.1	<i>Background</i>	72
4.3.2	<i>Methodology</i>	74
4.3.2.1	<i>Discussion with clinic manager</i>	74
4.3.2.2	<i>Participative discussion with frontline staff</i>	74
4.3.3	<i>Result</i>	74
4.3.3.1	<i>The allocation of time for ESCAPE-knee pain sessions</i>	74
4.3.3.2	<i>Treatment sessions and frequency</i>	75
4.3.3.3	<i>Treatment venue</i>	75
4.3.3.4	<i>Staff to patient ratio</i>	75
4.4	<i>PHASE 3 – OUTCOME MEASURES FOR THE PROOF-OF-CONCEPT STUDY</i>	77
4.4.1	<i>Background</i>	77
4.4.2	<i>Condition-specific outcome measure</i>	78
4.4.2.1	<i>Background</i>	78
4.4.2.2	<i>Knee injury and Osteoarthritis Outcome Score (KOOS)</i>	79
4.4.3	<i>Patient-specific outcome measure</i>	80

4.4.3.1	Background .....	80
4.4.3.2	Patient-specific Functional Scale.....	80
4.4.4	Self-efficacy measure.....	81
4.4.4.1	Background .....	81
4.4.4.2	Self-efficacy for Exercise.....	82
4.4.5	Psychological measure .....	82
4.4.5.1	Background .....	82
4.4.5.2	Hospital Anxiety and Depression Scale.....	82
4.4.6	Global improvement .....	83
4.4.6.1	Background .....	83
4.4.6.2	The Numeric Global Rate of Change Score.....	83
4.4.7	Performance testing .....	83
4.4.7.1	Background .....	83
4.4.7.2	40-meter fast speed walk test.....	84
4.4.7.3	30-second chair stand test.....	84
4.4.7.4	12-step stair climb test.....	84
4.5	PHASE 4 – TRAINING FOR PHYSIOTHERAPIST .....	84
4.5.1	Objectives.....	85
4.5.2	The trainer and background.....	85
4.5.2.1	Background in Social Cognitive Theory .....	85
4.5.2.2	Background on Motivational Interviewing.....	86
4.5.2.3	Background on adult learner.....	86
4.5.3	Methodology.....	87
4.5.3.1	Target participants and recruitment.....	87
4.5.3.2	Pre-training survey on physiotherapist.....	88
4.5.3.3	The results of the pre-training survey.....	91
4.5.3.4	Training programme .....	94
4.5.3.5	Post-training evaluation on therapists.....	96
4.5.3.6	Results of post-training evaluation on physiotherapists.....	96
4.5.3.6.1	Updating current evidence.....	96
4.5.3.6.2	Feedback on the content of training.....	98
4.5.3.6.3	Feedback on the training process.....	98
4.5.3.6.4	Feedback on the outcome after the training.....	98
4.5.3.6.5	Comment on ESCAPE-knee pain programme.....	98
4.6	DISCUSSION.....	98
4.6.1	Summary of findings.....	98
4.6.2	Translation of the information booklet.....	100
4.6.3	Replication of evidence-based programme.....	101
4.6.4	Outcome measures for local use.....	102
4.6.5	Training for physiotherapists.....	103
4.7	STRENGTH AND LIMITATION .....	104
4.7.1	Strength of the programme development .....	104
4.7.2	Limitation .....	105
4.8	CONCLUSION .....	105
<b>Chapter 5:</b>	<b>Proof-of-concept study – a mixed method approach.....</b>	<b>106</b>
5.1	BACKGROUND .....	106
5.1.1	Introduction.....	106
5.1.2	Background on mixed method research.....	106
5.1.2.1	Purpose of mixed method research .....	106
5.1.2.2	Sequencing of quantitative and qualitative methods.....	107
5.1.2.3	Focus group in the qualitative research.....	107
5.2	AIMS.....	108
5.2.1	Objectives.....	108

5.3	METHODOLOGY .....	108
5.3.1	Phase 1 – Proof-of-concept study (quantitative part) .....	108
5.3.1.1	Study design.....	108
5.3.1.2	Identification and sampling.....	109
5.3.1.3	Intervention.....	110
5.3.1.4	Evaluation and outcome measures .....	111
5.3.1.5	Safety measures.....	113
5.3.1.5.1	Screening for high risk group and monitoring.....	113
5.3.1.5.2	Guidance for exercising intensity and progression.....	113
5.3.1.6	Treatment fidelity.....	113
5.3.2	Phase 2 – focus group (qualitative part) .....	114
5.3.2.1	Invitation to participate in the focus group.....	114
5.3.2.2	Sample strategies and sample size .....	114
5.3.2.3	Preparation for fieldwork – topic guide.....	115
5.3.2.4	The focus group .....	116
5.4	DATA ANALYSIS .....	116
5.4.1	Data analysis for quantitative research.....	116
5.4.2	Data analysis for patient opinion survey.....	118
5.4.3	Data analysis for qualitative research.....	118
5.4.3.1	Transcription and translation of data .....	118
5.4.3.2	The data analysis .....	119
I	Familiarising with data.....	119
II	Generating initial codes.....	119
III	Searching for themes.....	120
IV	Reviewing potential themes.....	120
V	Defining and naming themes.....	120
VI	Producing the report.....	120
5.4.4	Data synthesis.....	120
5.4.5	Reflexivity.....	121
5.6	RESULTS .....	121
5.6.1	Participants .....	121
5.6.2	Attendance and attrition.....	123
5.6.3	Clinical outcomes .....	124
5.6.3.1	KOOS .....	124
5.6.3.2	Self-efficacy for Exercise.....	126
5.6.3.3	Patient-specific Functional scale.....	127
5.6.3.4	Hospital Anxiety and Depression scale .....	128
5.6.3.5	Performance testing .....	129
5.6.4	Adverse event.....	130
5.6.4.1	Incident and management.....	130
5.6.5	Satisfaction survey.....	131
5.6.5.1	Conducting the satisfaction survey.....	131
5.6.5.2	The translation process.....	131
5.6.5.2.1	Better use of an English expression .....	131
5.6.5.2.2	Better choice of word(s) for accuracy of translation.....	132
5.6.5.2.3	Clarification required for more accurate translation .....	132
5.6.5.3	The survey results .....	133
5.6.5.3.1	The physiotherapists .....	133
5.6.5.3.2	Receiving information about the class before starting.....	133
5.6.5.3.3	The programme content of exercise component.....	133
I	Frequency .....	133
II	Intensity .....	133
III	Types .....	134
5.6.5.3.4	Total number of sessions.....	134

5.6.5.3.5	<i>The programme content of self-management – usefulness of booklet</i>	134
5.6.5.3.6	<i>Benefits from the KOA class</i>	134
I	<i>Clarification of some misconception – exercise helped my knee</i>	134
II	<i>Learning to do some exercise correctly and that was helpful</i>	134
III	<i>Learning some self-management skills to cope with pain</i>	134
5.6.5.3.7	<i>Improved outcomes on pain, strength and fitness</i>	135
5.6.5.3.8	<i>Adherence to exercise in the long term</i>	135
5.6.6	<i>The data from focus group and synthesis with survey data</i>	135
5.6.6.1	<i>Theme 1: Knee pain – a burden to patients</i>	137
5.6.6.1.1	<i>1.1: Chronic knee pain not relieved with passive treatment</i>	138
5.6.6.1.2	<i>1.2: Significant impact on daily functioning due to knee pain</i>	138
5.6.6.1.3	<i>1.3: Belief on overloading the knee to cause pain</i>	139
5.6.6.2	<i>Theme 2: Interactive education on active coping for self-management</i>	139
5.6.6.2.1	<i>2.1: Interactive learning for self-efficacy</i>	140
5.6.6.2.2	<i>2.2: Relevant &amp; valuable pain-coping strategies for self-management</i>	140
5.6.6.2.3	<i>2.3: Goal setting</i>	142
5.6.6.3	<i>Theme 3: Doing exercise to stay active</i>	143
5.6.6.3.1	<i>3.1: Starting exercise and progressing</i>	143
5.6.6.3.2	<i>3.2: Walked better and squatted lower after exercise</i>	145
5.6.6.3.3	<i>3.3: Limiting barriers manageable with resilience</i>	146
5.6.6.3.4	<i>3.4: Confidence built up with vitality</i>	146
5.6.6.4	<i>Theme 4: Therapists motivating change in patients</i>	147
5.6.6.4.1	<i>4.1: Creating interactive and collaborative environment to motivate change</i>	148
5.6.6.4.2	<i>4.2: Nurturing mastery of exercise practice to increase self-confidence</i>	148
5.7	<b>DISCUSSION</b>	149
5.7.1	<i>The primary outcomes</i>	150
5.7.1.1	<i>KOOS</i>	150
5.7.1.2	<i>The responsiveness</i>	151
5.7.2	<i>The secondary outcomes</i>	152
5.7.2.1	<i>Patient-specific Functional scale</i>	152
5.7.2.2	<i>Performance-based testing</i>	152
5.7.2.3	<i>Self-efficacy for Exercise</i>	152
5.7.2.4	<i>Hospital Anxiety and Depression scale</i>	153
5.7.3	<i>Focus group</i>	154
5.7.3.1	<i>The group participation</i>	154
5.7.3.2	<i>The transcript</i>	154
5.7.3.3	<i>The analysis</i>	156
5.8	<b>STRENGTHS OF THE STUDY</b>	158
5.9	<b>LIMITATIONS OF THE STUDY</b>	158
5.10	<b>CONCLUSION</b>	159
<b>Chapter 6: Summary and discussion, dissemination and implementation plan</b>		<b>160</b>
6.1	<b>THESIS AIM</b>	160
6.2	<b>ORIGINAL CONTRIBUTION</b>	161
6.2.1	<i>Summary findings</i>	161
6.2.2	<i>Qualitative and mixed study method</i>	162
6.2.3	<i>Evidence for integrated intervention of exercise and self-management</i>	163
6.2.3.1	<i>Summary of exercise intervention</i>	163
6.2.3.2	<i>Summary of primary outcome measure</i>	165

6.2.3.3 Support for theory-based self-management .....	166
6.2.3.4 The patients' journey in participating the ESCAPE-knee pain programme.....	170
6.2.4 Cultural differences & developing ESCAPE-knee pain in HK for adoption .....	171
6.2.4.1 Cultural difference between UK & HK in delivering ESCAPE-knee pain.....	171
I Information gathering.....	173
II Preliminary adaptation design.....	174
III Preliminary adaptation test .....	174
IV Adaptation refinement .....	174
V Cultural adaptation trial.....	174
6.2.4.2 Translation of patient information booklet .....	175
6.2.5 Feasibility and acceptability of the intervention.....	178
6.2.5.1 The feasibility of HK ESCAPE-knee pain programme in HK.....	178
6.2.5.2 The acceptability of HK ESCAPE-knee pain programme in HK.....	179
6.2.5.3 Cultural issues.....	180
6.3 IMPLICATIONS FOR RESEARCH .....	181
6.3.1 Methodology.....	181
6.3.1.1 Cultural adaptation of ESCAPE-knee pain programme.....	181
6.3.1.2 Follow-up arrangement in the intervention .....	183
6.3.2 Further evaluation of the intervention .....	183
6.3.2.1 Feasibility of an efficacy/effectiveness study.....	183
6.4 IMPLICATIONS FOR CLINICAL PRACTICE.....	184
6.4.1 Physiotherapists' role in caring for patients' physical & psychological needs..	185
6.4.2 Theory-based intervention .....	185
6.4.3 Progressive and mixed type of exercise regime for KOA patients.....	186
6.4.4 Improving access to self-management interventions .....	186
6.5 STRENGTHS AND LIMITATIONS .....	187
6.6 PERSONAL REFLECTION .....	188
6.7 THESIS SUMMARY .....	189

<b>Reference.....</b>	<b>191</b>
-----------------------	------------

<b>Appendices.....</b>	<b>225</b>
------------------------	------------

Appendix A: Data extraction forms for systematic literature review.....	225
Appendix B: Risk of bias included studies .....	235
Appendix C: Critical appraisal skills programmes for RCT .....	236
Appendix D: Comparison of original and local relevant illustrations .....	246
Appendix E1: Participant information sheet for physiotherapist in booklet study	248
Appendix E2: Consent form for physiotherapist in booklet study .....	251
Appendix E3: Evaluation form on relevance & comprehension for physiotherapist	
.....	252
Appendix F1: Patient information sheet for patient in booklet study .....	255
Appendix F2: Consent form for patient in booklet study .....	258
Appendix F3: Evaluation form on relevance & comprehension for patient .....	259
Appendix G: Minimal important change of KOOS after physiotherapy treatment	262
Appendix H1: Participant information sheet for physiotherapist training .....	263
Appendix H2: Participant consent form for physiotherapist training .....	266
Appendix I1: Pre-training survey form for physiotherapist.....	267
Appendix I2: Post-training survey form for physiotherapist .....	270
Appendix J: Detail reference for updated evidence on KOA management .....	273



Appendix K1: Power-point slides for evidence update .....	277
Appendix K2: Power-point slides for training on motivational interviewing .....	284
Appendix L1: Ethics approval from Clinical Research Ethics Committee .....	292
Appendix L2: Ethics approval from Faculty Research Ethics Committee .....	294
Appendix M1: Patient information sheet for POC study .....	297
Appendix M2: Patient consent form for POC study.....	300
Appendix N1: Exercise diagrams.....	301
Appendix N2: Exercise diary .....	303
Appendix N3: A patient's exercise log sheet during group exercise session .....	304
Appendix O: Patient satisfaction survey .....	305
Appendix P: Invitation card to potential participants for focus group .....	307
Appendix Q1: Full version of topic guide for focus group .....	308
Appendix Q2: Short one-page topic guide for focus group.....	312
Appendix R1: Patient information sheet for focus group .....	314
Appendix R2: Consent form for focus group .....	317
Appendix S1: Independent code summary (focus group data) by doctoral candidate .....	318
Appendix S2: Independent coding of focus group data by supervisor .....	323
Appendix T1: Concept map in detail.....	325
Appendix T2: Concept map simplified .....	326
Appendix T3: Concept map for presentation.....	327
Appendix U: Dissemination at local magazine .....	328
Appendix V: Abstract submission to Hospital Authority Convention 2017 .....	330
Appendix W: Poster presentation at HK Physiotherapy Association Annual Conference 2017.....	332
Appendix X: Gold award winning in HKPA Annual Conference .....	333

## List of figures

Figure 3.1: Flowchart indicating search study selection .....	36
Figure 3.2: Risk of bias for the included studies .....	46
Figure 4.1: Food pyramid in HK version of booklet .....	70
Figure 5.1: Flowchart of proof-of-concept study.....	110
Figure 5.2: Numeric global rate of change .....	117
Figure 5.3: Recruitment & attendance of participants in POC study .....	122
Figure 5.4: Percentage of responders & non-responders for KOOS subscales .	126
Figure 5.5: Percentage of participants with non-psychological & potential psychological disorders .....	129

## List of Tables

Table 1.1: Risk factors for knee Osteoarthritis .....	3
Table 2.1: Differences between western culture (e.g.UK) & Asian culture (e.g.HK) .....	19
Table 3.1: Overview of inclusion & exclusion criteria .....	32
Table 3.2: MeSH terms for search strategy .....	33
Table 3.3: Characteristics of included studies.....	38

Table 3.4: Descriptions of integrated exercise and self-management interventions in the included studies.....	41
Table 3.5: Outcome measures utilised in the included studies .....	43
Table 3.6: Summary of pain outcomes .....	44
Table 3.7: Summary of disability outcomes .....	44
Table 3.8: Summary of ASES-pain subscale outcomes.....	45
Table 3.9: Summary of ASES-other symptom subscale outcomes .....	45
Table 3.10: Time-points & percentage of participants analysed for outcomes .....	48
Table 4.1: The change of information applicable to the local scene in the cross-cultural adaptation of the booklet translation .....	63
Table 4.2: Issues of accuracy in translating the information booklet .....	64
Table 4.3: Language refinement in translation of the information booklet .....	65
Table 4.4: Clarity by adding words in Chinese expressions or procedures .....	65
Table 4.5: Comments raised by the patient partners in the think-aloud interview.	68
Table 4.6: Evaluation o equivalence of translation in the cognitive briefing.....	70
Table 4.7: Scale of response of the cognitive debriefing questionnaires.....	70
Table 4.8: Mean endorsement scores of individual items of questionnaire in cognitive debriefing .....	72
Table 4.9: Summary table of cultural adaptation of all sessions & patient booklet	77
Table 4.10: Response categories & interpretation of questions in pre-training form .....	91
Table 4.11: Individual physiotherapist's profile of the pre-training survey results .	93
Table 4.12: Training programme for physiotherapists delivering ESCAPE-knee pain .....	95
Table 4.13: Physiotherapists' profile before & after training on knowledge .....	97
Table 4.14: Improvement in knowledge of current evidence on KOA.....	97
Table 5.1: Topics of concern & details of the patient satisfaction survey .....	112
Table 5.2: Sample selection criteria determining diversity of qualitative sample	115
Table 5.3: Baseline characteristics of participants .....	123
Table 5.4: Baseline characteristics of participants stratified into attendance rate	124
Table 5.5: KOOS outcome pre- & post-intervention stratified into attendance group .....	125
Table 5.6: KOOS results in participants categorised into "better" & "same" group .....	125
Table 5.7: Responsiveness (15%improvement criteria) & MIC of POC study ....	126
Table 5.8: SEE-C, PSFS & HADS pre-&post-intervention stratified into attendance groups.....	127
Table 5.9: SEE-C, PSFS & HADS results categorised into "better" & "same" groups.....	127
Table 5.10: Activities named by participants in PSFS .....	128
Table 5.11: Performance test outcomes pre-&post intervention stratified into attendance groups .....	130
Table 5.12: Performance test outcomes categorised into "better" & "same" groups .....	130
Table 5.13: Texts of first, second & final reconciled version of satisfaction survey .....	132
Table 5.14: Choice of words or expression presenting a more accurate translation .....	132
Table 5.15: Choice of words or expression presenting a more accurate translation .....	133
Table 5.16: Codes generated by candidate & supervisor independently (focus group.....	135

## List of abbreviations

ASES	Arthritis Self-efficacy Scale
ASMP	Arthritis Self-management programme
CI	Confidence Interval
CRN	Community Rehabilitation Network
EBP	Evidence-based practice
ESCAPE	Enabling Self-management and Coping with Arthritic Pain using Exercise
EULAR	European League Against Rheumatism (EULAR)
HA	Hospital Authority
HAD	Hospital Anxiety and Depression Scale
HAQ	Health Assessment Questionnaire
HK	Hong Kong
HKSAR	Hong Kong Special Administrative Region
ICC	Intraclass correlation coefficient
KOA	Knee osteoarthritis
KOOS	Knee injury and Osteoarthritis Outcome Score
KOOS-PS	KOOS-Physical function
MA	Meta-analysis
MES	Mean Endorsement Score
MIC	Minimal important change
NGRCS	Numeric global rating of change score
NSAID	Nonsteroidal anti-inflammatory drugs
OA	Osteoarthritis
OARSI	Osteoarthritis Research Society International
OR	Odds Ratio
POC	Proof-of-concept
PROM	Patient reported outcome measure
PSFS	Patient Specific Functional Scale
PWH	Prince of Wales Hospital
QoL	Quality of life
RCT	Randomised controlled trial
RD	Risk difference
SCT	Social Cognitive Theory
SD	Standard deviation
SE	Self-efficacy
SEE-C	Self-efficacy in Exercise - Chinese
SLR	Systematic literature review
SMD	Standardised Mean Difference
TA	Thematic analysis
TCM	Traditional Chinese Medicine
TOAP	Taipei Osteoarthritis Programme
UK	United Kingdom
WOMAC	Western Ontario McMaster University Osteoarthritis Index



# Chapter One: Introduction to the Disease of Knee Osteoarthritis

## Overview and context of chapter

This chapter describes an introduction to KOA on pathology, highlighting the modifiable risk factors, and disability and psychological problems associated. Exercise benefits and functions of self-management education in management of KOA are laid out. Divided into four parts in this chapter, the first two constituting an introduction to KOA and management of KOA. The subsequent two parts highlight the cultural issues as reflected in the following chapter and the rationale for the research studies presented in this thesis.

## 1.1 Introduction to Knee Osteoarthritis

### 1.1.1 Definition

Osteoarthritis (OA) and associated joint pain is a dynamic reactive heterogeneous condition involving repair processes of all joint tissues, and particularly the hyaline cartilage. It does not necessarily deteriorate as age advances (Holden et al, 2012) but only when an imbalance develops in the dynamic equilibrium between the breakdown and repair of joint structures (Hunter, 2011a), particularly when local factors such as abnormal gait biomechanics and injury, and systemic factors, for example, ageing, obesity and genetics (Hawker and Stanaitis, 2014).

Classified by the American College of Rheumatology, KOA is a clinical disease in older adults (over-45) who present with knee pain, morning stiffness and joint crepitus (Hochberg et al, 1995; Altman et al, 1986). It is often associated with pathological changes such as joint narrowing or osteophyte growth, evidenced by radiographic changes (Zhang et al, 2001).

### 1.1.2 Pathology and Aetiology

OA is the most common form of joint disease (Vincent & Watt, 2010; Williams & Spector, 2006) and the knee is a commonly affected joint (Anderson & Loeser,

2010). Although OA is an age-related condition, it is not an inevitable consequence of ageing (Anderson & Loeser, 2010). In the process of ageing, there are changes outside the joint, including sarcopenia, or reduced muscle bulk, and reduced proprioception. There is also a decrease in muscle strength, proprioception, balance and joint laxity affecting joint function (Anderson & Loeser, 2010). Within the joint, there are ageing changes observed in cells and extracellular matrix. Articular cartilage that overlies the ends of bone at synovial joints is uniquely adapted to withstand stress (Vincent & Watt, 2010). At the initial stage of OA, loss of articular cartilage occurs at the articular surface and then spreads through the cartilage matrix down to the subchondral bone (Vincent & Watt, 2010). There is progressive degradation of the extracellular matrix within the cartilage, which is made up of the proteoglycan, aggrecan, and type II collagen. The joint becomes thickened due to sclerosis of subchondral bone, and episodic synovitis (Vincent & Watt, 2010; Anderson & Loeser, 2010; Williams & Spector, 2006). The cartilaginous tissues become brittle with increased fatigue failure (Anderson & Loeser, 2010). Cartilage thins with ageing, particularly at the femoral surface of the joint and the patellar retro-surface (Anderson & Loeser, 2010; Ding et al, 2005). The loss often precedes the development of pain, hence joint degeneration can be advanced by the time an individual presents with OA symptoms (Vincent & Watt, 2010; Peat, McCarney and Croft, 2001). Pain associated with OA may arise from bone or inflamed synovium, or other peri-articular structures, such as bursae or tendons (Vincent & Watt, 2010). Local nerve fibre sensitisation or changes in the central nervous system that occur over time may result in chronic pain (Vincent & Watt, 2010). Ageing of the musculoskeletal system increases the susceptibility for developing OA, catalysed by the presence of other risk factors (Anderson & Loeser, 2010).

### 1.1.3 Risk factors

Although OA is age-related, it is not an inevitable consequence of ageing (Anderson and Loeser, 2010). OA has been recognised as primary or secondary, with or without a known predisposing factor or factors. The disease process in OA reflects a dynamic reactive pattern within a joint related to increasing age, female sex, obesity, previous joint or ligamentous injury or surgery, genetic predisposition,

biomechanical load and occupational or physical work demands (Busija et al, 2010, Creamer & Hochberg, 1997). Biomechanical loading factors include congenital abnormalities like genu varum or genu valgum, and unequal leg length (Busija et al, 2010). Reduced muscle strength and repetitive joint use also contribute to mechanical loading (Anderson & Loeser, 2010; Busija et al, 2010). Amongst the above-mentioned, several potentially modifiable risk factors for the progression of OA have been identified including obesity and reduced muscle strength (Hunter, 2011a; Busija et al, 2010; Hurley, 1999). Baseline lower limb muscle strength was shown to be significantly associated with greater cartilage loss ( $r=+0.32$ ,  $p<0.001$ ) at two-year follow up in a cohort study (Ding et al, 2008). Another study showed that greater quadriceps strength had a protective effect (odds ratio [OR] 0.4, 95% confidence interval [CI] 0.2 to 0.9) on cartilage degeneration at the patello-femoral joint at 30-month follow up (Amin et al, 2009).

A systematic review and meta-analysis of prospective cohort and retrospective case-controlled studies reported that people with previous knee trauma have more than threefold likelihood of developing KOA compared to those with no injury; people with obesity have more than twofold likelihood compared with those of normal weight (Blagojevic et al, 2010). Other risk factors identified in the review included female gender, hand OA and older age. Of interest, the review included an article that studied the risk factors for KOA in HK Chinese populations (Lau et al, 2000) which also found previous knee injury and obesity to be highly associated with the onset of KOA. Repetitive stair climbing ( $\geq 15$  flights/day) and heavy lifting ( $\geq 10$  kg) were also identified as high risk for KOA in the HK study, but this may not be a replicable finding. Details of the systematic review and HK-based study are presented in Table 1.1.

Table 1.1 Risk factors for knee osteoarthritis

Risk factors	OR (95% CI)* [Blagojevic 2010, M.A. review]	OR (95% CI) [Lau 2000, HK study]
Previous knee trauma	3.86 (2.61, 5.70)	Men 12.1 (3.4, 42.5) Women 7.6 (3.8, 15.2)
Obesity	2.63 (2.28, 3.05)	Highest quartile of weight: men 4.8 (1.9, 12.1) women 4.3 (2.6, 7.2)
Female gender	1.84 (1.32, 2.55)	NA

Hand OA	1.49 (1.05, 2.10)	NA
Climb stairs frequently	NA	Men 2.5 (1.0, 6.4) Women 5.1 (2.5, 10.2)
Lifting heavy weight	NA	Men 5.4 (2.4, 12.4) Women 2.0 (1.2, 3.1)

\* OR (95% CI): Odds ratio (95% confidence interval); NA: data not available

#### 1.1.4 Prevalence

The estimates for KOA show a wide variability depending on age, sex, studied population and method of case identification (Busija et al, 2010). The case definition used to distinguish between individuals who have the disease from those who do not varies from medically diagnosed, radiographic, symptomatic or self-reported doctor-diagnosed identifying criteria (Busija et al, 2010). The prevalence of symptomatic KOA ranges from 7 to 28%; it is more prevalent in women and increases with age (Peat, McCarney & Croft, 2001; Zhang et al, 2001; Andersen et al, 1999; Woo et al, 1994). In the HK Chinese population, the prevalence of symptomatic KOA for men and women aged 50 or over was reported as 7% and 13% respectively (The Chinese University of HK, 2001), increasing to 12% in men and 40% in women aged 70 and over (Woo, Leung & Lau, 2009; Woo, 2004; Woo et al, 1994).

#### 1.1.5 Problems for individuals with knee osteoarthritis

Musculoskeletal diseases are one of the most common causes of long-term pain and disability. In the Global Burden of Disease 2010 study of almost 300 conditions, hip and knee osteoarthritis were ranked as the 11th highest contributors to global disability and 38th highest in disability-adjusted life years (Cross et al, 2014). KOA poses significant economic cost globally (Chen et al, 2102a) including direct medical expenses and indirect societal costs such as lost productivity (Agaliotis et al, 2014; Hermans et al, 2012; Woo et al, 2003). Furthermore, individuals with KOA may have to depend on family support with their normal daily activities like walking, shopping and cooking. In the HK context, a family may have to employ a domestic helper to run the household errands or take care of disabled elders (Woo et al, 2003).



Individuals with KOA often present with joint stiffness, muscle weakness, altered proprioception, reduced balance and gait abnormalities (Bennell, Dobson & Hinman, 2014). They often report pain and reduced function in their daily activities. Limitations to mobility and physical activities increase the risk of obesity and cardiovascular diseases (Busija et al, 2010). Over recent years, associations between OA and other chronic conditions have been studied including metabolic syndrome. Increased cartilage degeneration may be caused by modifiable metabolic disorders including abdominal circumference, hypertension, fat consumption, and diabetes (Jungmann et al, 2013). Further, type 2 diabetes has been reported to be associated with the development and presence of OA even when controlling for body mass index and weight (Williams et al, 2016; Nieves-Plaza et al, 2013). In turn, multi-morbidity has been reported to have a role in the management of OA (Hawker & Stanaitis, 2014).

Another area of research has focussed on cardiovascular disease (CVD) and OA. Walking disability in OA was found to be associated with risk for a composite CVD outcome like hospitalisation for angina, acute myocardial infarction, congestive heart failure or stroke (Hawker et al, 2014). OA diagnosis has also been identified as an independent predictor of CVD for older men and adult women (Rahman et al, 2013).

Research has also been carried out to investigate the association between vascular abnormalities and OA (Hawker & Stanaitis, 2014). Circulatory disturbances associated with CVD were hypothesised to have an impact on synovial membrane and sub-chondral bone and contribute to the destruction of cartilage (Katz, Agrawal & Velasquez, 2010; Conaghan, Vanharanta and Dieppe, 2005). Atherosclerosis or its component was more recently shown to have an independent association with KOA (adjusted OR 1.7, 95% CI 1.1 to 2.7) (Hoeven et al, 2013).

Apart from pain and physical problems, psychological impairments such as depression and anxiety, are common in patients with KOA (Bennell, Dobson & Hinman, 2014; Scopaz et al, 2009; Heuts et al, 2004). Pain-related fear and pain catastrophizing were shown to explain psychological disability and physical disability like walking speed (Somers et al, 2009). The psychosocial issues may relate to a personal expectation and self-efficacy, and be associated with changes

in mood, sleep and coping abilities (National Institute for Health and Care Excellence (NICE) guideline, 2014).

## **1.2 Management of Knee Osteoarthritis**

The NICE guidelines (2014) recommend core treatments for all people with symptomatic OA and these core treatments are echoed in the Osteoarthritis Research Society International (OARSI) guidelines for KOA (McAlindon et al, 2014) and a recent systematic review of 16 guidelines (Nelson et al, 2014). A recent systematic review combining guidelines published by the NICE, OARSI and the European League Against Rheumatism (EULAR) (Walsh, Pearson and Healey, 2017) provides stronger support for the core management. The core management principles include exercise, education and self-management and weight loss for those who are overweight. The core treatment should be given to all patients with KOA. If these treatments are insufficient, pharmacologic modalities should be considered as the second line of treatment. If a person experiences joint symptoms (pain, stiffness and reduced function) that have a substantial impact on their quality of life and are refractory to conservative treatment, assessment for arthroplasty is recommended (NICE, 2014; March et al, 2010). The clinical practice guidelines in HK provide similar recommendations (Yuen, 2014; Kwok, 2010; Lee, Kwok & Wong, 2004).

Physiotherapists have a key role within the multidisciplinary team providing care for patients with KOA. Having knowledge of various aspects of holistic management for KOA is necessary. This should include knowledge and understanding of the management of KOA at all stages of the disease.

Here, a brief discussion on the surgical and pharmacological management is presented, followed by a more detailed discussion of the non-pharmacological approaches to management.

### **1.2.1 Pharmacological management**

There are guidelines and reviews of guidelines globally agreeing on the pharmacological management for KOA. As the international guidelines are more

up-to-date than those specific to HK (Lee, Kwok & Wong, 2004), the following discussions are based on most recent available evidence.

Acetaminophen/paracetamol (effect size for pain 0.18, Bannuru, Dasi & McAlindon, 2010) is recommended as first-line (safest) therapy in symptomatic KOA (NICE, 2014; Nelson et al, 2014; Lim and Doherty, 2011) and appropriate for individuals without relevant co-morbidities (McAlindon et al, 2014).

Second-line agents for pain reduction include topical non-steroidal anti-inflammatory drugs (NSAIDs) or capsaicin for KOA patients without relevant co-morbidities (McAlindon et al, 2014; Nelson et al, 2014). The recommendation is however uncertain due to increased associated local adverse events (McAlindon et al, 2014). Non-selective oral NSAIDs (effect size for pain: standardised mean difference [SMD] 0.37, 95% CI 0.26-0.49) and COX-2 selective oral NSAIDs (effect size for pain SMD 0.44, 95%CI 0.33-0.55) are recommended with appropriate risk consideration. They are appropriate for prescription if the individual has no co-morbidities. Medication for gastro-protection is recommended for people with relevant co-morbidities. Due to serious safety risks associated with oral NSAID use, conservative dosing and treatment duration consistent with approved prescribing limits should be considered. Individuals having high co-morbidity risk should not be prescribed this type of medication (McAlindon et al, 2014; Nelson et al, 2014).

For refractory symptoms, tramadol (SMD -8.5 units on a 0 to 100 scale, 95% CI -12.0 to -5.0), an opioid, is recommended but adverse events often cause participants to stop taking the medication (Cepeda, Camago and Valencia, 2006). Similarly, patients receiving non-tramadol opioid therapy were found to withdrawal from the prescribed opioid four times more likely as compared with the placebo participants due to adverse events (RR.4.05, 95%CI 3.06-5.38) and they are likely to experience more serious adverse event (RR 3.35, 95%CI 0.83-13.56) (Nuesch et al, 2009). It is suggested that all oral opioids are associated with adverse events.

Intra-articular corticosteroids are recommended as an adjunct to core treatments for KOA to provide short-term decrease in pain (McAlinden et al, 2014; Nelson et al, 2014). Intra-articular hyaluronan injections for the management of OA is not recommended (NICE, 2014).

The cartilage constituents of chondroitin and glucosamine

### **1.2.2 Surgical management**

Referral for surgical assessment should be made before there is prolonged and established functional limitation and severe pain (NICE, 2014). Surgery is indicated for the end-stage of KOA with which people have experienced joint symptoms (pain, stiffness and reduced function) that have a substantial impact on their quality of life and are refractory to non-surgical treatment (NICE, 2014). The core treatment should have been offered but have failed (NICE, 2014; Yuen, 2014). For appropriate patients, total knee joint replacement (TKR) is recommended (Nelson et al, 2014), yet many patients continue to experience significant pain after TKR (Chan et al, 2013). Appropriate pain relief strategies and adequate information at discharge to effectively self-manage post-operative knee pain following TKR is essential (NICE, 2014; Chan et al, 2013). Follow-up and reviews after surgery should be offered to patients with symptomatic OA to monitor symptoms and ongoing impact of the condition on daily activities and quality of life (NICE, 2014). Arthroscopic lavage and debridement is not recommended for managing symptomatic KOA unless the person has a clear history of mechanical locking as opposed to morning stiffness as a classical feature in OA, 'giving way' or X-ray evidence of loose bodies (NICE, 2014).

Woo et al (2003) analysed the socio-economic impact of OA in HK. The healthcare system is highly subsidised by the government, covering primary to tertiary care, including drugs, investigations, clinic attendance, hospital stays and operations. Patients receiving knee replacement surgeries pay a nominal low-cost fee (this accounts for 2.5% of the recurrent operating expenses in public hospitals) to receive these services (Woo et al, 2003). The economic burden of OA is therefore shifted to the government. In a global context, direct costs of OA are usually the result of hospital admissions for elective orthopaedic surgery (Hunter, Schofield and Callander, 2014). In a French cohort, the cost incurred for hospital admissions for surgery by 3% of KOA patients contributed to 50% of the direct cost of OA (Le, Reygrobellet and Gerentes, 2005). Instead of focussing on the management of KOA at end-stage illness, modifying the two most important risk factors – obesity and joint injury – could reduce the prevalence of KOA and therefore costs (Hunter,

Schofield and Callander, 2014; Hunter, 2011b). From the healthcare provider perspective, more effort should, therefore, be placed on the earlier stages of OA to render the structural changes preventable or reversible.

### **1.2.3 Non-pharmacological approaches**

Similar to the reviews of guidelines in the pharmacological management for KOA, both the international and local guidelines were reviewed for the most up-to-date recommendations. Non-pharmacological management included exercise, education on self-management and weight loss if overweight (NICE, 2014). Other non-pharmacological recommendations include shock absorbing footwear, use of walking aids and orthotics (McAlindon et al, 2014; Nelson et al, 2014). In the following discussion, the effectiveness and efficacy of exercise, self-management and the combination of the two are discussed in more detail.

#### **1.2.3.1 Exercise**

Exercise interventions may aim to improve muscle strength of the lower limb, particularly the quadriceps, and general physical activities for functional performance and aerobic exercises, for example, standing up from a chair, walking on level ground, stair climbing or cycling. Exercise prescription may include the specific types of exercise, intensity or dose, frequency, and time period. Exercise could be unsupervised or supervised by a healthcare professional or exercise specialist. Mode of delivery could be one-to-one or in a class format. The benefits of exercise management for KOA were demonstrated in a recent Cochrane Review (Fransen et al, 2105) but it is also clear that the benefits decline over time if the exercise is not continued (van Baar, 2001). Adherence to exercise, therefore, is important.

Quadriceps weakness is common amongst people with KOA, possibly associated with disuse atrophy, but it is also considered to be part of the active disease process (Hurley, 1999). Further to this, lower limb muscle strength is associated with greater cartilage loss (Ding et al, 2008). Increased muscle strength, as a result of training, was reported to have a protective effect on cartilage degeneration over a 30-month period (Amin et al, 2009). Additionally, in a clinical trial the arm receiving lower limb strength training had reduced disease

progression compared to a control arm that undertook general mobility exercises (Mikesky et al, 2006). To achieve improvements in pain and function, a mixed programme of low-impact aerobic, strengthening and proprioceptive exercises, with task-specific functional training has been recommended (Fransen et al, 2015; McAlinden et al 2014; Nelson et al 2014; Beckwee et al, 2013; Jansen et al, 2011).

A Cochrane review of exercise studies showed significant improvements in pain (SMD [95% CI] -0.49 [-0.39, -0.59]), physical function (-0.52 [-0.39, -0.64]) and quality of life (0.28 [0.15, 0.40]) (Fransen et al, 2015). SMD was significantly different when comparing 12 or more supervised sessions versus less than 12 sessions for pain (0.46 vs 0.28,  $p=0.03$ ) and physical function (0.45 vs 0.23,  $p=0.02$ ) (Fransen & McConnell, 2008). There was a dose-response relationship proposed between adherence and exercise effects (Bennell, Dobson & Hinman, 2014). Furthermore, Zacharias et al (2014) in their meta-analysis study on KOA showed a small effect due to low-intensity resistance exercise against control in the short term but no significant effect in the intermediate or long term. For high-intensity resistance training, a medium effect was demonstrated in the short term and a large effect in the intermediate term versus a control (Zacharias et al, 2014). The high resistance training arm was demonstrated to improve more than the low resistance arm in a Chinese cohort (Jan et al, 2008). However, in a recent Cochrane systematic review on high-intensity versus low-intensity exercise in people with KOA, the analyses provided uncertain evidence whether increased exercise time (including duration, number of sessions) and level of resistance (including strength or effort) have an impact on the programme effects (Regnaud et al, 2015). In all exercise trials, the beneficial effects of the exercise intervention tended to diminish over time and this was associated with a decline in participation (Jansen et al, 2011). The beneficial effects of exercise only last as long as the patient with KOA continues to participate hence maximising adherence is a key element for the success of exercise therapy (Bennell & Hinman, 2011; van Baar, 2001). Incorporating self-management coping strategies with exercise has been shown to enhance adherence over time (Hurley et al, 2012; Jordan et al, 2010).

### 1.2.3.2 Self-management

Adults with arthritis-related problems are often provided information about knowledge of the disease. Misconceptions should be clarified such as “the joint inevitably progresses by ‘wear and tear’ and no treatment helps” (NICE, 2014). Patients were also equipped with self-management strategies to minimise their disability and maximise their independence and life quality (March et al, 2010). The delivery mode of the education may be a one-off presentation or on-going interactive component of the management programme.

Intervention strategies targeting behavioural change are recommended to suit the chronic nature of KOA. Self-management is one of the core concepts for managing KOA, alongside exercise (McAlindon et al, 2014).

#### *I) Functions of and barriers to self-management*

People with KOA may find it difficult to self-manage their problems, especially through exercise, due to pain, limited aerobic capacity, muscle weakness, joint instability, joint stiffness and swelling, along with any comorbid health conditions and impaired cognitive functioning (van Dijk et al, 2011; van Dijk et al, 2009).

#### *II) Theories in self-management*

Barlow (2002, p.178) defined self-management as involving “an individual’s ability to manage the symptoms, treatment, physical and psychological consequences and lifestyle changes inherent in living with a chronic condition”. The objective is for individuals to have control over their health habits leading to better health outcomes (Bandura, 2004). Social Cognitive Theory (Bandura, 2004) and the related Self-efficacy Theory (Bandura, 2004) are most frequently used to explain mechanisms of self-management (Richardson et al, 2014; Brand et al, 2013; Du et al, 2011).

Self-efficacy beliefs can influence an individual’s motivation levels, thought patterns, moods, emotional reactions and attitudes. Self-efficacy perceptions can mediate the capacity and willingness to elicit behaviours that influence health and promote wellbeing, in controlling functioning and life events (Marks, 2012; Bandura, 2004, Bandura, 1991). In healthcare, self-efficacy is defined as the confidence to carry out a specific behaviour (for example, exercise) necessary to reach the

desired goal (Bodenheimer et al, 2002), and that enables a person to overcome perceived and actual barriers (Jerant, Friederichs-Fitzwater & Moore, 2005).

### *III) Relationship between self-efficacy and functional activity participation in KOA*

Pain, as a result of KOA, influences an individual's ability to engage in physical activity (Rejeski et al, 1996). Strategies for improving an individual's ability to self-manage pain may improve functional ability (Cross et al, 2006). Self-efficacy beliefs have been shown to have a significant relationship with pain and mobility scores (Morone et al, 2009), explaining up to 21% of the variance in functional ability in people with KOA (Gaines et al, 2002). Coping self-efficacy has been found to mediate between pain catastrophising and its effect on physical functioning in people with early KOA (McKnight et al, 2010). It has therefore been suggested that improving self-efficacy should be a treatment target early in the course of disease. Patients with KOA are likely to lack confidence in performing physical functional tasks and this can increase their disability (Marks, 2012). Self-efficacy is amenable to change through education programmes by equipping patients with the tools to plan and monitor the desired behaviour, such as through goal-setting and action-planning (Bodenheimer, MacGregor and Sharifi, 2005). Higher levels of self-efficacy correlate positively with better functional outcomes among patients with KOA (Marks, 2012). Efforts to assess, monitor and improve a person's self-efficacy are therefore likely to enhance physical performance (Rejeski et al, 1996).

### *IV) Self-management interventions for KOA*

The objectives for self-management interventions for arthritis include empowering a person to reduce the impact of their pain and improve physical and psychological functioning (Newman, Steed & Mulligan, 2004). In the Arthritis Self-Management Programme (ASMP) developed by Lorig and Holman (2003a) (the first recognised programme for OA), self-efficacy enhancing processes included skill mastery (action planning and feedback), modelling as supplied by facilitators, symptom reinterpretation and group persuasion (Lorig et al, 2008a). Patients were encouraged to set specific and realistic action plans, based on a central concept of self-efficacy to bring forth and sustain long-term maintenance. In an eight-year follow-up study on patients after attending an ASMP comparing outcomes at



baseline, four-month and eight-year after intervention, the improved self-efficacy at four-month post-intervention on the participants was shown to be maintained (Barlow, et al, 2009). Education on problem-solving skills and pain coping strategies were taught with lay leaders serving as role models (Bodenheimer et al, 2002), although more recent research suggests that self-management programmes delivered by health-care professionals achieve better results than lay leaders (Coleman et al, 2012).

#### 1.2.3.3 Combined approaches of exercise and self-management

Recent management of KOA has included interventions combining exercise with self-management and psychological strategies to achieve better long-term outcomes (Brady, 2012). Exercise, in addition to group education, was shown to be helpful (Schlenk et al, 2011; Piyakhachomrot et al, 2011). Walsh et al (2006) systematically reviewed combined programmes of exercise and self-management for KOA and showed that the vast majority of studies reported significant improvement in pain and function at the primary endpoints, with the range of 2 to 18 months and 50% of the studies at 5 to 6 months.

The Enabling Self-management and Coping with Arthritic Pain using Exercise (ESCAPE) -knee pain programme developed by Hurley et al (2007a) integrated exercise, self-management and active coping strategies for patients with chronic knee pain. ESCAPE is a manualised physiotherapist-delivered group programme based on Social Cognitive Theory and enhancing self-efficacy, which includes guided discussions, promotion of simple self-management and coping strategies and facilitation of engagement in moderately intense exercise. Significant benefits for pain and function were demonstrated up to 30 months post-treatment (Hurley et al, 2012), and were associated with cost savings compared to standard general practitioner care (Hurley et al, 2012; Hurley et al, 2007b) and traditional physiotherapy (Jessep et al, 2009). Furthermore, qualitative investigation noted participant's knowledge about their disease and self-management strategies were enhanced, and confidence in their ability to use exercise to effect improvement increased (Hurley et al, 2010). Whether the ESCAPE-knee pain programme can be applied in a different culture, to a different population with KOA, remains a question and was the basis for this thesis.

### **1.3 Cultural Issues**

The ESCAPE-knee pain programme has proved effective in improving physical and psychological aspects for patients with KOA. All of the developmental and investigative work has however been undertaken in the UK, delivered to UK populations in English. However, western independent culture such as that in the UK is different from the Chinese interdependent culture in HK. In the local modernised society, overlaid with a highly subsidised medical system based upon a paternalistic approach and long patient waiting lists, the care-seeking patient might have difficulty accepting self-management. Chinese older adults (particularly women), are subject to considerable domestic responsibilities associated with caregiving and familial commitments, and are discouraged from exercise and self-management of their own disease (Lin et al, 2007). It cannot therefore be assumed that the ESCAPE-knee pain programme is directly transferable to HK. For innovation transfer across culture, it is also not known whether physiotherapists in HK can be trained to deliver the programme and whether patients with KOA would find it acceptable.

In HK, patients with KOA usually receive physiotherapy treatment for four sessions (unpublished data of Prince of Wales Hospital from an in-house Clinical Data Analysis and Reporting System, Hospital Authority of HK, 2015), based on manual therapy and some exercise, with a lack of emphasis on psychological strategies, collaborative approaches to condition management or enhancement of self-efficacy.

### **1.4 Rationale for the studies**

The exercise programmes for KOA in HK are mainly delivered by physiotherapists. The method of exercise prescription is directive and focused mainly on strengthening and stretching, often with no progression plan. The education information commonly consists of a one-off presentation by a health care professional delivered in person or by video. Structured self-management programmes in physiotherapy are lacking. Amongst physiotherapy professionals in HK, the concept of self-management in chronic conditions is emerging yet far from

widely accepted. As a result, the skills and knowledge necessary to deliver self-management need to be developed.

The earlier parts of this chapter have highlighted the impact of OA and the management for the condition. As such the aims and objectives of this thesis were:

To determine the suitability of ESCAPE-knee pain, an integrated programme of exercise, self-management and active coping strategies, for a HK Chinese speaking population with KOA.

The objectives were to:

1. Review the influence of culture on management of KOA condition
2. Review the literature systematically for integrated exercise and self-management programmes delivered to Chinese people
3. Adapt the ESCAPE-knee pain programme for local use in HK, including translation, cultural adaptation, identification of outcome measures and therapist training
4. Deliver the ESCAPE-knee pain programme to a small cohort of people with KOA in HK
5. Explore the acceptability of the intervention to participants.

The next chapter provides some accounts of cultural issues and context.

## Chapter Two: Introduction to the Thesis – Cultural Issues and Context

The following chapter discusses the influence of cultural issues and the emergence of 'Hong Kong-ism', and the potential influence on the effectiveness and impact of healthcare interventions.

Evidence-based practice (EBP) is a process applying evidence accumulated to individual patients through a sequence of Ask-Acquire-Appraise-Apply-Assess (Dijkers, 2012; Trinder and Reynolds, 2000). Clinicians ask questions about the care of patients, then identify and appraise the evidence to answer the questions. Finally the evidence is put into clinical practice for improving patient care (Dawes et al, 1999). In supporting EBP, a variety of databases are accessible for healthcare providers to inform decision-making, including evidence from international studies. It is a changing process to practise EBP in another population group and country from where the evidence was derived.

Cultural values for an individual are influenced by factors including age, gender, education and socio-economic status while wealth and freedom influence national characteristics (Steel and Taras, 2010). It is then necessary to determine whether the research evidence is appropriate when taking cultural issues into account (Beaton et al, 2000). On the other hand, patients are the target individuals involved in an intervention. Their preferences should be considered (Ferreira, 2009), along with their goals and needs for satisfaction (Cooper, Smith & Hancock, 2009). In chronic conditions, it is also important to know whether patients can adapt or self-manage their disease from a personal and cultural perspective (Huber et al, 2011).

This chapter will explore cultural issues, as an introduction to this thesis.

Before developing and translating the programme of an evidence-based integrated exercise and self-management programme from the UK to HK, more knowledge was required to fully understand the cultural issues and differences between populations. In this chapter, the discussion is divided into four parts. Firstly, cultural values of individualism versus collectivism and the relevance to the UK and HK are discussed; traditional Chinese values are discussed in the second

section; exploration on modernised cultural change in HK is laid out in the third section; with a final section on the medical system in HK.

## **2.1 Cultural values of individualism versus collectivism**

### **2.1.1 Definition of cultural values**

Culture as a concept can be defined as a pattern of shared values, beliefs and behaviours of a group of people (Kaasa, 2017) with common spheres of meaning (Iwama, 2006); the values of which may be expressed overtly or indirectly (Napier et al, 2014). Culture can be explained as a shared set of practices, behaviours, customs, habits, language, and geography (Napier et al, 2014), with values representing the core level and behaviours, and traditions and rituals representing the superficial levels. Values are the focus of culture and are believed to govern individual behaviour (Steel and Taras, 2010). Hofstede (2010) described culture as ‘software of the mind’ that determines every individual’s social behaviour. In health care, culture can be defined as the shared, overt and covert understandings, symbols and ideas that constitute common practices and make them meaningful (Napier et al, 2014).

### **2.1.2 Hofstede’s theory on culture**

Hofstede’s model and theory was made up of four dimensions (Hofstede, 1980), later developed to six (Boyadzhieva, 2016; Hofstede, 2010). One of them, ‘individualism’ vs ‘collectivism’, had direct relevance to this thesis. The purpose of Hofstede’s framework is reducing, quantifying and measuring phenomena in different countries through scores that reflect cultural differences between countries (Beugelsdijk, Maseland and van Hoorn, 2015). In Hofstede’s individualism-collectivism dimension, the UK scored 93 while HK scored -5 (China scored -31), with more positive scores representing a more modern ‘western’ individualistic culture while more negative scores such as HK and China represent a more collectivistic culture (Minkov et al, 2017; Tamis-LeMonda et al, 2008; Fougère & Moulettes, 2007).

### **2.1.3 Individualism versus collectivism**

Individualism is defined as a tendency to weigh individual goals more heavily than group goals (Lu, 1998). Any person within individualistic cultures looks primarily after his/her own interest rather than as a member of a group (Steel and Taras, 2010). Collectivism on the other hand is defined as a tendency to place group goals above individual goals (Lu, 1998). Persons in collectivistic cultures belong to one or more 'in-groups' (whether extended family, clan or organisation). From the scores on the individualism-collectivism, the UK is more individualistic than HK (Minkov et al, 2017). Therefore a programme based on individual health goals that was shown to be effective in an individualistic culture like the UK would not necessarily have the same effect in a collectivistic culture like HK where people, particularly women, put the interest and health of their family above their own requirements.

In work conducted by Tamis-LeMonda et al (2008) on personal development, individualistic cultures were recognised as fostering opportunities and environments to develop autonomy and competitiveness. Personal choices are emphasised for enhancing motivation and achievement, and the internal drive to achieve one's success is valued. A high self-esteem is nurtured to feel good about oneself for happiness and achievement of personal goals, and maximisation of potential as an individual is encouraged.

Very differently in rural, indigenous and East Asian cultures (Fuligni, Tseng and Lam, 1999; Cortes, 1995), a person is connected to the family where 'Family obligation' and 'filial piety' encompass feelings of closeness, allegiance, and mutuality with family members, over and above the individual needs (Cortes, 1995), and there is a strong orientation to the family and larger community. Therefore in the Chinese community in HK, the acceptability of an individualistic programme of self-fulfilment could be questionable. It might also be difficult for persons raised in a collectivistic community to accept self-maximisation of their individual potentials. A summary table between the differing cultural values is shown below (Table 2.1).

Table 2.1 showing the differences between western culture (e.g.UK) and Asian culture (e.g.HK)

	<b>Western culture (UK)</b>	<b>Asian culture (HK)</b>
Culture type	individualistic	collectivistic
Dependence	Independent and accounting on his/her own interest and interest of his/her immediate family (husband, wife and children)	interdependent amongst the group (e.g. clan, family) from which he/she cannot detach from (Fung, 2013; Steel and Taras, 2010)
Goal achievement	achieve personal goal with autonomy	achieve group goals above individual goals (Lu, 1998)
Obligation	personal choice associated with enhanced motivation and achievement (Tamis-LeMonda, Way and Hughes, 2008)	connected to family with obligation and filial piety (Tamis-LeMonda, Way and Hughes, 2008)
Attitude toward self-maximisation	self-maximise and fill ones full potential	emphasise the good of the larger community (Tamis-LeMonda, Way and Hughes, 2008)
Attitude toward oneself	feeling good about oneself is the key to successful outcome (Tamis-LeMonda, Way and Hughes, 2008)	respect and obedience to achieve harmony within the group (Tamis-LeMonda, Way and Hughes, 2008)

Iwama, Thomson & Macdonald (2009) suggested that the individual in western social culture is situated in the centre of all concerns, competent, able and in control of their environment. Dysfunction and disability occur when there is failure or compromise in controlling the environment. A common valued pattern includes independence, autonomy, equality and self-determinism for the person in the western social context. In the eastern collective-oriented society, such as HK Chinese, people are interconnected, embedding the self within the environment and combining individual harmony with nature and its circumstances. The state of well-being and disability are neither internally (in the body) or externally (in the environment) isolated. There is greater value in embedding 'self' in relationships, belonging and interdependence.

In the case of Chinese culture, it is described as being shaped by Confucian philosophy (Lu, Gilmour, and Kao, 2001; Holroyd, 2001). Individuals are conscious

of the repercussions of their actions on the family or larger community, and consider this before acting (Tamis-LeMonda, et al, 2008). Respect and obedience are considered to be central in such a collectivistic culture. As such, to participate in a new programme where new strategies of self-management are introduced, it must be considered how Chinese participants accept and apply these strategies in their daily life or if there are any barriers to this philosophy.

#### **2.1.4 Relevance to the United Kingdom and Hong Kong**

As discussed earlier, the UK represents a western independent culture, while HK represents an East Asian interdependent culture (Minkov et al, 2017; Yeung, Fung and Lang, 2008).

In the post-colonial period, there were criticisms about ethnocentrism and assumptions about one society being superior to another (Napier et al, 2014). After the Second World War, British government officials put a concerted effort into constructing British values and national identity in HK. Via the British Council, talks were arranged to share British culture, values and way of life, and scholarships were offered to HK students and civil servants for training in Britain in 1950s to 1980s. The doctoral candidate was amongst the recipients who were able to experience in person the British culture. This has inevitably influenced the candidate's research and interpretation of data as May and Perry (2013) discussed on reflexivity that actions and understandings of the researchers contribute to the description of accounts. This experience was one of the drivers to translate the evidence-based ESCAPE-knee pain programme from the UK and make it beneficial to the Chinese community in HK, and to appreciate how culture affects local ideas about health and related health outcomes (Napier et al, 2014).

In the following sections, further information is provided on traditional Chinese culture and how the modern Chinese culture is evolving in HK, with an emphasis of health-related issues, and is critical to help the reader understand the context within which health-care is delivered.



## **2.2 Traditional Chinese cultural values**

### **2.2.1 Confucian philosophy in traditional Chinese culture**

Chinese culture is collectivistic in nature (Poon & Fung, 2008) and has been shaped by Confucian philosophy since ancient times (Lu, Gilmour and Kao, 2001). It puts the family or clan at the centre of one's entire life (Lu, Gilmour and Kao, 2001) and collective welfare of the family (extending to society and the human race) is more important than individual welfare (Lu, Gilmour and Kao, 2001).

Doctrines of Confucianism identified a hierarchical structure of relationships across country (ruler/subject), family (father/son, husband/wife, elder brother/younger brother) and friends. Each relationship carries clearly ascribed obligations and behaviours (Holroyd, 2001), notably an expectation to prioritise the welfare of elders (and husbands in the case of women) over themselves.

### **2.2.2 The valued norms and traditions amongst Chinese**

Social reciprocity and adherence to norms and traditions are emphasised. Through ageing, social reciprocity becomes more significant amongst the Chinese as a group (Fung, 2013). The concept of happiness in Chinese language is vague; having 'fu' or 'fu-qi' is the closest equivalent of happiness in ancient Chinese writings. While it is vaguely defined as having longevity, prosperity, health, peace, virtue and a comfortable death, they are among the best values an individual treasures in his/her life (Lu, Gilmour and Kao, 2001).

Chinese older adults in HK engage in physical activities for reasons of social integration, as opposed to their well-being (Poon & Fung, 2008). Traditional Chinese Medicine contributes to health and chronic disease management, and passive medicalised management is divergent from the principles of active lifestyle and self-management behaviour postulated in western health-care culture (Chan et al, 2008; Chan, Tsang and Fung, 2015).

### **2.2.3 Close family ties and commitment within traditional Chinese culture**

Close family ties and well-defined roles in the family is another distinguishing factor of traditional Chinese culture. Husband and wife relationships are bound by

the traditional Chinese marital philosophy of lifelong commitment to care for each other (Chan and Chui, 2011). Many adult children in their middle years are required to help as their parents become frail and in need of assistance, as influenced by filial piety – expected duties and obligations of children to their parents (Lee and Kwok, 2005; Nolan and Grant, 1989). Women take up a central role to care for elders in all patriarchal families. They also consider household chores as their core duties in the family, whereas their male counterparts rarely perform household tasks (Lu, Maume, and Bellas, 2000). The cultural requirement of caregiving and household responsibilities add further stress to older women, especially when they are managing their own ill-health or disease, including conditions such as osteoarthritis (Chan and Chui, 2011).

## **2.3 Modernised cultural change in Hong Kong**

### **2.3.1 Modernisation and its influence on culture in Hong Kong**

Although over 95% of the population in HK are ethnic Chinese, 150 years of British rule until 1997 established a strong western orientation (Farh, Leong and Law, 1998). The socio-economic status of HK has gradually advanced, and it has become highly modernised due to its status as an international financial and commercial centre (Chan and Lee, 1995). Families are usually small and nuclear in structure (Lee, Stewart & Chan, 2006) but there are extensive links maintained with other non-residential family members to provide care and financial assistance for a frail elder (Holroyd, 2001). In HK, the family is still the main provider of care to older people regarding living arrangements and intergenerational support (Lee and Kwok, 2005).

The reality of taking care of a frail elder or a very young family member at home is consuming for a person, physically and psychologically, and can be an inhibitor to their chronic disease self-management.

### **2.3.2 The decline of traditional culture**

As globalization and rapid modernisation of society continue, cultural diversity decreases. HK society is relinquishing some traditional Chinese values yet some

still hold (Farh, Leong and Law, 1998). For example, many women, of middle class origin are engaged in full-time paid work, yet perceive themselves still responsible for housework and childcare (Lee, 2002). In HK, the traditional Confucian filial piety, i.e. the role of the family and care for the elder parents, may be waning (Ng, Phillips and Lee, 2002); in some families, older people are regarded as guests rather than the host of the family (Chau and Yu, 2009). As younger members of the family work long hours, elderly women in return provide support to their families, such as house-sitting, doing various household chores and caring for grandchildren in exchange for a better relationship with and care from family members (Ng, Phillips and Lee, 2002). They may deprive themselves of time and opportunities to receive healthcare programmes or undertake activities supporting their own health.

## **2.4 The medical system in Hong Kong**

### **2.4.1 The development of public and private service**

The medical care system in Hong Kong is unique, and has been influenced by British colonial history. Similar to other ex-colonies in the British Commonwealth, it derived from the tax-funded National Health Service model in the UK. It evolved into a universal, comprehensive and efficient, public health care system accounting for 56% of total spending, along with private hospitals and practitioners accounting for the remaining 44% (Schoeb, 2016; Leung et al, 2005). The HK Special Administrative Region (HKSAR) government supports the majority (95%) of public sector funding from general tax revenue while the rest is generated from payment at the point-of-care (Leung et al, 2005).

The Hospital Authority (HA) is a statutory body established in 1990. It is responsible for managing all 42 public hospitals and institutions, 47 Specialist Out-patient Clinics and 73 General Out-patient Clinics (Hospital Authority). The system has continued to develop within this model after the repatriation to the People's Republic of China in 1997. The public fee structure is low and heavily subsidised for all-inclusive hospital or ambulatory (out-patient or day hospital) care.

Private health financing is through personal out-of-pocket expenditure or insurance schemes. The public and private services are segregated (The Harvard Team, 1999) except for minimal public-private interfacing of electronic medical information on patients who are willing. All permanent residents of HK are entitled to have quality, highly subsidised care in the public sector (Leung et al, 2005). The literature suggests that the population is shaped to over-rely on the welfare system and a lack of sense of personal responsibility over health care (Leung et al, 2005). Consequently, the HA has significant waiting lists because of the low self-payment for medical care.

#### **2.4.2 The western allopathic and traditional Chinese medicine**

After the repatriation of HK back to China, Traditional Chinese Medicine (TCM) was recognised as a medical service after the passing of the Chinese Medicine Ordinance (Cap. 549 Chinese Medicine Ordinance, of the Laws of Hong Kong) in 1999. Whilst western medicine predominates, TCM emerges as complementary medical care, and its practitioners play a supportive role to western doctors (Low et al, 2016; Lam & Sun, 2013).

TCM defines health as the balance of 'yin' and 'yang', which depends on the capacity of an organism to adapt to change and maintain equilibrium. Sickness is the result of excess or deficiency of either 'yin' or 'yang' (Zhang and Wang, 2014). TCM practitioners espouse different methods including Chinese dietary practices, herbal medicine, acupressure, acupuncture (Chan, Tsang and Fung, 2015; Chan et al, 2008) and traditional forms of exercise like Tai Chi (Lan, Lai and Chen, 2002) and Qigong (McCaffrey and Fowler, 2003). Despite advocating Tai Chi and Qigong for health promotion by some voluntary agencies in the community, patients are inclined to receive passive healthcare rather than the self-management approach that is active (Leung et al, 2005).

#### **2.4.3 Care-seeking behaviour for residents receiving medical care**

In HK, demand for care is very high when compared with other countries internationally (The Harvard Team, 1999). Patients commonly expect a prescription from the doctor to 'cure' illness (Lam and Lam, 2003), and the paternalistic view that "doctors know best" is still widely observed in HK (Leung et

al, 2005). Satisfying the patient or his/her carer often takes precedence over patient education, especially in busy public clinics with extremely heavy workloads (Lam and Lam, 2003). The care-seeking behaviour further perpetuates the over-reliance of medical care, as such patient education for self-management on lifestyle change is very limited (Leung et al, 2005).

#### **2.4.4 Limited self-management approach**

From the data obtained from the 2002 territory-wide Thematic Household Survey, conducted by the Census and Statistical Department in Hong Kong (more than three thousand residents interviewed representing 6.5 million persons after applying population weights) (Thematic Household Survey Report no.8, 2002), only 16% of residents who experienced lifestyle associated symptoms undertook self-management strategies. Reported strategies were: western over-the-counter medicine (60%); over-the-counter TCM (16%); both over-the-counter western and TCM (2%); dietary modification (1%); and rest from activities (16.7%) (Leung et al, 2005). These findings highlight the over-reliance on passive management strategies.

#### **2.4.5 Physiotherapy training and service in HK**

The training programme for physiotherapy professions in HK commenced in the 1950s as a hospital-based certificate programme. It was then transferred to university education in 1981, and gained honours degree status in 1998, with Master entry-level training commencing in 2013. At present, there is only one training institute in HK, the Hong Kong Polytechnic University which leads all under and post-graduate education. Until 2016, this reflected the UK three-year model but now follows a four-year curriculum.

The Physiotherapy Board is a statutory body established in 1981 overseeing the registration, education, examination and disciplinary issues relating to local physiotherapists (Physiotherapists Board HK). There are approximately 2500 registered physiotherapists in the territory (Physiotherapists Board HK) with around 900 physiotherapists working in the public sector.

The patients' attitude toward physiotherapy service is similar to medicine in that they expect therapists to eradicate their pain. Overall patient-reported improvement of post-intervention was reported to correlate with pain reduction doubled to that for disability improvement (Tsang, 2004). Requests from therapists to undertake self-management can be interpreted as not adequately fulfilling the healthcare role.

In the BSc Physiotherapy undergraduate training programme in HK, pain psychology with biopsychosocial approaches to management are included. Active coping and self-management concepts have been introduced in the undergraduate physiotherapy curriculum (Definitive Document of Physiotherapy Programme, 2017, private circulation), with detailed knowledge and skills training only recently introduced at post-graduate level.

## **2.5 The care of managing knee osteoarthritis**

Patients with chronic diseases like osteoarthritis (OA) incur considerable costs for their long-term care, increasing with disease severity (Woo et al, 2003). In HK, patients with mild OA are subsidised to around 66% by the government for the medical consultation and medication. Those patients with severe OA pay around 25% of the total cost with the remainder contributed by the government (Woo et al, 2003). Yet the expenses are relatively less compared to those for surgeries. The highly subsidised medical system covers joint replacement operations and the subsequent follow-up consultations and medication. The waiting time for non-urgent patients suffering from OA for public medical service is always long. The delay further adds to the burden on patients and has societal implications associated with disease advancement, employment issues and costs of medical care.

A novel approach of care, providing patients with opportunities to learn and experience an active way of management for their disease may help to control their pain and disability thus impacting on wider societal benefits.

## **2.6 Summary**

The HK collectivistic interdependent culture is very different from the western independent culture, where people are more engaged in personal goals. Many people in HK have traditional family obligations and filial piety, with women taking responsibility for caregiving roles and household responsibilities. Yet, in the modernised society, where many women also work, taking care of frail elders and other family members is burdensome and often deters from self-management behaviour.

The medical system in HK is highly subsidised by the government, shaping the population to over-rely on the welfare system and a lack of personal responsibility over healthcare. The paternalistic medical approach and care-seeking behaviour render limited opportunity for patient education or self-management. TCM, which is prevalent, espouses passive approaches and further influences reliance on healthcare. This is the context within which this work is based.

Initially a systematic review was carried out to inform programme development and research design, and is presented in the following chapter.

## **Chapter Three: Systematic literature review**

### **3.1 Introduction**

Previous reviews have been undertaken to investigate the non-pharmacological management of KOA, predominantly based on evidence gained in Western Societies. This chapter presents a systematic literature review (SLR) investigating integrated programmes of exercise, self-management and active coping strategies for patients with KOA in Chinese speaking populations.

### **3.2 Background**

#### **3.2.1 Description of the condition**

A description of KOA and associated pain and disability has been presented in chapter one.

#### **3.2.2 Description of the intervention**

As reported in chapter one core management is recommended to all patients having KOA, including education, exercise and weight loss if the individual is overweight or obese.

##### **3.2.2.1 Exercise intervention**

Exercise interventions may aim to improve muscle strength of the lower limb, particularly the quadriceps, and general physical activities for functional performance and aerobic exercises, for example, standing up from a chair, walking on level ground, stair climbing or cycling. Exercise prescription may include the specific types of exercise, intensity or dose, frequency, and time period. Exercise could be unsupervised or supervised by a healthcare professional or exercise specialist. Mode of delivery could be one-to-one or in a class format. The benefits of exercise management for KOA were demonstrated in a recent Cochrane Review (Fransen et al, 2105) but it is also clear that the benefits decline over time if the exercise is not continued (van Baar, 2001). Adherence to exercise, therefore, is important.



### 3.2.2.2 Education and self-management

The information provided to patients may include knowledge of the disease and ways to self-manage the disease. Misconceptions should be clarified such as “the joint inevitably progresses by ‘wear and tear’ and no treatment helps” (NICE, 2014). The delivery mode of the education may be a one-off presentation or on-going interactive component of the management programme.

Intervention strategies targeting behavioural change are recommended to suit the chronic nature of KOA. Self-management is one of the core concepts for managing KOA, alongside exercise (McAlindon et al, 2014).

### 3.2.2.3 Integration of exercise and self-management

Evidence has shown that integrated exercise and self-management strategies improve pain and function for patients with KOA (Walsh et al, 2006). ESCAPE-knee pain was an integrated programme proven effective in the UK (Hurley et al, 2007a) with treatment effect sustained at 30 months (Hurley et al, 2012).

## **3.2.3 The theoretical basis of intervention**

OA reflects a dynamic reactive pattern of a joint (Busija et al, 2010). Evidence suggests that interventions can be designed to manage the modifiable risk factors of KOA, namely muscle weakness, obesity (Hunter, 2011; Busija et al, 2010) and repetitive use of the joint (Anderson & Loeser, 2010) for increased mechanical loading. As mentioned previously, exercise to improve muscle strength and functional performance helps to improve pain and reduce disability for people with KOA (Fransen et al, 2015). Barriers for an individual adhering to exercise include self-perception of physical inactivity, emotional involvement such as fear and depression and change in medication use indicating more pain or additional health problems (Loew et al, 2016; Scopaz et al, 2009). On the other hand, facilitators foster positive influences to treatment adherence and include supervised programmes, support from family or friends (Loew et al, 2016) and behaviour change strategies (Hay-smith, 2016). A recent systematic review and meta-analysis showed that theory-based interventions significantly impact the exercise behaviour of participants with overall effect size 0.31 (95% CI 0.24, 0.37)

compared to control arms (Gourlan et al, 2016). Social Cognitive Theory (Bandura, 1989) is a commonly used theory guiding interventions (Gourlan et al, 2016; Richardson, et al 2014) and the effect size for interventions adopting this theory was found to be 0.42 (95% CI 0.28, 0.56) (Gourlan et al, 2016). Self-efficacy is the confidence that a person has to carry out a specific behaviour (Bandura, 1998; Bandura,1989), in the present context adhering to exercise. Long-term treatment effects of exercise interventions were demonstrated to be mediated by self-efficacy, self-regulation and social support (Anderson et al, 2010). Through engaging in exercise, a patient's confidence increases to use exercise to improve knee pain and this is exercise self-efficacy (Hurley et al, 2010). These findings explain the mechanisms underpinning the integrated approach of exercise and self-management.

#### **3.2.4 The importance of this review**

As mentioned previously, the Chinese culture is different from the western culture. The evidence revealed previously was a mixture of studies undertaken in western and eastern cultures, yet some studies may have been excluded because of language issue as the majority of the searches were performed in English databases and papers excluded if not in English. Even when studies on Chinese populations were included, no subgroup analysis had been done to investigate results specific to Chinese participants.

The ESCAPE-knee pain programme was proven effective in improving physical and psychological aspects for patients with KOA. However, all of the developmental and investigative work has been undertaken in the UK, delivered to UK populations in English. A systematic review of integrated programmes delivered to Chinese populations could inform the cultural adaptation of the ESCAPE-knee programme prior to further investigation of its acceptability in HK.

### **3.3 Aim and Objectives**

Aim:

To identify current evidence of the effect of integrated exercise and self-management interventions on pain and function for KOA in Chinese speaking populations.

Objective 1: To assess whether integrated exercise and self-management interventions for Chinese speaking populations with KOA are effective at reducing pain and improving function.

Objective 2: To identify which outcome measures for pain, disability and performance testing have been used in integrated exercise and self-management programmes for people with KOA in Chinese speaking populations.

Objective 3: To identify the types of exercise and dosage adopted in the exercise component of the integrated programmes for KOA in the Chinese speaking populations.

### **3.4 Method**

To maximise the utility of the question asked in SLRs, Sackett (2000) recommended four specific components: 1) **P**atient group; 2) **I**ntervention; 3) **C**omparison intervention and 4) **O**utcomes of interest.

The main themes were followed in developing the search concept:

1. Population – Chinese speaking adults diagnosed with KOA
2. Interventions – Must include both exercise and self-management in the face-to-face rehabilitation programme
3. Comparison – Any control intervention
4. Outcome – Measured effect on pain and/or function.

#### **3.4.1 Inclusion and Exclusion Criteria**

The criteria for the inclusion were well defined during the search and selection process, specifying randomised controlled trials, undertaken with Chinese speaking participants diagnosed with KOA, using direct supervised active rehabilitation programmes of exercise and self-management, with outcomes

focused on pain and disability. The eligibility criteria of inclusion and exclusion are detailed in Table 3.1.

Table 3.1 – Overview of inclusion and exclusion criteria

	Inclusion	Exclusion
Types of studies	Randomised controlled trials, quasi-experimental controlled trials	Systematic reviews / Non-experimental / observational studies / case studies
Types of participants	Human adults, aged 45 or above, Chinese speaking population diagnosed with clinical or radiographic osteoarthritis of the knee	Healthy volunteers / people with no knee osteoarthritis / other arthritic conditions (e.g. rheumatic arthritis)
Types of Intervention	Exercise therapy and Self-management (including behavioural modification techniques and pain coping strategies)	Yoga / Massage / Surgery /Cognitive strategies only/ Research protocols
Mode of delivery	Direct face-to-face supervised individual or group rehabilitation programme	On-line programme
Types of outcome measures	Pain Functional ability Self-efficacy	No measure of pain or function
Language of publication	English / Chinese*	Other languages

Key: \*The candidate is fluent in written and spoken English and Chinese with training (Advanced Professional Diploma on Translation and Bilingual Communication, organised by Chinese University of Hong Kong 2012)

### 3.4.2 Search Strategy

#### 3.4.2.1 Search keywords

Key search terms were identified relating to KOA, exercise rehabilitation and self-management programmes. Each search term was extensively reviewed by scoping the search software for similar reviews or studies previously conducted. Advice was sought from the supervisory group, and a librarian was also consulted. Synonyms commonly used in the literature or keywords in known published studies in related topics were established for each term. Truncations were used where appropriate in an attempt to obtain all relevant articles. The search within each term (for the same column in Table 3.2 below) was linked with Boolean

operator 'OR'. The terms across the columns, combined for the purpose of this review, were linked with the Boolean operator 'AND'. The full list of MeSH search terms is presented in Table 3.2.

Table 3.2: MeSH terms for search strategy.

Osteoarthritis		Knee		Rehabilitation		Exercise		Self management
Osteoarthrosis Degeneration of joints Arthritis Hypertrophic Senescent arthritis OA Arthrosis	AND	Tibiofemoral joint Patella- femoral joint	AND	Intervention Therap* Treatment Management Restor* Relief Remed*	AND	Physical exercise Physical fitness Aerobic exercise Cardiovascular fitness Strengthening Mobilizing power	AND	Self-regulat* Self-coping Self-care Self-adjust* Self-control Self-help Active-coping Pacing Empowerment Patient care Patient- centred care

#### 3.4.2.2 Bibliographic databases –

A structured search was carried out for the intervention studies from the date of inception of the databases published until February 2016 using the Cochrane Library, MEDLINE, CINAHL, Science Direct, EMBASE, PsycINFO, Pubmed Central and SportDiscus. No date limits were placed on the search. Only English databases were searched to identify abstracts published in English.

### 3.4.3 Data Collection and Analysis

#### 3.4.3.1 Selection of studies

Relevant publications were identified using the above-mentioned MeSH terms. After duplicates of articles were removed a preliminary screening of the titles was conducted to determine suitability for inclusion. Abstracts of all the remaining articles were reviewed by the student, following the specified inclusion and exclusion criteria. Papers not accessible via the UWE library were sought via local university libraries in HK. Articles meeting all of the inclusion criteria at this point were included in the review and full text obtained. Reference lists of the included studies were also checked for any other potentially eligible papers. For articles publishing abstract in English but full paper in Chinese, Chinese databases were searched locally to retrieve them.

#### 3.4.3.2 Data extraction

All eligible articles were reviewed and assessed on study quality using the standardised Critical Appraisal Skills Programme Guide for Randomised Controlled Trial (CASP 2013). Then the data was extracted using a pre-defined data extraction form (Appendix A). The data extraction form was based on previous reviews (Bennell, Dobson and Hinman, 2014; Brady, 2012) with focus given to the specific information that was needed to meet the objectives of this review. The template was tested on one article for suitability and was deemed appropriate.

#### 3.4.3.3 Assessment of risk of bias in included studies

The Cochrane Bias Methods Group identified seven categories of bias for randomised controlled trials, namely randomisation process, allocation concealment, blinding of participants and assessors, attrition, reporting and any other sources (Higgins et al, 2011). All the included papers were assessed using the Cochrane Collaborations' tool for risk of bias, and were assigned the risk level to be low, high or unclear. All decisions were discussed with the supervisory team.

#### 3.4.3.4 Analysis of the included studies

The programme characteristics and intervention content were compared and described narratively. Since outcome measures for pain and physical functions were not standardised, meta-analysis was not performed as an option a priori. The outcomes were laid out narratively for comparison.

### **3.5 Results**

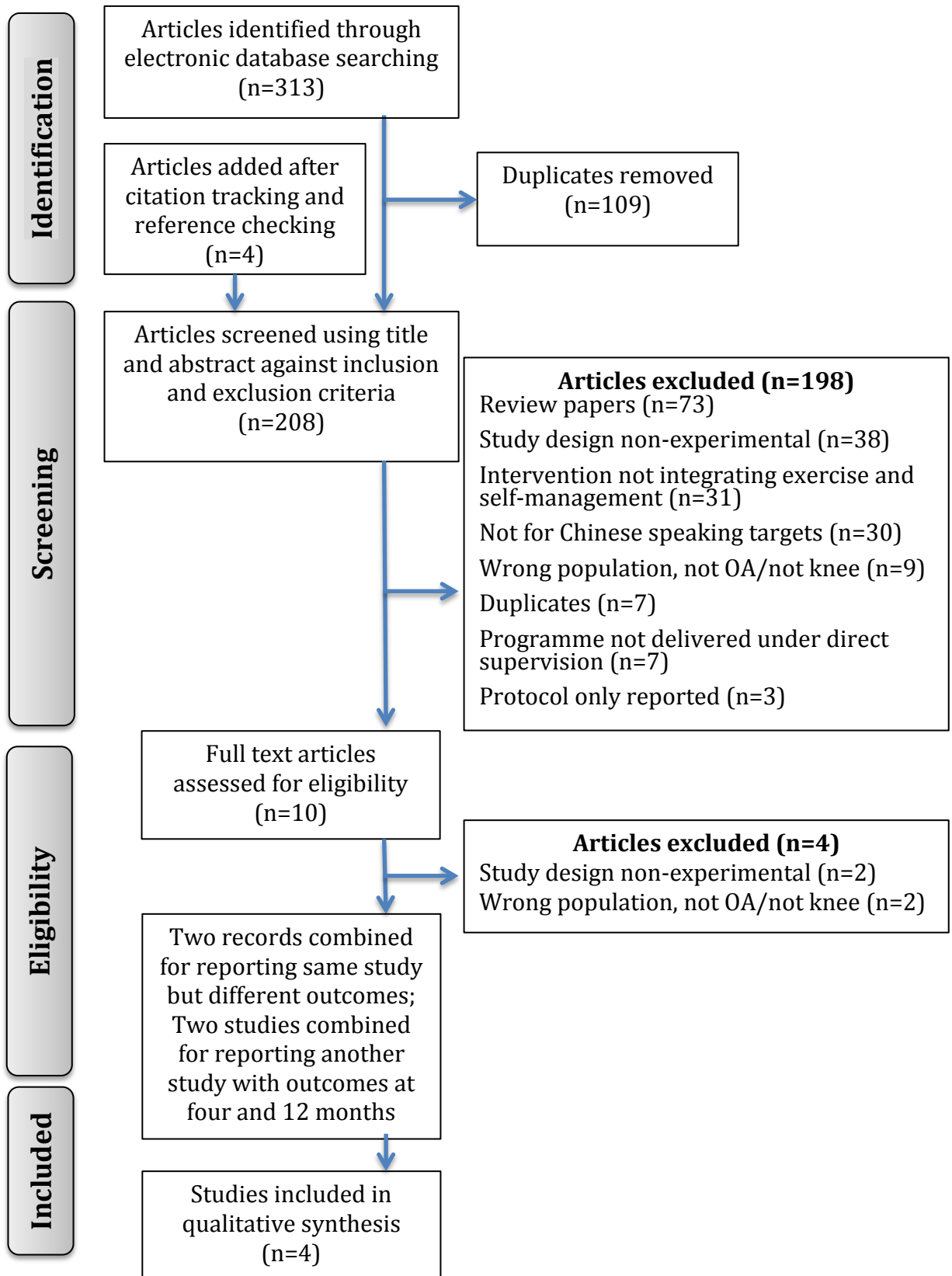
#### **3.5.1 Description of Studies**

##### 3.5.1.1 Results of the search

A PRISMA diagram (Liberati et al, 2009) (figure 2.1) shows the results of the study selection and screening procedures. Details are given of the number of references retrieved and removed at each stage of the search. Within the five records eligible for review, two were later noted to be the same study reporting different outcomes.

The abstract of one included study was published in English but the full text was in Chinese. Details of the study were extracted from the abstract and Chinese full text article. Unidirectional translation was done by the doctoral candidate.

**Figure 3.1 – Flowchart indicating search study selection**





### 3.5.1.2 Characteristics of studies and populations

Four studies were included in this SLR: one from Taiwan (two articles reporting different outcomes) (Kao et al, 2012; Wu et al, 2011), two from HK (Yip et al, 2007 & 2008 reporting the same study at four and 12 months; Yip, Sit & Wong, 2004) and one from China (Zhao, Huang & Teng, 2005). The two articles from Taiwan reporting the same study but different outcomes were combined. Two articles in HK (Yip et al, 2008; Yip et al, 2007) were combined also for reporting another study at four months (Yip et al, 2007) and one year (Yip et al, 2008) post-intervention. All were experimental trials but the randomisation procedure differed (see Table 3.3).

All studies were carried out in Asian localities where the Chinese population is predominant. The sample sizes ranged from 42 to 259. They were recruited from the community, clinics and residential home for the elderly. The mean age varied from 60 to 86.7 years. The majority of participants recruited were female, ranging from 59% in the younger age group to 92.9% in the older age group.

The diagnosis of KOA was clinical, confirmed by nurses, traditional Chinese medicine (TCM) doctors, or physiotherapists, with medical history available. In one study (Yip, Sit & Wong, 2004), participants reported OA in multiple joints; 66.6% reported having knee pain.

Table 3.3. Characteristics of included studies

Author year	Location of Study	Study Design	Study Aim	Sample size (n=)	Population	Diagnosis of KOA confirmed	Gender (female)	Age range of Participants
Wu et al, 2011	Taiwan	Quasi-experimental trial	To develop a self-management [Taipei Osteoarthritis Programme (TOAP)] for community residents. To evaluate the outcomes of TOAP.	n=205 IG=114 CG=91	Volunteers with KOA from community of four districts out of 12 in Taipei	Medical history, clinical	Overall 70% IG 80.7% CG 71.4%	Overall 67±10 IG 67.3±10.1 CG 68.2±11.2
Kao et al, 2012			To evaluate the effectiveness of the TOAP on community elderly who suffered from KOA.					
Yip et al, 2007, 2008	Hong Kong	RCT	To evaluate the effectiveness of adapted Arthritis Self-Management Programme (ASMP) with an added exercise component amongst Chinese KOA sufferers.	n=95 IG=45 CG=50	Volunteers with KOA from general primary clinic and a health clinic	Medical history, clinical or radiological	Overall 85% IG 88.9% CG 82%	Overall 63 IG 64.8±10.6 CG 63.4±10.7
Yip et al, 2004	Hong Kong	Quasi-experimental trial	To evaluate the effectiveness of an adapted Arthritis Self-Management Programme (ASMP) intervention in enhancing arthritis self-efficacy, reducing arthritis pain and improving functional and emotional status.	n=42 IG=23 CG=19	Volunteers with OA from an aged home, more than 66.6% with knee pain	Medical history	Overall 92.9% IG 91.3% CG 94.7%	Overall 86.7 IG 81.99 (79.6-85.5)* CG 85.15 (83.7-87.9)*
Zhao et al, 2005	China	RCT	To explore the effectiveness of acupuncture combined with rehabilitation and guidance on daily activities on KOA.	n=42 IG=22 CG=20	Volunteers with KOA from a TCM outpatient clinic	Medical history, clinical	Overall 59% IG 59.1% CG 60%	Overall 60 IG 60±7 CG 60±8

Key: CG control group; IG intervention group; KOA knee osteoarthritis; RCT randomised control trial; TCM traditional Chinese medicine;  
\* 95%CI.

### 3.5.1.3 Programme characteristics

#### 3.5.1.3.1 *Format and time duration*

Three studies (Wu et al, 2011; Yip et al, 2008; Yip, Sit & Wong, 2004) included a group format and the other was individually delivered by TCM doctors. In the group format, education and discussion classes were all led by nurses. The exercise sessions were run by physiotherapists in the study carried out in Taiwan (Wu et al, 2011), and by nurses and Tai Chi masters in the studies based in HK (Yip et al, 2008; Yip, Sit & Wong, 2004). The programmes were completed in either four or six weeks, with a total contact time (time for each session x total number of sessions) ranging from 5 hours over four weeks to 12 hours over six weeks.

#### 3.5.1.3.2 *Exercise component*

All the included studies integrated exercise therapy and self-management programmes. The exercise components varied in type, including stretching, strengthening exercise in a non-weight bearing position, flexibility, walking and Tai Chi. The dosage and intensity were unclear. Only one study (Wu et al, 2011) specified allocating 25% (20 minutes) of time to practice exercise within the sessions. In general, action plans for self-practice were given.

#### 3.5.1.3.3 *Self-management component*

The types of self-management interventions varied. As classified by Brady (2012), two types of self-management programme were adopted in studies included in this review: 1) education and 2) behavioural change with structured physical activity. One study (Zhao, Huang and Teng, 2005) focused on education, in the form of information delivery. The other three studies targeted behavioural modification of increasing physical activity. The interventions adopted were the Arthritis Self-Management Programme (Yip et al, 2008; Yip, Sit & Wong, 2004) and a newly developed Taipei Osteoarthritis Programme (Wu et al, 2011).

#### *3.5.1.3.4 Theoretical framework and strategies*

The behavioural interventions were reportedly based on the self-efficacy theory (Bandura, 1998; Bandura, 1989). In addition to providing information on KOA, goals and action plans were set with participants. Pain coping strategies, problem-solving skills and skills in enhancing self-efficacy were discussed. One study (Wu et al, 2011; Kao et al, 2012) reported providing a structured DVD programme on knee care, a written “Osteoarthritis Self-Care” booklet and an exercise instruction sheet. Details of exercise and self-management in the included studies are shown in Table 3.4.

#### 3.5.1.4 Control group

In three of the four studies (Wu et al, 2011; Yip et al, 2008; Yip, Sit & Wong, 2004), the intervention group was compared to a control arm that received usual routine care only. In the other study (Zhao, Huang & Teng, 2005), acupuncture alone was given to control arm participants.

Table 3.4. Descriptions of integrated exercise and self-management interventions in the included studies.

Authors, year	Format	Self-management				Exercise	Control group	Theory/ model of behaviour
		Type	Target	Education	Behaviour change	Types and dose		
Wu et al, 2011 Kao et al, 2012 Taiwan	Four weekly 80-min. classes 10-15 participants 20 min. lecture (RA) 20 min. ex (PT) 40 min. counselling (RA)	Behavioural change + structural physical activities	To increase self-efficacy, To improve clinical outcome	<u>Resources:</u> -DVDs -'Osteoarthritis Self-Care' booklet -ex instruction sheet <u>Content:</u> -Anatomy -Protection & pain reduction strategies -Introduce ex -Relieving pressure from disability	Efficacy-enhancing counselling: group sharing of goal-setting, with peer support and building up confidence & ability to self-care; problem-solving skills	Muscle stretching & strengthening for whole body, especially for lower limbs	Normal routine care of regular health patient education provided by nurse educators & nutritionists	Bandura's concept of self-efficacy
Yip et al, 2007 Yip et al, 2008 HK	Six 2-hour weekly classes, 10-15 participants, led by trained RN	Behavioural change + structural physical activities	To give participants skills to optimise their ability to manage their condition	<u>Content:</u> Coping and management strategies for arthritic pain, fatigue, daily activity limitations and stress	Modified ASMP	Action plan of 3 types of ex, reinforced in weekly program: -stretching ex -walking -Tai Chi Pedometer given to intervention group for 3 days to reinforce walking	Routine conventional treatment	Bandura's social learning theory & self-efficacy model

Authors, year	Format	Self-management				Exercise	Control group	Theory/ model of behaviour
		Types	Target	Education	Behaviour change	Types & dose		
Yip et al, 2004	Six 2-hour weekly classes, 10-15 participants, led by trained RN	Behavioural change + structural physical activities	To give residents skills to optimize their ability to manage their condition	<u>Content:</u> Coping and management strategies for arthritic pain, fatigue, daily activity limitations and stress	ASMP (fully structured protocol): -SM principles -Medical aspects -Joint protection -PA & ex -available treatment -stress management -nutrition -communication & available resources	-flexibility ex -walking ex -Tai Chi-coaching during the last 3 session (flexibility ex practiced in class)	Routine orthopaedic treatment	Bandura's concept of self-efficacy
Zhao et al, 2005 China	Acupuncture given individually, 10 sessions in 4 weeks, 30 min. each, format for guidance not mentioned, by TCM Dr.	Education	Not stated	<u>Content:</u> -Explanation of disease, harm of using knee excessively, avoiding prolong PA, like standing, walking, stair & squatting -weight reduction if obese	Nil	<u>Advice:</u> Stretching & strengthening ex for knee, Strengthening ex for hip (all done in non-weight bearing position)	Acupuncture only	Not stated

Key: ASMP Arthritis Self-Management Programme; Dr. Doctor; ex Exercise; HK Hong Kong; PA Physical activities; PT Physiotherapist; RA Research assistant; RN Registered nurse; SM Self-management; TCM Traditional Chinese Medicine

### 3.5.2 Effectiveness of Integrated Exercise and Self-management Programme

#### 3.5.2.1 Types of outcome measures

In this review, the outcomes used in the four included studies to measure treatment effectiveness were diverse. For the purpose of analysis, they are grouped into five categories as shown in Table 3.5 below:

Table 3.5. The outcome measures utilised in the included studies

Author year	Outcome measures				
	Pain	Disability	Psychosocial	Physical activity	Healthcare
Wu 2011 Kao 2012	Pain days	Disability days WOMAC	ASES-pain ASES-OS SOPA SF36		Unplanned medical consultation
Yip 2007 2008	Pain -current -at night -walking -sit→stand	m-HAQ	ASES-pain ASES-OS		Self-rated health Unplanned medical consultation
Yip 2004	Pain -current	m-HAQ	ASES-overall CES-D	Leisure-time light ex	
Zhao 2005	Lysholm knee score				
	-Pain -Locking -Instability -Swelling	-Limping -Support -Stairs -Squat			

Key: ASES Arthritis Self-efficacy Scale (OS Other symptoms) (Lorig et al, 1989) ; CES-D Depression Scale (Radloff, 1977); Ex Exercise; Lysholm knee score (Briggs, et al, 2009); m-HAQ Modified Health Assessment Questionnaire (Pincus et al, 1983); Pain (Huskisson, 1983); SF36 Short-form 36 (Ware, 1993); SOPA Survey of Pain Attitude (Jensen, Turner & Romano, 2000); WOMAC Western Ontario and McMaster Universities Osteoarthritis Index (Bellamy et al, 1988).

#### 3.5.2.2 Effectiveness for reducing pain

Short-term improvement in pain was supported immediately post-intervention in three of the four studies. For long-term follow-up at one year, the effectiveness in reducing pain was maintained in some activities such as walking, while more challenging tasks such as chair-stands had regressed (Yip et al, 2008). Details are presented in Table 3.6.

Table 3.6. Summary of pain outcomes

Author year	Number of participants		Outcome	Time point*	P-value	Effect size
	Treatment	Control				
Wu 2011	114	91	Pain days	2 months	0.16	
Yip 2004	21	16	Current pain	4 months	0.05	
Yip 2007 <sup>^</sup>	67	53	Current pain	4 months	0.0001	0.61
Yip 2008 <sup>^</sup>	45	50	Current pain	12 months	0.0001	0.89
			Pain at night	12 months	0.001	0.74
			Pain in walking	12 months	0.013	0.53
			Pain sit→stand	12 months	0.15	0.28
Zhao 2005	22	20	Lysholm-pain	1 month	<0.05	

\* Time point at post-intervention follow-up

<sup>^</sup> The Yip et al, 2007 and Yip et al, 2008 studies reported the same study population but reviewing outcomes at 4 and 12 months follow-up respectively.

### 3.5.2.3 Effectiveness for improving function

Zhao (2005) reported short-term improvement in lower limb functional activities immediately after the intervention such as walking, demand for assistive aid, stair climbing and squatting. Muscle strength of the hamstrings and quadriceps was reported to improve significantly (Yip, Sit & Wong, 2004). There was no other substantial improvement detected in intermediate-term or long-term effect from the function questionnaires. Details are shown in Table 3.7.

Table 3.7. Summary of disability outcomes

Author year	Number of participants		Outcome	Time point*	P-value	Effect size
	Treatment	Control				
Kao 2012	114	91	WOMAC-function	2 months	0.236	
Yip 2004	21	16	m-HAQ	4 months	0.89	
Yip 2007	67	53	m-HAQ	4 months	0.14	0.12
Yip 2008	45	50	m-HAQ	12 months	0.91	0.08
Zhao 2005	22	20	Lysholm-limping	1 month	<0.05	
			Lysholm-stairs	1 month	<0.05	
			Lysholm-squatting	1 month	<0.05	

Key: Ex exercise; SM Self-management; WOMAC Western Ontario and McMaster Universities Osteoarthritis Index; m-HAQ Modified Health Assessment Questionnaire

\* Time point at post-intervention follow-up

### 3.5.2.4 Effectiveness for psychosocial outcomes

As detected by the Arthritis Self-efficacy Scale (ASES) subscales of pain and other symptoms, participants' self-confidence in managing pain and other symptoms improved significantly in studies using the modified Arthritis Self-management Programme (ASMP) (Yip et al, 2008) and Taipei Osteoarthritis Programme (TOAP)



(Wu et al, 2011). The overall ASES was found to be significantly improved ( $p=0.03$ ) in one study (Yip, Sit & Wong, 2004). Pain beliefs as measured by the Survey of Pain Attitude (SOPA) in the TOAP improved ( $p=0.033$ ) but depression showed no change (Yip, Sit & Wong, 2004). Details of the ASES pain and other symptoms subscale are presented in Tables 3.8 and 3.9 below.

Table 3.8. Summary of ASES-pain subscale outcomes

Author year	Number of participants		Outcome	Time point*	P-value	Effect size
	Treatment	Control				
Wu 2011	114	91	ASES-pain	2 months	<0.001	
YIP 2007	67	53	ASES-pain	4 months	0.0001	0.534
Yip 2008	45	50	ASES-pain	12 months	0.02	0.58

Key: ASES-OS Arthritis Self-efficacy Scale

\* Time point at post-intervention follow-up

Table 3.9. Summary of ASES-other symptom subscale outcomes

Author year	Number of participants		Outcome	Time point*	P-value	Effect size
	Treatment	Control				
Wu 2011	114	91	ASES-OS	2 months	0.049	
Yip 2007	67	53	ASES-OS	4 months	0.0001	0.509
Yip 2008	45	50	ASES-OS	12 months	0.01	0.64

Key: ASES-OS Arthritis Self-efficacy Scale other symptom subscale;





























\* Time point at post-intervention follow-up

### 3.5.3 Risk of Bias in Included Studies




#### 3.5.3.1 Overall comment

The four included studies were found to have varying levels of risk of bias. The risk of bias in the different categories are summarised in Figure 3.2. Blinding of participants was not feasible in these types of intervention studies. With the exclusion of this category, two studies (Yip et al, 2008; Zhao, Huang & Teng, 2005) exhibited low to unclear risk of bias. The other two studies had high risk of bias in outcome assessment and in addition Yip, Sit & Wong (2004) is considered to have high risk of selection bias. The detailed information gathered from the various studies for the assessment is presented in Appendix B.

Figure 3.2 Risk of bias for the included studies

	Random Sequence Generation	Allocation Concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other sources of bias
Wu 2011 Kao 2012							
Yip 2008							
Yip 2004							
Zhao 2005							

Key:	 Low risk of bias	 Unclear risk of bias	 High risk of bias
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### 3.5.3.2 Random sequence generation (check for selection bias)

For group assignment, Yip et al (2008) defined their strategy of using a random number table and Zhao et al (2005) applied consecutive number sequencing. They were therefore considered to have low risk of selection bias. Wu et al (2011) chose districts by ballot using two districts for each arm only. The risk level is unclear as districts are potentially different as far as sociodemographics are concerned. No further information was available in the study. In the earlier study by Yip's group (2004), no true randomization was performed. Those recruited early from the first call were assigned into the intervention arm. They were significantly younger with longer history of KOA than the control arm who were recruited from the second and third call. Hence the study was considered to have high risk of selection bias.

#### 3.5.3.3 Allocation concealment (check for selection bias)

In Wu et al (2011) and Yip et al (2004), participants were allocated into arms at the point of recruitment and selection bias was considered to be high. The group allocation was known at the time of recruitment and assessment. For the other two studies, the risk of selection bias was unclear as no further details of concealing allocation into groups was provided, although randomization strategies were adopted.

#### 3.5.3.4 Blinding of participants and personnel (check for performance bias)

Blinding of participants in all four studies was not possible and all were therefore considered to have high risk of performance bias. It is not easy to blind participants for exercise interventions. There have however been attempts in some studies to blind participants by giving an alternative intervention and/or not providing full details of the purpose of the intervention.

#### 3.5.3.5 Blinding of outcome assessment (check for detection bias)

The outcome assessors were reportedly not involved in delivering the intervention in Yip et al (2008) and Zhao et al (2005), although no information was provided as to whether blinding remained intact. The risk of detection was judged to be low. In the other two studies, face-to-face interviews and muscle strength tests were undertaken by the researchers who knew of participants' arm assignment. The detection bias for these was therefore considered to be high.

#### 3.5.3.6 Incomplete outcome data (check for attrition bias)

Intention-to-treat analysis was reported in three studies (Wu et al, 2011; Yip et al, 2008; Zhao, Huang & Teng, 2005). The a priori primary endpoints varied. One study reported this at the immediate post-intervention period (of 4 weeks) (Zhao, Huang & Teng, 2005), one at two-month post-intervention (Wu et al, 2011) and two at four-months post-intervention (Yip et al, 2007; Yip, Sit and Wong, 2004). The longest follow-up period was reported by Yip et al (2008) at one year after the programme. All the studies were powered to have a retention rate of 80% for a priori primary endpoints and all studies were considered low risk in view of the retention bias. A summary is presented in Table 3.10 showing the participants' outcomes analysed at various time-points for all the included studies.

Table 3.10. Time-points and percentage of participants analysed for outcomes

Author year	Post-intervention (% participants analysed)				
	Immediate		Follow up		
	(4 week)	(6 week)	2 month	4 month	12 month
Wu 2011 (Kao 2012)	91.1%		79.2%		
Yip 2007; Yip 2008		81%		77.9%	55.8%
Yip 2004		90.5%		88.1%	
Zhao 2005	100%				

In Zhao et al (2005) data analysis was reported on 100% of participants at immediate post-intervention, hence there was no attrition. In Yip et al (2008) 55.8% of participants were analysed at one-year follow-up. The outcome characteristics amongst drop-outs and completers were however similar. Only in this study was the management of missing data reported, using the previous observation as proxy data for the missed follow-up. The risk of attrition bias for these two studies (Yip et al, 2008; Zhao, Huang & Teng, 2005) was considered low. No information for missing data was reported in the other two studies (Wu et al, 2011; Yip, Sit and Wong, 2004), therefore, the risk of attrition bias was unclear.

#### 3.5.3.7 Selective reporting (check for reporting bias)

In Yip et al (2008), one outcome on leisure time activity was not reported at one-year time point but was reported 4-months post-intervention (Yip et al, 2007). The risk of reporting bias is therefore unclear. No selective reporting was identified in the other three studies reviewed. The risk of bias for those three was therefore judged to be low.

#### 3.5.3.8 Other sources of bias

There were no other sources of bias detected.

### 3.5.4 Behaviour Change Theories

The theoretical concept used for developing the interventions of the reviewed studies was the Social Learning theory (Yip et al, 2008) and the Self-efficacy model (Wu et al, 2011; Yip et al, 2008; Yip, Sit & Wong, 2004) (Bandura, 1998). The programmes were structured to incorporate elements of self-efficacy – mastery experience, vicarious experience, social persuasion and interpretations of somatic state. Group format was adopted in Yip et al (2004), Yip et al (2008) and

Wu et al (2011). Booklet and exercise sheets were used to enhance home practice (Wu et al, 2011).

## **3.6 Discussion**

### **3.6.1 Summary**

#### 3.6.1.1 The evidence identified

This phase of work involved an SLR to determine the effect of integrated rehabilitation programmes of exercise and self-management on pain and function in Chinese speaking people with KOA. Four randomised controlled trials (RCTs) were identified; two exhibited low to unclear risk of bias (Yip et al, 2008; Zhao, Huang & Teng, 2005) and the other two exhibited high risk of bias in relation to blinding of outcome assessment (Wu et al, 2011; Yip, Sit & Wong, 2004) with one also having a high risk of selection bias (Yip, Sit & Wong, 2004).

Study participants (N=384) included in this review were representative of the OA population in age, gender and severity of symptoms (Peat, McCarney & Croft, 2001; Zhang et al, 2001) from various places in Asia where the Chinese speaking population is in the majority.

#### 3.6.1.2 The treatment effectiveness

Whilst few studies were identified, the results indicate that integrated programmes are effective for pain relief in the short term, but long-term evidence is limited. Only limited evidence was available for the short-term effect on disability (Zhao, Huang & Teng, 2005). Hence future research is justified with a focus on strategies to improve patients' abilities and functions long-term.

#### 3.6.1.3 The use of outcome measures

The outcome measures for pain and function used in the studies were varied. The Modified Health Assessment Questionnaire (HAQ) and Lysholm Knee Scoring scale measuring function were not validated for KOA populations. Only questionnaires were used with no objective performance testing carried out. To ensure valid results, disease-specific outcome measures for KOA patients should

be used in future studies. Some objective performance testing should also be considered for comparison purposes.

#### 3.6.1.4 Types of exercise and dosage

The types of exercise included in the intervention programmes varied, covering stretching, flexibility, strengthening in a non-weight bearing position, walking and Tai Chi. The dosage of exercise was mostly unclear. Only one study reported the specific duration of exercise in each session. The intensity of exercise was also unclear. Therefore, in considering the exercise dosage and intensity in future studies, the number and duration of exercise sessions should be clearly described, along with the details of when the exercises were progressed.

### **3.6.2 Theoretical Framework in the Interventions**

#### 3.6.2.1 Social cognitive theory

Only three out of the four studies included were theory-based interventions. The predominant theoretical framework for supporting behavioural change was Bandura's Social Cognitive Theory (SCT) and self-efficacy enhancement (Bandura, 2004; Bandura, 1998; Bandura, 1989). This is reflected in a recent systematic review on self-management interventions for chronic diseases (Richardson et al, 2014), which also states that SCT is the most frequent theoretical framework employed for self-management interventions for chronic diseases. To achieve their effect, programmes included goal-setting, coping strategies, information and education, and problem-solving skills. These essential components were supported in recent systematic reviews on self-care interventions in managing KOA (Button et al, 2015; Brand et al, 2013). The ESCAPE-knee pain is a programme integrating a personalised, progressive exercise regime with patient education, self-management and active coping strategies (Hurley et al, 2007a). Like other self-management programmes, education, goal-setting, coping strategies and problem-solving skills were incorporated in ESCAPE-knee pain.

### 3.6.2.2 Self-efficacy theory

To improve self-efficacy, skills mastery and persuasion are major influencing factors (Bandura, 1998). Self-efficacy is a subjective marker to help track the mediator for change toward a defined behavioural outcome (Lubans, Foster & Biddle, 2008). The adopted outcome of the ASES (Lorig et al, 1989) showed a significant change in the short- (Wu et al, 2011) and intermediate-term (up to 4 months after intervention) (Yip et al, 2008; Yip, Sit & Wong, 2004). The one study (Yip et al, 2008) that recorded outcomes at one-year also demonstrated a maintained significant effect, though the retention rate reduced to 56%. The effect sizes reported in the ASES overall or subscales in the three studies (Wu et al, 2011; Yip et al, 2008; Yip, Sit & Wong, 2004) were large (greater than 0.5, according to Warsi et al, 2003) at all time-points. The meta-analysis undertaken by Brand et al (2013) also showed a significant effect although the effect size was smaller (mean difference of  $0.20 \pm 0.32$  for pain and  $0.29 \pm 0.29$  for other symptoms). Two studies (Wu et al, 2011; Yip et al, 2008) included in this SLR were also included in the Brand et al study (2013). The considerable inflation of effect sizes on ASES of the three reviewed studies compared with that from the meta-analysis are possibly associated with the quality of the research. Studies scored high in risk of bias may therefore have been susceptible to over-estimation of treatment effect. Self-efficacy on exercise and exercise belief was reported to be increased in the intervention arm of the ESCAPE-knee pain study (Hurley et al, 2007a). More information was provided in the concurrent qualitative analysis of the participants' experience. Participants in the intervention arm had increased belief in the safety and utility of exercise to control symptoms (Hurley et al, 2010). Their fear of exercise reduced, and confidence in their ability to apply exercise as a self-management strategy increased.

### **3.6.3 Key Clinical Outcomes**

#### 3.6.3.1 Pain

The key clinical outcomes reviewed were pain and function. In the short-term, the number of days having pain was not different in the intervention arm compared to the control (Wu et al, 2011). The degree of pain perceived, however, in the current

state and upon walking was significantly reduced in the short-term (Zhao, Huang and Teng, 2005). Similar short-term significant improvement ( $p < 0.01$ ) was also observed in an RCT for KOA in western cohorts (Bezalel, Carmeli & Katz-Leurer, 2010). Pain reduction was maintained in the intermediate-term of 4 months (Yip et al, 2007; Yip, Sit & Wong, 2004) and long-term, up to 12 months (Yip et al 2008). Similar significant pain reduction was demonstrated by Ravaud et al (2009) at 4 months ( $p = 0.04$ ) and long-term at 1 year ( $p = 0.03$ ) for patients with KOA. This observation is supported in a meta-analysis undertaken by Du et al (2011) on self-management programmes for chronic musculoskeletal pain at time-points of 4 and 12 months ( $p = 0.0003$  &  $0.008$  respectively).

When activities of higher physical demand like standing up from a chair or step climbing were considered, no difference was found in the pain level between the control and intervention arms (Yip et al, 2008). Pain coping strategies may explain the improvement in pain reported during lower functioning levels such as walking. Greater lower limb muscle strength is required for performing activities of higher physical demand and correlation between the functioning level and lower limb strength was demonstrated (Segal et al, 2013). Therefore, it can be interpreted that the functional level of training in the reviewed study (Yip et al, 2008) might not meet high physical demand. A systematic review and meta-analysis showed limited value on pain and disability for self-management interventions not including a significant exercise component (Warsi et al, 2003). Hence for the HK population self-management and exercise should be combined with equal importance.

Nonetheless the observed 12-month effect of the integrated exercise and self-management intervention on pain (effect size 0.89) in the current reviewed study (Yip et al, 2008) is much higher than the studies identified from the literature undertaken in western KOA populations (effect sizes 0.25-0.27, in Thomas et al, 2002; Hurley et al, 2007a). The potential for the large observed effect size to be due to research bias has been discussed previously (see section 3.6.2.2) .

### 3.6.3.2 Function

In the included studies, the functional outcome measures were not disease specific for KOA. The HAQ (Pincus et al, 1983) is a generic disability outcome



measure restricted to general daily activities. It includes upper and lower limb activities but is not specifically focused on knee related tasks. Furthermore, the Lysholm knee scoring scale (Lysholm & Gillquist, 1982) was developed to evaluate instability symptoms after knee ligament surgery, so may not be appropriate. In the present review, the only positive effect on function, obtained immediately post-intervention, was demonstrated by Zhao et al (2005). The other three studies (Kao et al, 2012; Yip et al, 2008; Yip, Sit & Wong, 2004) showed no significant effect of the integrated exercise and self-management intervention at the primary time-points.

Different results were observed in other comparable studies on participants with KOA. The function subscale of Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) (Bellamy et al, 1988) is a widely used outcome measure for KOA studies. Significant improvements in function have been demonstrated following integrated exercise and self-management interventions for KOA in the short-term (2-month post-intervention) (Bezalel, Carmeli & Katz-Leurer 2010), intermediate-term (6 months) (Hurley et al, 2007a) and long-term (12 months) (Ravaud et al, 2009). The WOMAC is likely to be more sensitive to change in KOA, compared to other measures, as it is disease specific.

From the meta-analysis undertaken by Du et al (2011) on chronic arthritis-related disabilities, the effect size on the general function scale HAQ, for the pooled population of more than 2400 patients was -0.06 in the intermediate-term (4-months post-intervention) and -0.17 at long-term follow up (one year; n>1500 participants). In the ESCAPE-knee pain study (Hurley et al, 2007a), the improvement in patient-reported outcome on function (WOMAC-function, p=0.010, standardised effect size 0.29) was supported by functional performance testing on common daily activities (aggregating walking, chair stand and stair climbing, p=0.019, standardised effect size 0.17). These activities were best included in the training for patients to experience the benefits attainable from exercise to achieve more functional improvement (Roddy, Zhang & Doherty, 2005).

#### 3.6.3.3 Exercise dosage and intensity

The effect of exercise is relative to dose-response relationships (Bennell, Dobson & Hinman, 2014). The non-significant result shown in the three reviewed studies

(Wu et al, 2012; Yip et al, 2008; Yip, Sit & Wong, 2004) could be attributable to an inadequate training dosage. In contrast to the 10 sessions given in Zhao et al, the other studies were four (Wu et al, 2011) to six (Yip et al, 2008; Yip, Sit & Wong, 2004) sessions, with 25% of the total 5.3 hours (Wu et al, 2011) committed to exercise training. For sufficient dosage of exercise training, 12 sessions or more (Fransen & McConnell, 2008) direct supervised exercise training (Jordan et al, 2010), done 2-3 times per week (Bennell, Dobson & Hinman, 2014) is advocated. More improvement was demonstrated for patients receiving high-intensity resistance versus control (Zacharias et al, 2014) or low resistance arm (Jan et al, 2008). ESCAPE-knee pain incorporated an individualised supervised exercise programme delivered by physiotherapists. The exercises were progressed to remain challenging to the participants. In the 30-month follow-up (Hurley et al, 2012), the ESCAPE-knee pain participants still demonstrated improvement in physical functioning and self-reported that they had kept exercising, although the effect size had declined slightly. ESCAPE-pain intervention thus demonstrated to facilitate adherence to exercise. Maintaining exercise programmes beyond a supervised period of instruction for patients with KOA is recognised as a major challenge (Roddy, Zhang & Doherty, 2005). For future intervention programmes for KOA in Hong Kong, ESCAPE-knee pain should justifiably be tested in a Chinese population.

### **3.7 Limitations of the review**

This systematic literature review was targeted to Chinese speaking populations having KOA. The search for identifying evidence was undertaken on English databases which may have limited identification of all Chinese studies, although one article was retrieved with an English abstract and full paper in Chinese.

There may have been a potential bias for one reviewer only extracting information from the selected articles. Measures, however, were taken to minimise bias as follows:

- Preliminary study quality assessment on all the reviewed articles was done using the standardised Critical Appraisal Skills Programme Guide for Randomised Controlled Trial (CASP 2013). They are attached in Appendix C.

- Data extracting forms for the reviewed studies were attached for reference in Appendix A.
- Quality assessment according to the Cochrane Bias Methods Group with the reasoning of judgement was presented at the Appendix B for cross checking.

Another limitation is that this review was only focused on clinical effectiveness measured by pain and functions. No attempt was made in the review to determine cost-effectiveness.

### **3.8 Summary of findings and implications for future study design**

This chapter has presented an SLR of the evidence for integrated interventions of exercise and self-management for KOA in Chinese speaking populations, and suggests that an integrated approach is a promising intervention for people with KOA. Significant benefits were demonstrated for pain control, but no significant changes in disability were shown.

The outcome measures for pain and disability were diverse and quality of life was often not evaluated. Measures of self-efficacy were used as a mediator for change as they reflect a person's confidence to carry out a specific behaviour. It is, however, not a measure for change in disability. The exercise types and dosage were potentially inadequate and may have contributed to the lack of effect on disability. Implications for KOA management in Chinese populations are summarised:

- Self-management is potentially effective for pain control amongst Chinese cohorts with KOA and recommended for a clinical trial;
- The optimal dosage of exercise training should be incorporated for better effect with gradual progression to a higher level of intensity according to an individual's capability; and
- A combined intervention of self-management and exercise with equal emphasis is potentially feasible in Chinese population with KOA and further investigation should be conducted to confirm.

With adequate exposure and participation in exercise, self-confidence and self-efficacy will be promoted, and self-management skills are likely to enhance

exercise practice in the long-term. To the doctoral candidate's knowledge of interventions of KOA in the current HK context, the education component varies and is generally less comprehensive compared to the studies included in this SLR. The Chinese (including HK) studies to date provide evidence that an integrated programme would be acceptable. A standardised programme with equal emphasis on self-management and exercise for patients with KOA is lacking. The evidence-based ESCAPE-knee pain intervention has the potential to be applied to the HK Chinese population, yet cultural adaptation is needed. Further research is necessary to establish feasibility and acceptability amongst the healthcare institutions, physiotherapy professionals and patients.

### **3.9 Findings of the SLR influencing the subsequent doctoral work**

The positive findings of the SLR laid out in this chapter on integrated interventions of exercise and self-management for KOA in Chinese speaking populations provided sufficient evidence for culturally adapting the ESCAPE-knee pain programme and a proof-of-concept (POC) study amongst HK Chinese.

Information from this SLR was used to inform the subsequent aspects of this doctoral work by:

- Identifying available validated disease-specific outcome measures to evaluate pain, disability and quality of life for KOA management interventions, as the outcome measures used in the reviewed studies were not validated for KOA populations;
- Identifying available validated process measures to evaluate self-efficacy for exercise for use in the ESCAPE-knee pain programme in HK as Social Cognitive theory and Self-efficacy theory were identified as the predominant supportive theoretical frameworks for self-management and exercise adherence in the long-term;
- The positive findings of pain but insignificant change in disability demonstrated in the included studies in this SLR called for equal emphasis of self-management and exercise components in integrated programmes. An example of these integrated programmes was ESCAPE-knee pain programme. Potential clinical benefits were expected from culturally adapting ESCAPE-knee pain programme for delivery amongst HK Chinese cohort,

- including translation and validation of education information booklet;
- Conducting a POC study for testing the feasibility and acceptability.

The next chapter provides details of the work carried out to adapt the ESCAPE-knee programme for a HK Chinese population.

The research was undertaken in accordance with research governance requirements. The ethics reference numbers are:

- CREC ref No. 2016.403 approved by the Clinical Research Ethics Committee (CREC) in Prince of Wales Hospital in Hong Kong (Appendix L1);
- UWE REC REF No. HAS.16.10.031 approved by the Faculty Research Ethics Committee (Appendix L2)

## **Chapter Four: Programme adaptation of the ESCAPE-knee pain programme for Hong Kong**

Chapter two provided an introduction to the differences between western independent and Chinese interdependent culture. Obligatory roles and commitments for Chinese women and their care-seeking behaviours may influence their response to interventions recommended for KOA.

This chapter focuses on the cultural adaptation of the ESCAPE-knee pain programme for HK use. The cultural adaptation of the programme was conducted in four phases and included: translation of the patient information booklet; replication and adaptation of the ESCAPE-pain programme for HK use; identification of outcome measures; and a training programme for local therapists to conduct the programme. The development processes are described in sequence, with discussion and conclusion sections at the end of this chapter.

### **4.1 Aim and objectives**

Aim:

Initial development of the HK version of ESCAPE-knee pain programme was to translate and cross-culturally adapt a patient information booklet for teaching self-management. It was also necessary to adapt the programme to ensure the suitability for Chinese-speaking KOA patients in HK and identify the appropriate outcome measures in Chinese for programme evaluation. In addition, there was a need to conduct a training programme in preparing local physiotherapists to be competent in delivering the ESCAPE-knee pain programme.

The objectives of the programme development include the following:

1. To prepare a Chinese translation of the patient information booklet and powerpoint slides that was culturally adapted to support the ESCAPE-knee pain HK study.
2. To modify the ESCAPE-knee pain programme, ensuring relevance and appropriateness to an HK population, while maintaining the core ESCAPE-knee pain features of education of self-management and exercise.
3. To identify outcome measures suitable and available for programme evaluation in the HK context.

4. To train local physiotherapists in the clinic where they worked to deliver the ESCAPE-knee pain programme.

## **4.2 Phase one – Linguistic translation and cross-cultural adaptation of the booklet**

### **4.2.1 Background**

The ESCAPE-knee pain programme is an integrated programme of exercise, self-management and active coping strategies. It has proven effectiveness in the UK for patients with KOA (Hurley et al, 2007a). In the clinical environment in the UK, the programme was tested in a controlled trial in clinical practice and proved to be effective and resulted in a cost-saving for health care (Jessep et al, 2009). The core components of the programme are interactive self-management discussion and exercise in each session. While ESCAPE was developed in the UK, researchers (Reid et al, 2014; Beaton et al, 2000) have previously pointed out that translating programmes or outcome measures to other language or culture might not necessarily maintain the beneficial outcomes. This may be the case when applying the evidence-based ESCAPE-knee pain programme to a new Chinese speaking population in HK. Differences in culture, language, age and socioeconomic status between the two different populations may pose some barriers to implementing the programme (Reid et al, 2014). Hence it is necessary to investigate issues related to the process of translating the materials included in the ESCAPE-knee pain programme package into Chinese to ensure cultural adaptation.

Beaton et al (2000) summarised guidelines on cross-cultural adaptation in medical, sociological and psychological areas. To administer a self-report measure/document in a new country, culture and/or language, a specific set of procedures is recommended (Beaton et al, 2000). The process is divided into three stages: translation, adaptation and cross-cultural validation (Epstein, Santo and Guillemin, 2015). Through translation, a document is produced from a source version to the target language. Adaptation, specifically cross-cultural adaptation here, refers to the process of considering any differences between the source and target culture to maintain equivalence in meaning. Cross-cultural validation aims to

ensure the new translated material functions as intended and in the same way as the original (Epstein, Santo and Guillemin, 2015). A culture in which a person is familiar can affect how people perceive and respond (Epstein, Santo and Guillemin, 2015).

The process of translating the programme book was considered in the following categories, with reference to the review reported by Epstein, Santo and Guillemin (2015):

1. *Conceptual equivalence*: topics have the same relevance, meaning and importance regarding the explored concept in both cultures.
2. *Item equivalence*: content is as relevant and acceptable in both cultures.
3. *Semantic equivalence*: meaning of the content is the same in both cultures.
4. *Operational equivalence*: the patient information booklet can be used in the same way by its target population in both cultures.
5. *Functional equivalence*: both versions “do what they are supposed to do equally well”.

In the current project of developing the HK version of ESCAPE-knee pain programme, the patient education booklet was utilised to serve as a guidebook and workbook for patients during the interactive discussion in groups and reference afterwards. There is limited evidence/framework guiding translation of patient information. However, there are frameworks for patient-reported outcome measures (PROM) (Wild et al, 2005). A PROM is designed for patients to provide information from their perspective regarding physical and psychological well-being at specific points in time (Ahern, Ruseckaite and Ackerman, 2017). Although patient information and PROM are not equivalent, the principles of good practice for translation and cultural adaptation (Wild et al, 2005) were taken as reference and discussed in more depth below. These included forward translation, reconciliation, backward translation and review and cognitive debriefing. Translation and agreement were made at first. No backward translation was conducted but a quality control process was taken instead. The final draft was tested with staff and patient group for relevance and comprehension level. The processes taken according to the steps mentioned above are reported in the following.



## 4.2.2 Forward translation

More than one native speaker of the Chinese language was needed for controlling bias (Epstein, Santo and Guillemin, 2015). They should reside in HK, be fluent both in English and Chinese (Geisinger, 1994) with prior experience in translation. The in-country culture has advantages of language ability (Wild et al, 2005).

### 4.2.2.1 Methodology

The patient information booklet was written for patients to support the development of self-management skills, with topics matched to the programme content. The presentation slides were used by therapists to support discussion with patients throughout the ESCAPE-knee pain programme. The doctoral candidate (first translator) translated the entire patient information booklet – *Managing Your Joint Pain* (Walsh et al, 2013) – into Chinese. The first translator was the native Chinese residing in HK, fluent in both Chinese and English, with formal training in translation (Advanced Professional Diploma in Translation and Bilingual Communication, 2012, Chinese University of HK). The first translator also possessed relevant experience in translating a PROM from English into Chinese (Tsang et al, 2016; Lee et al, 2004). During this process, the material written on “healthy diet” was sent electronically to a practising dietitian in the Prince of Wales Hospital. The dietitian reviewed the material for suitability and applicability in educating local patients with KOA, and resulting comments were incorporated in the first draft of the translated information booklet.

### 4.2.2.2 Results

The entire information booklet and education slides were translated into Chinese of draft version 1. The following information for local relevance was inserted replacing the original:

#### 1) Prevalence of KOA in HK

In the original booklet, it is mentioned that KOA affects approximately 8 million people in the UK. For the information to be contextually relevant, it was considered more appropriate to illustrate the prevalence of OA in HK. A cohort study with 4-year follow-up, Woo, Leung and Lau (2009) reported the prevalence of knee pain

to be 31% for people over age 65. Lee (2005) also reported that OA is estimated to affect 1 in 3 people aged 70 years and older in HK with over 80% suffering from OA of the knee. For the information to be easily understood by KOA patients, the local prevalence estimation was changed to “1/3 of people aged 70 or above”. (See table 4.1)

## II) Food pyramid

The diets of the British and Chinese are very different. Chinese meals are based on rice; vegetables are blanched or fried to become tender, and the food is usually served warm. Compared to the UK, senior Chinese people rarely eat bread with their main meals and infrequently eat cold salads or raw vegetables (Eatwell Guide – GOV.UK). To provide more relevant dietary advice suitable for the Chinese HK population, the dietitian recommended replacing the diagram with a food pyramid, used commonly locally (Department of Health 2012) as shown in fig 4.1.

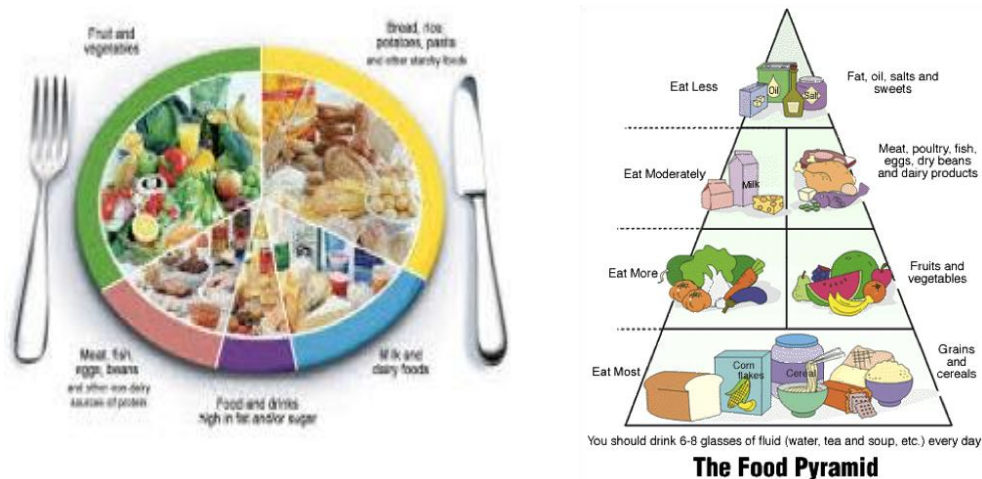


Fig. 4.1 Food pyramid in Hong Kong version of booklet

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## III) Health care service provider in Hong Kong – Hospital Authority

In the section on “Drug Management”, the healthcare provider was changed from National Health Service (NHS) of the UK to Hospital Authority (HA) of HK in the Chinese booklet.

#### IV) Local community resources for long-term exercise

To reflect local provision, information about long-term exercise classes available to patients for continuation was added to the information leaflet including website information for gymnasiums and local training courses delivered by the Leisure and Cultural Services Department of the Hong Kong Government and Community Rehabilitation Network (CRN).

Table 4.1 showing the change of information applicable to the local scene in the cross-cultural adaptation of the booklet translation.

	Original in the UK	HK scene	Reason for the change
1	Prevalence of KOA - affected approximately 8 million people	31% of people over age 65 (4-year FU); estimated 1 in 3 aged 70 or over	Local relevance
2	Diet Western diet usually served with bread, cold salads or raw vegetable	Chinese meals served hot rice with cooked vegetable and meat	Local relevance as advised by dietitian
3	Health authority NHS	Hospital Authority	Local relevance
4	Websites for community resources for long-term exercises *EXTEND *Walking for health *Arthritis Care	*Community Rehabilitation Network *Leisure and Cultural Services Department	Local availability

FU follow-up; HK Hong Kong; KOA Knee osteoarthritis; UK United Kingdom.

#### V) New illustrations

It is not common in HK to play baseball in the elderly population; walking is a more popular morning exercise and advocated by the government (QualiWalk Scheme). Local relevant illustrations were inserted. A comparison is attached in Appendix D.

#### 4.2.3 Reconciliation and synthesis

The in-country investigator worked with the other forward translator to agree on discrepancies from the translated versions and produced a single translation (Epstein, Santo and Guillemin, 2015; Wild et al, 2005).

#### 4.2.3.1 Methodology

For robustness, a second translator who was native Chinese residing in HK and fluent in both English and Chinese, reviewed the entire translated draft version 1, along with the original English version. Any discrepancy in the translated version was noted. The first translator made the changes discussed in section 4.2.2.2. The discrepancies highlighted by the second translator were discussed in a meeting between the first and second translators, and a translated version was agreed. When there was any disagreement, a third translator was invited to make the final decision upon the most suitable translation.

#### 4.2.3.2 Results

The translated draft version 1 was accurate except for a few points raised by the second translator during the proof-reading process. Discrepancies were grouped into three categories: I) the accuracy of meaning; II) refinement in the use of language in Chinese; and III) clarity by adding in words for Chinese expression.

##### I) Accuracy of meaning

Duration and intensity of exercise and the contraindication in applying ice and heat were found to be inaccurate in the draft version 1. They were raised in the project meeting and finalised (see table 4.2).

Table 4.2 Issues of accuracy in translating the information booklet.

	Original version (English)	First draft (Chinese)	Second draft (Chinese)	Final draft version (Chinese)
Exercise recommendation				
Duration	“at least thirty minutes.”	“thirty minutes.”	“at least thirty minutes.”	“at least thirty minutes.”
Intensity	“how hard.”	“how difficult.”	“how vigorous.”	“how vigorous.”
Contraindication of ice & heat	“circulatory problems.”	“blood and water circulatory problems.”	“blood circulatory problems.”	“blood circulation problems.”

## II) Refinement in the use of language in Chinese

The translation of a clause in the “Healthy diet” and “Progressive muscular relaxation” sections were refined in the Chinese language, to aid understanding as there was not a literal translation (See table 4.3).

Table 4.3 Language refinement in the translation of the information booklet.

Original version (English)	Final draft version (Chinese)	Reasons for change
“how much you do eat in relation to the amount of physical activity taken.”	“to compare the amount you eat to you exercise.”	The Chinese translation was more concise, and the wording was in parallel.
“Hold for a count of 10... <i>and</i> relax.”	“Hold for a count of 10 ... <i>then</i> relax.”	In Chinese conceptual framework, chronological sequence is important.

## III) Clarity by adding words for Chinese expression

To clarify meaning words were added to the translated text to make the Chinese expression or procedure more overt. Here are the quotes from the “Programme aims” and “Ice and heat” section (See table 4.4).

Table 4.4 Clarity by adding words in Chinese expressions or procedures.

Original version (English)	Final draft version (Chinese)	Reasons for change
“There is often a ‘cycle of change.’”	“There is often a <i>process</i> – ‘cycle of change’”	To render the concept of ‘cycle of change’ better understood in Chinese.
“use a towel to cover and protect the area.”	“use a towel to cover <i>first</i> and protect the area.”	To make the steps clearer.
“wrapped in a damp towel to the area.”	“wrapped in a damp towel to the <i>inflamed</i> area.”	Overtly pointing out to apply ice on the inflamed area.
“Contact with other people is important, and helps when we’re feeling a bit down.”	“Contact with other people is important, and helps when we’re feeling a bit down <i>in mood</i> .”	In the colloquial understanding for HK Chinese, “a bit down” was taken as mentality.

#### **4.2.4 Qualitative review and validation – Think-aloud interview with patient-partners**

The purpose of backward translation was to identify mistakes in the forward translation and provide a quality-control step, ensuring the same meaning when the translation is moved back into the source language (Wild et al, 2005) and it allows researchers to make inferences about the quality of translation (Epstein, Santo and Guillemin, 2015; Weeks, Swerissen and Belfrage, 2007). Others, however, do not prefer this step (McKenna and Doward, 2005; Geisinger, 1994). In the case of translating questionnaire, Geisinger (1994) advocated to involve a group of individuals fluent in both languages, familiar with both cultures and expert in the content measured on the instrument. McKenna and Doward (2005) proposed a dual-panel approach in which a panel of professional experienced translators reviewed the questionnaire and then followed by a panel of monolingual lay people working as a focus group in the target language to assess the questionnaire. An experimental design study showed that backward translation had limited use, especially when the translators were bilingual in the source and target languages (Perneger, Leplege and Etter, 1999).

The objective of the information booklet is different from that of a survey questionnaire. It was written for being used as an adjunct in the education on active coping and self-management. In the content, the directions of self-management were laid out with some information on different topics and interactive worksheets on reflecting active lifestyle of eating and exercise, and action plans. Validation was indicated for patients to receive and understand the messages in the same way the authors intended.

“Think aloud” protocol and cognitive interviewing is getting more widely adopted for linguistic validation of clinical outcome assessment (White et al, 2017; Epstein, Santo and Guillemin, 2015). This process allows researchers to check for misunderstandings, incomplete concept coverage and inconsistent interpretations (Collins, 2003).

Cognitive interviews have been adopted to explore overt or covert errors in measurement of question-and-answer process in survey questionnaires, in different stages of comprehension, retrieval, judgement and response (Collins,

2003). During the physiotherapist facilitated discussion along with the information booklet, the patients needed to comprehend, might involve in retrieving some background information for reflection or sharing, yet no such detail recall was required to make any judgement or response as in the case of answering a questionnaire. The purpose of the cognitive pre-testing of the information booklet was for establishing whether:

- patients understood the literal meaning of the translated words, including literacy level,
- they understood the concept or task described for self-management,
- in a way the authors intended, and
- the ease of use of the booklet.

In this doctoral study, the cognitive pre-testing was conducted in two stages:

1. Modified “think aloud” interview for collecting information from patient partners qualitatively,
2. Modified cognitive debriefing for collecting opinions from physiotherapists and patients quantitatively.

The qualitative pre-testing was described in this section, with the quantitative part described in the section following.

From literature, a lay panel was invited to check through a “*Think aloud*” protocol (Jääskeläinen, 2010). Patients in the target population of KOA were invited to read aloud the manuscript of the booklet to see if it was expressed clearly and was intelligible (Willey and Tanimoto, 2014). The clarity and thoughts about the content were scanned in this usability test (Cooke, 2010) from the recipients’ perspective. They were instructed to verbalise any thoughts while reading aloud (White et al, 2016; Willey and Tanimoto, 2015). If the text was well written and easily understandable, participants read the text aloud without verbalising any additional information (e.g. “um” and “ah”) or silence (Cooke, 2010). The interview was mainly respondent-driven (Collins, 2003).

#### 4.2.4.1 Methodology

In the quality control step of think-aloud protocol (Jääskeläinen, 2010), two patient research partners, aged 65 and 67 respectively, were invited to review the

translated ESCAPE–knee pain information booklet. Both were previous patients from the physiotherapy department and had received treatment for KOA. In the process guided by the candidate, they were asked to read through the entire translated booklet in Chinese. Notes were made when the patient research partners appeared to be confusing based on their facial expression, pauses, comments for clarification or additional information (White et al, 2016). A discussion on sharing their thoughts and how to improve clarity for comprehension was conducted in parallel (Kitchen et al, 2018). The modifications were documented and subsequently discussed at a project meeting with two other translators. The most appropriate revision was agreed upon by the translation team, and the booklet was changed.

#### 4.2.4.2 Results

The two patient research partners understood the information booklet and reported after reading it their knowledge of OA improved. However, they reported difficulty in understanding two points on “Benefits of exercise” section; frequency and choice of exercise. Changes to these sections were agreed upon by all translators (See table 4.5). Concerning the size of the printed booklet, the patient partners preferred A5 as it was easier to carry.

Table 4.5. Comments raised by the patient partners in the think-aloud interview.

Original version (English)	Final draft version (Chinese)	Reasons for change
“on most days of the week”	“daily or five days in a week”	The patient partners found it easier to grasp the idea of how frequently to perform the exercise after the modification.
The list of exercises was abstract by just looking at it.	The patient partners suggested including some diagrams to accompany the list of exercises.	Visual impact is better than words alone.
The size of booklet was A4.	The patient partners suggested the Chinese booklet was A5. They read it in this size and felt comfortable with the size, though it did seem to look a bit wordy.	The layout of the Chinese characters was more compact than the English alphabets. The A5-size booklet was easier to carry.



#### **4.2.5 Quantitative cognitive debriefing with staff and patients**

Cognitive debriefing interviews are qualitative in nature. Existence of a problem was identified with some suggestions made (Collins, 2003). After the resolution undertaken by the translation panel, the cognitive pre-testing was put to further step to collect quantitative data from potential users, namely physiotherapists and patients. In the real-world situation, the newly translated information booklet was tested on patients with KOA and clinicians (Wild et al, 2005). This collaborative effort is an important and valuable step (Epstein, Santo and Guillemin, 2015). The purpose was to ensure the translation was comprehensible to the patient population on two aspects of relevance and comprehension. The therapists spoke both the source and target languages. They were also target users who would use the booklet for patient education.

##### **4.2.5.1 Methodology**

A group of physiotherapists were invited to participate in the cognitive debriefing process by presenting Participant Information Sheets (Appendix E1) to them. For those who showed interest, consent forms (Appendix E2) were signed. They were given Chinese version of the information booklet to read and an evaluation questionnaire on relevance and comprehension to complete along side. In total there were 13 questions which evaluated the concept, item, operation and the functional equivalence (Epstein, Santo and Guillemin, 2015):

- For concept equivalence – a question on whether the topics covered in the booklet met the patients' needs.
- For item equivalence – questions for the content covered in each of the topics.
- For operation equivalence – a question on the printed format
- For functional equivalence – a question as a summary asking whether self-management and exercise were goals the patients wanted to achieve (see table 4.6).

A nominal scale of 6 choices from “totally not relevant” (score 0) to “totally relevant” (score 5) and “difficult to understand” (score 0) to “easy to understand” (score 5)

was recorded (See appendix E3 for physiotherapist evaluation form). This cognitive debriefing on staff and patients served as testing content validity of the Chinese information booklet (Kitchen et al, 2018).

Table 4.6 Evaluation on equivalence of translation in the cognitive debriefing

Equivalence	Questions content
Concept	Topics of the booklet
Item of content	<ul style="list-style-type: none"> <li>• ‘aim’ &amp; ‘change cycle’</li> <li>• ‘joint pain’ &amp; ‘exercise benefits’</li> <li>• ‘goal’ &amp; ‘action plan’</li> <li>• ‘pacing’</li> <li>• ‘healthy diet’</li> </ul> <ul style="list-style-type: none"> <li>• ‘ice’ &amp; ‘heat’</li> <li>• ‘anxiety, mood &amp; joint pain’</li> <li>• ‘relaxation’</li> <li>• ‘drug management’</li> <li>• ‘managing flare-up’ &amp; ‘long-term exercise’</li> </ul>
Operation	Printing presentation & design
Functional	Goal to achieve learning self-management skills & exercise

Patient recruitment for cognitive debriefing was carried out at the end of a regular exercise class held for KOA patients in the physiotherapy department. A group of patients were invited to participate in a briefing and discussion session on introducing the information booklet. Patient Information sheets were given (Appendix F1). For the patients who agreed to participate, consent forms were signed (Appendix F2). They participated in an hour-long, in-person discussion. The doctoral candidate introduced Chinese version of the information booklet and guided them to read the booklet section by section. The patients shared their thoughts on each section. Then they were asked to rate on the evaluation form for each part of the booklet. The same evaluation form was used for both physiotherapists and patients except the one for patients was in Chinese ( see Appendix F3 for patient evaluation form).

#### 4.2.5.2 Data analysis

The response scales were converted to a 6-point Likert scale from 0 to 5 (table 4.7).

Table 4.7 Scale of responses of the cognitive debriefing questionnaires.

	totally not relevant	quite not relevant	slightly not relevant	slightly relevant	quite relevant	totally relevant
	difficult to understand	quite difficult to understand	a bit difficult to understand	slightly easy to understand	quite easy to understand	easy to understand
Converted to Likert scale	0	1	2	3	4	5

In the cognitive debriefing process, responses of the questionnaires were averaged for all individual scores for all the 13 items to obtain a mean endorsement score (MES) as performed by Lee et al (2004). The lower the MES, the less agreement there was for the specific item.

#### 4.2.5.3 Results

For content validity of the information booklet, ten physiotherapists (five female and eight with more than 10 years working experience in musculoskeletal areas) were invited to complete the questionnaire after reading the booklet.

From the physiotherapists' comments, the majority were totally or quite relevant (Likert scale 5 or 4) although some therapists found the content slightly relevant (Likert scale 3). No item was reported irrelevant. The average MES for relevance was 4.48 (maximum 5, range 4.00-4.90).

The MES for comprehension was 4.12 (range 3.60-4.80). There were three topics some therapists scored lower than three: 1) aim and change cycle (3.8); pacing (3.7) and relaxation (3.6). (See table 4.8)

Six patients, diagnosed with KOA, were invited to join a cognitive debriefing session for field testing. Their median age was 65 (range 56 to 71) and four of them were female, with five of them having knee pain for more than a year.

No patient reported the content and the presentation of the booklet irrelevant. The MES for relevance was 4.46 (maximum 5, range 4.00-4.67). Except one patient on "Ice and heat" and one patient on "drug management", all patient partners commented that the content of the booklet was relevant, either quite or totally (Likert scale 4 or 5).

Similarly, the majority of the patient partners indicated that the content of the booklet was easy or quite easy to understand (Likert scale 5 or 4). Drug management seemed not so easy to understand. The MES for patient comprehension was 4.53 (range 3.83-4.83). The drug management section was the only topic that scored below 4.00. (See table 4.8) For the overall comments on presentation and design of the printed version, the MES for relevance and comprehension was higher for patients (4.67 and 4.5 respectively) than for

physiotherapists (4.4 and 4.2 respectively). The functional use of the booklet aimed to achieve educating self-management and exercise. The patient partners and physiotherapists found them relevant (4.7).

Table 4.8 Mean endorsement scores for individual items of the questionnaires used in cognitive debriefing.

	Items/Topic in booklet	Relevance		Comprehension	
		Therapist	Patients	Therapist	Patients
1	Content page	4.50	4.00	4.00	4.00
2	Aim & change cycle	4.20	4.67	3.80	4.67
3	Joint pain & ex. Benefits	4.60	4.17	4.30	4.67
4	Goal & action planning	4.40	4.67	4.00	4.50
5	Pacing	4.30	4.33	3.70	4.50
6	Healthy diet	4.40	4.50	4.30	4.67
7	Ice & heat	4.90	4.33	4.80	4.83
8	Anxiety, mood	4.50	4.67	4.20	4.67
9	Relaxation	4.00	4.67	3.60	4.67
10	Drug management	4.60	4.33	4.00	3.83
11	Managing flare-up & long-term ex.	4.70	4.33	4.40	4.50
12	Presentation & design	4.40	4.67	4.20	4.50
13	Achieve SM & ex.	4.70	4.67	4.20	4.83
	Average	4.48	4.46	4.12	4.53

Key: The scores range from 0-5 with the higher score showing more agreement for the specific item.

On the whole, participants provided a positive report of the usefulness of the programme booklet.

### 4.3 Phase two – Replicating ESCAPE-pain – fidelity and adaptation

#### 4.3.1 Background

Phase one outlined the process of validating the ESCAPE-knee pain programme information booklet in Chinese. Phase two was to adapt the ESCAPE-knee pain

intervention for the Chinese healthcare community in HK. The crucial features central to the intervention need to be maintained in the subsequent replication for effectiveness and should not be modified (Tornatzky et al, 2013). In replicating effective programme of HIV preventive interventions to community service providers Kelly et al (2000) defined core elements likely responsible for effectiveness. These elements were not changed for the benefits of fidelity of the intervention while adaptation was made to meet the needs of the clients. The core elements can be judged by extensive experience with the intervention, participant's reactions and feedback about the intervention activities. The researchers found the feedback about the intervention activities and from experienced facilitators especially useful (Kelly et al, 2000). From the theory-based (social cognitive theory) design of the programme (Hurley et al, 2007a) and the participants' feedback on ESCAPE-knee pain programme (Hurley et al, 2010), the core components were attributable to the content, structure and facilitating physiotherapist, as detailed below:

*Content:*

- It should include self-management with content guided by the patient information booklet and the slides for therapist facilitated discussion. They cover the various aspects for participants to gain knowledge and understand their condition and treatment options.
- It should also include exercise practice with progression, tailored to each individual's needs and ability, reducing their concern of potential dangers of exercise and experiencing improvement in pain, physical and psychosocial functioning. (Hurley et al, 2007a; Hurley et al, 2010)

*Structure:*

- The programme should be held twice a week for 5-6 weeks (10-12 sessions) with two components of education discussion on self-management and exercise regime in each session (ESCAPE-knee pain website).

*Physiotherapist:*

- It should be guided by a physiotherapist who provides non-directive, motivational guidance to participants for facilitating behavioural change (FASA guidebook for facilitators written for ESCAPE-knee pain as well).

This proof-of-concept (POC) study was carried out in a local public district hospital. Participative discussion and interpersonal contact amongst hospital management and frontline staff (Tornatzky et al, 2013) facilitated the delivery of ESCAPE-knee pain programme in this POC study.

### **4.3.2 Methodology**

#### **4.3.2.1 Discussion with clinic manager**

To conduct the POC study in the physiotherapy department a meeting with the clinic manager, responsible for service delivery in the local hospital, was held. While the core components of ESCAPE-knee pain programme (10-12 sessions of group self-management education with exercise over 5-6 weeks, guided by a trained physiotherapist) were maintained, a negotiation about the timing of treatment sessions, venue, appointment arrangement, workforce allocation and institutional safety guidelines was conducted. A site visit and equipment preparation were also considered at the meeting.

#### **4.3.2.2 Participative discussion with frontline staff**

Discussion meetings were made with frontline staff on introducing the ESCAPE-knee pain programme and how the core components linked to effectiveness. It was important to include the two physiotherapists leading the programme and assistants in the discussions as they needed to understand the logistics of delivering the ESCAPE-knee pain programme in a daily clinical service.

### **4.3.3 Result**

#### **4.3.3.1 The allocation of time for ESCAPE-knee pain sessions**

To maintain the core components structure, each session was assigned 20 minutes discussion and 40 minutes of exercise. A total of 90 minutes was allowed, accounting for flexibility in arrival time, socialisation between patients and the physiotherapist and potential patient questions.

#### 4.3.3.2 Treatment sessions and frequency

The original ESCAPE-pain programme in the UK was 12 sessions held weekly across a 6-week period (Hurley et al, 2007a). To make the programme clinically applicable and to promote long-term adherence to regular exercise, Jessep et al (2009) shortened it to 10, held twice a week for 5 weeks, with a 1-hour review session held four months after the completion of the programme to reinforce key messages and progressing the exercise regimen if appropriate.

In contrast to the UK where the National Health Service care is free at the point of access, all HK patients have to pay for their treatment sessions. The clinical staff in the local hospital perceived that more fees would be charged to patients for twelve sessions compared with ten, i.e. HK\$1015 vs HK\$855. Furthermore, being conscious of the availability of physiotherapists and patient case load, the clinic manager voted for the proven clinically effective 10-session programme in five weeks as reported in Jessep et al (2009). The compression of the programme was managed by integrating the mid-term review and the final reflection session into the other sessions (as per Jessep et al, 2009).

#### 4.3.3.3 Treatment venue

It is advocated in the original ESCAPE-pain programme that exercise does not require sophisticated equipment, to enable participation, and are easy for patients to learn and have greater potential to be continued (Hurley et al, 2010).

For this POC study, there was little difficulty finding suitable equipment for running the programme. However, within the physiotherapy department, there was difficulty finding a private and quiet location to deliver the education component. With negotiation and arrangement, a small gymnasium within the department was identified to run the class, and the projector and computer were set up every time before the class and removed immediately afterwards.

#### 4.3.3.4 Staff to patient ratio

In the ESCAPE-knee pain programme in the UK, there were six to eight participants in a group. In HK, it was decided to have ten participants because of resource availability, but an assistant was designated to help with every session.

The therapist's role was not simply an instructor, but rather a supervisor working in a collaborative partnership with the patients. This relationship was important to build trust between the therapist and patients. Some elders in HK may be illiterate, and needed assistance in completing exercise records during the class, so the presence of an assistant was required.

The overall changes made through the cultural adaptation processes are summarised in the table 4.9.



Table 4.9 Summary of cultural adaptation of the ESCAPE-knee pain sessions and the patient information booklet.

Programme session	Cultural adaptation	Reasons for adaptation
1 Programme aims & change cycle	Nil	Not applicable
2 Knee pain & exercise benefits	Prevalence changed to local data	Cultural relevance
	Add pictures to show exercise	Better understanding diagrams/pictures than abstract wording in this cohort/age group
	Picture of baseball for PA replaced by that of hiking	Hiking commonly practised in this cohort/age group
3 Goal setting & action plan	Nil	Not applicable
4 Pacing	Include examples of household chores (sweeping floor) & shopping	Gardening mostly not applicable in local living environment
5 Healthy eating	Eat-well food plate replaced by Healthy eating food pyramid	Preference of rice and cooked vegetable in Chinese culture of this age group
6 Ice & heat	Nil	Not applicable
7 Mid-term review	Merged into session on ice & heat	For reducing the total number of sessions
8 Mood & arthritis pain	The picture of a naked man replaced with an emoji diagram	Conservative culture amongst Chinese
9 Relaxation	Nil	Not applicable
10 Medication	Nil	Not applicable
11 Flare-up management	Nil	Not applicable
12 Long-term exercise	Merged into session of long-term exercise	For reducing total number of sessions

## 4.4 Phase three – Outcome measures for the Proof-of-Concept study

### 4.4.1 Background

PROMs can be used to evaluate an intervention where data are collected at pre- and post-intervention time-points (Ahern, Ruseckaite and Acherman, 2017).

Validated generic and condition-specific tools can be used. A condition-specific

PROM is more responsive to subtle changes in an individual's condition. It is important to identify a PROM for patients with KOA for HK Chinese use.

#### **4.4.2 Condition-specific outcome measure**

##### **4.4.2.1 Background**

There was no Chinese derived validated condition-specific outcome measure commonly used for KOA in HK. PROMs available in Chinese, translated from other languages, include the Chinese Oxford Knee Score (OKS), WOMAC (Chinese) and KOOS (Chinese). In practice only the OKS is used in very few centres.

The Chinese OKS (Xie et al, 2011; Dawson et al, 1998) is used for patients undergoing total knee replacement (Collins et al, 2011), and as it was a surgical outcome measure, it was considered inappropriate to use in the POC study.

The WOMAC, a 3-dimensions scale (of pain, joint stiffness and daily functional activities), has been widely used as an outcome measure for KOA (Bellamy et al, 1988), and was used in the original ESCAPE-knee pain trial. Because of the increasing use of WOMAC to measure outcomes in condition-specific interventions in the 1990s, it was recommended by consensus under the auspices of the World Health Organisation and American Association for Orthopaedic Surgery as a primary efficacy measure in OA treatment studies (Sun et al, 1997). It is not without criticism however. Item analyses for the WOMAC index revealed redundancy between corresponding pain and function items addressing the same task (Ryser et al, 1999). The total of 24 items in WOMAC added to burden on patients and clinicians with feasibility and compliance issues (Perruccio et al, 2008). Another shortcoming for using the WOMAC is that there are no data for knee-related quality of life, and that problem may be more of an issue than pain and daily activities (Roos et al, 1998).

A letter of permission to use the WOMAC for this research study was sent to Professor Bellamy in May 2015. A reply was received stating a licence fee, and charge for the WOMAC User Guide was required. This was beyond the resources of this study, and was not appropriate for future clinical use, hence, another

outcome measure for knee symptomology was explored for wider application and sustainability.

The Knee injury and Osteoarthritis Outcome Score (KOOS) was identified following literature review and consultation with academics. It is a validated outcome measure consisting of 5 subscales with 42 items: pain; symptoms; activities of daily living; sports and recreational activities; and knee-related quality of life (Collins et al, 2011; Roos et al, 1998). There was a Chinese version translated in Singapore (Xie et al, 2006) where mandarin dialect is predominant but recently a HK Chinese version in (local) Cantonese dialect was validated by an academic team in HK Polytechnic University (Cheung, Ngai & Ho, 2016).

#### 4.4.2.2 Knee injury and Osteoarthritis Outcome Score (KOOS)

The KOOS was selected as the primary outcome measure for the ESCAPE-knee pain programme in this POC study. It is now the outcome measure recommended for ESCAPE-pain programmes on the website ([www.escape-pain.org](http://www.escape-pain.org)) and it does not require a license fee. It incorporates all of the questions included in the commonly used WOMAC questionnaire. The recently translated Hong Kong Chinese (HKC) version of KOOS is a reliable and valid instrument for patients with KOA (Cheung, Ngai & Ho 2016). Internal consistency of the individual questions to its overall value was high (Cronbach alpha values above 0.70). Reasonably strong association was found between the HKCKOOS and the WOMAC index ( $\rho=-0.37$  to  $-0.86, p<0.001$ ). A diverse relationship was observed between HKCKOOS and Short Form-36. Test-retest reliability was reported to be excellent (Intraclass correlation coefficient [ICC] =0.89-0.92).

The KOOS was reported to take 10 minutes to complete by younger patients undergoing anterior cruciate ligament reconstruction in Sweden (Roos et al, 1998). For the population group of KOA patients in Hong Kong, the elder patients found HKCKOOS long and difficult to complete during a test for patient use in routine clinic audit of treatment effectiveness in PWH. This does not meet the criteria recommended by Ahern, Ruseckaite and Ackerman (2017) for a PROM that it should be feasible to be collected and minimal, to reduce burden for both patients and staff. Direct discussion in person was made with the developer, Professor Roos, in mid-2016 when she visited HK. Professor Roos recommended

incorporating a short measure of physical function for KOA – KOOS-Physical Function Shortform (KOOS-PS) (Perruccio et al, 2008). KOOS-PS was extracted from the two subscales of “activities of daily living” and “sports and recreation”. Seven of the original 22 items were selected for use as the functional component. For KOA patient clinical and research evaluation, Professor Roos also recommended to use three subscales of KOOS: 1) pain; 2) PS; and 3) Quality of life (QoL). This shortened version of HK Chinese KOOS (HKCKOOS-3) with 20 items was then tested on patients in a local physiotherapy clinic with KOA replacing the original form of five subscales. The burden on patients was reduced and the form was completed in seven minutes. The responses were put in a 5-point Likert scale from 0 to 4. The sum total for each individual subscale was converted to 100% following the instruction from the KOOS Users’ guide (KOOS user’s guide). The higher score represented better health status. HKCKOOS-3 was clinically applicable and feasible to be used as an outcome measure for this POC study. The minimal important change with physiotherapy ranged from 10.9 to 15.3 at 4 weeks following treatment (Ingelsrud et al, 2014) (Appendix G).

#### **4.4.3 Patient-specific outcome measure**

##### **4.4.3.1 Background**

Both general and condition-specific outcome measures are instruments with content and items fixed (Barten et al, 2012). They are convenient and relatively simple to categorise and compare across patients and settings. These fixed-item tools (for example KOOS, WOMAC) are often difficult to interpret on an individual patient level for treatment planning and monitoring (Barten et al, 2012; Jolles, Buchbinder and Beaton, 2005). Patients’ preferences and variability in performance on particular activities are not considered in clinical care (Seror et al, 2010). In order to understand and evaluate individual patients’ functional concern in priority in this POC study, a patient-specific functional outcome was included.

##### **4.4.3.2 Patient-specific Functional Scale**

The Patient Specific Functional Scale (PSFS) (Chatman et al, 1997) was identified to use in this POC study. It is patient-specific, in a different perspective of physical function at assessing change in a small number of activities that might be unique

and important at individual level (Gill et al, 2012). PSFS is a goal-oriented outcome measure that reflects a particular person's concern. It was designed to be used by a clinician during the initial assessment to identify three or more activities that the client felt difficult to perform due to his/her knee problem. The psychometric properties were shown to be reliable and valid for knee dysfunction (Chatman et al, 1997). The intraclass correlation coefficient (ICC) for test-retest reliability R was 0.84 and the sensitivity to change Pearson's r was 0.78. The PSFS was shown to be able to detect varying amounts of change over time between activities of different difficulty within patients (Chatman et al, 1997). The responses in PSFS were put in an 11-point likert scale from 0 – 10. Higher score indicated greater ability, nearer to the pre-morbid status. Averaging the sum total gave the final score that represented his/her ease of performing these activities (Lin et al, 2010).

#### **4.4.4 Self-efficacy measure**

##### **4.4.4.1 Background**

Benefits of exercise on improving pain and function are evident (Fransen et al, 2015) yet there is a tendency for the benefits to diminish over time in cases of reduced continued participation (Jansen et al, 2011; van Baar et al, 2001).

Maximising adherence to exercise is the key to success (Bennell & Hinman, 2011) in this integrated exercise and self-management programme (Hurley et al, 2012; Jordan et al, 2010).

Measuring self-efficacy was crucial in this project. Self-efficacy is a psychological attribute of a person's perceived belief about their ability to successfully perform a particular behaviour (Marks, 2012; Bandura, 2004), in this case, adhering to exercise. Self-efficacy perceptions can mediate the capacity and willingness to elicit health-related behaviours. Higher self-efficacy correlates with higher functional outcomes and Marks (2012) suggested that self-efficacy is behaviour domain specific. For improving functional task performance, control belief for the specific task was shown to be responsible for mediating change (Focht et al, 2005). Therefore a measure for self-efficacy for exercise and/or managing arthritis, validated in Chinese, was required for this group of KOA patients in this POC study.

#### 4.4.4.2 Self-efficacy for exercise

The Arthritis Self-efficacy Scale was developed to measure patients' arthritis-specific self-efficacy, their beliefs that they could perform specific tasks to cope with the consequences of arthritis (Brady, 2011). There is, however, no validated Chinese version available. One of the other scales, Self-efficacy on Exercise Scale, is validated to measure an individual's confidence in performing exercise, with a validated Chinese version available (Lee et al, 2009; Resnick & Jenkins, 2000). It contains nine items with responses on a Likert scale from 0 to 10 (11-point) to show their confidence to exercise. Averaging the total provides the final score. The higher score shows higher confidence to adhere to exercise. In reliability testing, internal consistency was found to be acceptable for elder Chinese (Cronbach's alpha coefficient 0.75). The criterion-related validity was supported by the positive correlation between Self-efficacy on Exercise – Chinese (SEE-C) score and level of physical activity ( $r=-0.46$ ,  $p<0.0001$ ) (Lee et al, 2009). So the SEE-C scale was chosen to reflect patients' confidence to adhere to exercise.

#### **4.4.5 Psychological measures**

##### 4.4.5.1 Background

Patients with KOA experience psychological issues, including pain-related fear, anxiety and depression (Scopaz et al, 2009; Heuts et al, 2004). Aerobic and resisted exercise was shown to have a causal effect on psychological well-being enhancement (Netz et al, 2005). As such it was beneficial to track the psychological status of participants before and after this POC study.

##### 4.4.5.2 Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression scale (HADS) was used in the original study of ESCAPE-knee pain (Hurley et al, 2007a). It was developed to screen psychological problems (Zigmond and Snaith, 1983). The anxiety and depression subscales are valid measures of severity of an emotional disorder. There were 14 items in the scale, with 7 for each of the subscales. The responses were put in a 4-point Likert scale from 0-3. The scores were summed for each subscale and the subscale scores were added for full scale. HADS was translated to Chinese and validated (Wong & Yu, 2013; Leung et al, 1999; Lam et al, 1995;). The optimal cut-

off threshold for screening psychiatric morbidity using the HADS for Cantonese-speaking Chinese elderly in the full scale were reported to be 10/11 (Wong & Yu, 2013) or 15/16 (Leung et al, 1999) respectively. The cut-off threshold for the anxiety and depression scores were varied amongst HK Chinese study populations as well: 6 and 3 by Lam and colleagues (1995); 8/9 and 5/6 by Leung and colleagues (1999); and 4/5 and 6/7 by Wong & Yu (2013) respectively. For this POC study, the lower margin of the cut-off of the full scale was adopted for more stringent criteria, i.e. 10/11 points in total (Wong & Yu, 2013).

#### **4.4.6 Global improvement**

##### **4.4.6.1 Background**

The numeric global rate of change score (NGRCS) (Kamper et al, 2009; Tsang, 2004) was included. This scale allows the patients to decide what they considered important. It collects important and relevant information in addition to being a standardised pain and disability instrument. From a systematic review of the threshold in discriminating the changes in health-related quality of life for chronic diseases, Norman and colleagues (2003) reported the NGRCS to be approximately half a standard deviation.

##### **4.4.6.2 The Numeric Global Rate of Change score**

In this POC study, a 21-point NGRCS was constructed (Tsang, 2004) to assess whether the patient's overall condition improved, remained unchanged or worsened. It anchors from -10 (worst change in overall condition) to +10 (best change in overall condition), with 0 being "no change". This score has been adopted for routine clinical care for all musculoskeletal care in all public hospitals and physiotherapy clinics in HK.

#### **4.4.7 Performance testing**

##### **4.4.7.1 Background**

Performance-based tests of physical function are recommended for patients diagnosed with KOA. They are intended for use in clinical or research as performance outcome measures and are viewed as complementary to established

self-report questionnaires for comparison. The OARSI recommend a minimum core set of tests (OARSI manual, 2012): 1) 30-sec chair stand test; 2) 40m fast-paced walk test, and 3) stair-climb test. They have been tested to be valid and reliable (Dobson et al, 2012) and selected in this POC study.

#### 4.4.7.2 40-meter fast speed walk test

A fast-paced walking test was timed over 4 x 10 meter for a total 40 metres. It tests walking activity for the speed and changing direction.

#### 4.4.7.3 30-second chair stand test

The maximum number of chair stand repetition possible was timed in a 30-second period. It tests sit-to-stand activity, reflecting lower body strength, aerobic capacity and dynamic balance.

#### 4.4.7.4 12-step stair climb test

The time to ascend and descend 12 steps was taken. In the local physiotherapy clinic, there was a 4-step staircase. So the client was timed to ascend and descend the staircase for 3 rounds. This represents a typical functional task that KOA patients often find challenging.

### **4.5 Phase four – Training for physiotherapists**

Physiotherapists are healthcare professionals who are expert in improving patients' muscle strength, enhancing physical activity and functional movement recovery (Hong Kong Physiotherapy Association, 2017). Therefore, physiotherapists were well placed to deliver the core component of the ESCAPE-knee pain programme in HK. Clinical practice, however, follows principles of physical, pathological and anatomical sciences as the main approach in physiotherapy (biomedical), as compared to the psychological and social aspects (psycho-social) [Definitive Programme Document of BSc (Hons) in Physiotherapy Programme, HKPolyU, 2016-2020, private circulation]. Typically, exercise interventions are offered to patients for strengthening and flexibility, together with a didactic talk on knee care or more often a video show in the local clinical setting in HK. Therefore, training to



equip physiotherapists with the knowledge and skills of self-management before the delivery of the ESCAPE-pain programme in this POC study was essential.

#### **4.5.1 Objectives**

1. To provide physiotherapists current and up-to-date evidence of KOA management
2. To enhance physiotherapists' knowledge and skills on motivation and self-management for exercise adherence
3. To equip physiotherapists with an in-depth understanding of the knowledge and skills covered in each class of the ESCAPE-knee pain programme

A seven-hour training programme divided into three parts and conducted out on different days was conducted for the involved physiotherapists as this arrangement matched more with their time schedule. The programme covered updated evidence on KOA management, motivational interviewing and the detailed content of the ESCAPE-knee pain programme.

#### **4.5.2 The trainer and background**

##### **4.5.2.1 Background in Social Cognitive Theory**

The doctoral candidate was the trainer, whose body of knowledge on contemporary evidence for KOA management has been developing throughout the doctorate studies. The most widely adopted theory explaining the mechanisms of self-management is the Social Cognitive Theory in health promotion (Bandura, 1998) and the related Self-efficacy Theory (Bandura, 1997). The self-efficacy enhancing strategies of skills mastery, modelling, symptom reinterpretation, and persuasion were adopted in self-management programmes (Richardson et al, 2014; Brand et al, 2013). In the Independent Studies module in the Doctorate in Health and Social Care programme, the candidate studied self-management theories and intervention processes in preparing for this POC study. Presentations were given on related topics in the in-service training programme in the physiotherapy department and tutorials with the fellow candidates on the Doctoral programme.

#### 4.5.2.2 Background on motivational interviewing

In addition to supporting behavioural change, motivational interviewing (MI) (Rollnick, 2010) is an emerging guiding style of verbal interaction with patients (Percival, 2017; Johnston and Stevens, 2013). Steps to engage patients, clarify their strength and aspirations, evoke their motivations for change and promote the autonomy of decision making were advocated (Rollnick, 2010). The skills include verbal communication skills in a non-directive way, engaging patients with acceptance and empathy, providing information after obtaining permission, and motivating patients to set goals and produce action plans. Recent systematic reviews showed MI to be promising in areas of weight management, sedentary behaviour, self-monitoring, physical activities in chronic illness and confidence in change (Halloran et al, 2014; Lundahl et al, 2013). The MI approach is also incorporated in the ESCAPE-knee pain programme.

The trainer had completed both an introductory and advanced workshop on MI. Being a member of the Chinese Association of Motivational Interviewing in HK, regular attendance in symposiums and forums organised by the Association were maintained. In-house introductory talks and training programmes for colleagues on the related topic have also been provided.

#### 4.5.2.3 Background on an adult learner

In the training programme designed for the practising therapists, the adult learners' needs should be understood such that strategies could be adopted in the education programme. Adults and children learn differently (Knowles, 1973). Andragogy is developed as a set of core adult learning principles that apply to all adult learning situations, focusing on individual growth (Knowles, Holton III and Swanson, 2015). Within andragogy, there are six key concepts which include: the learner's need to know, self-concept of the learner, prior experience of the learner, readiness to learn, orientation to learning, and motivation to learn (Knowles, Holton III and Swanson, 2015). The learning processes cover motor skills, verbal information, intellectual skills, cognitive strategies and attitudes. The learners gain knowledge and expertise. Adults learn through experiences and the meaning along with these experiences. They become motivated when they find needs and

interest, presented in real-life situations and analysis and relatedness of experiences.

Carl Rogers (1951) conceptualised a student-centred approach as parallel to client-centred therapy, emphasising five basic hypotheses: facilitation in adult learning, relevance of learning, resistance from experience inconsistent with the self, acceptant and supportive climate, and minimal threat to the learners and their experience seen in absolute and unconditional terms (Knowles, Holton III and Swanson 2015). In this training programme, all therapists were adult learners with different background knowledge and experience as a therapist and an individual. It was also likely that they had a different degree of willingness to learn new ideas/skills. The above background knowledge about adult learning informed the strategies taken for this training programme as discussed below:

- Needs and interest – the participating therapists' needs were solicited before the training for relevance of learning; for the section on training for ESCAPE-pain programme, the participants were invited to participate more in discussion
- Life situations – Case scenarios were introduced at the beginning and throughout the training sessions, with sharing the experience of managing KOA patients and how to motivate them for exercise
- Facilitation – no lecturing, but interactive discussion at different points of current evidence update sharing
- Acceptant and supportive climate – role plays to allow participants to present their first-hand experience, non-judgemental atmosphere during discussion or debriefing
- Minimal threat to learner – no direct linking with their work or job appraisal

### **4.5.3 Methodology**

#### **4.5.3.1 Target participants and recruitment**

Two physiotherapists were identified to deliver the ESCAPE-knee pain programme. Both were working at the same physiotherapy department as the doctoral candidate and had received overseas training in physical and psychosocial training programmes. They were also involved in related programmes for patients with complex low back pain and chronic obstructive pulmonary disease. A hard

copy of the Participant Information Sheet (Appendix H1) was presented to both of them by the doctoral candidate inviting them to each deliver the programme to a group of patients. Explanation and elaboration on the ESCAPE-pain programme was provided to both physiotherapists by the candidate. They were both given 24 hours to consider the participation in the POC study. The following day, they agreed to participate and provided signed informed consent (Appendix H2). Then the participating therapists were asked to complete a pre-training survey.

#### 4.5.3.2 Pre-training survey on therapists

This survey was aimed at understanding physiotherapists' previous training profile. It consisted of two sections: 1) therapist's background and expectation toward this training programme; 2) therapist's knowledge of evidence for KOA management.

The details are described below (see Appendix I1 for pre-training survey form):

1. Section 1 – Therapist's background and expectation (4 questions):

- Working experience in musculoskeletal cases (choices from less than a year to more than 10 years)
- Past training in cognitive behaviour therapy (if yes, number of days)
- Past training in motivational interviewing (if yes, number of days)
- Any expectations from this ESCAPE-knee pain pre-training (open-end questions for therapists to provide their information)

2. Section 2 – updated evidence on KOA management (16 questions in 6 areas with responses laid out in 5 categories of the agreement. The six areas, questions and the brief references are laid out below. Details reference is attached in Appendix J.

I) Misconception on KOA disease

Q1 *Knee pain is due to 'wear and tear' within the joint and the problem will probably worsen over the long term.*

OA is related to age but not inevitably resulted from ageing (Andersen and Loeser, 2010). It is a dynamic reactive pattern of a joint related to a number of risk factors (Busija et al, 2010).

Q2 *Participation in physical activity and exercise, in the presence of OA, may cause damage within the affected joint.*

Lower limb muscle weakness is associated with greater cartilage loss (Ding et al, 2008). Increased muscle strength was found to have protective effect on cartilage degeneration (Amin et al, 2009) and reduced disease progression (Mikesky et al, 2006).

II) Psychosocial factors

Q4 *Depression is associated with more OA symptoms.*

“Psychological impairment such as depression and anxiety are common” in KOA patients (Bennell, Dobson & Hinman, 2014, p.94). Inactive elder with KOA had higher depression scores (Shams, Hadi & Sahaf, 2016).

- Q10 *Apart from reducing pain, improving physical and psychological functioning is important for KOA management.*  
Core treatment of exercise, education and weight reduction should be given to all KOA patients (NICE, 2014). Physical activity has strong effects on self-efficacy. Improvement in strength, cardiovascular status and functioning improves overall well-being (Netz et al, 2005).

### III) Types of exercise

- Q3 *A patient suffering from moderate pain should refrain from physical exercise.*  
All people with OA are advised to exercise, irrespective of age, comorbidity, pain severity or disability (NICE, 2104). Exercise should include local muscle strengthening and general aerobic fitness. Similar effects were found in mild, moderate or severe KOA (Fransen et al, 2015; Juhl et al, 2014).
- Q5 *Patients with KOA should be deterred from practising weight-bearing activities.*  
A systematic review showed muscle strengthening with or without weight-bearing and aerobic exercise are effective for pain relief (Tanaka et al, 2013). Similar improvement for weight-bearing and non-weight bearing training in muscle strength and physical function (Jan et al, 2009).
- Q7 *Strengthening exercises for knee will need to cover quadriceps and hamstrings only.*  
Strengthening major lower limb muscles is advocated (Bennell, Dobson & Hinman, 2014), e.g. strengthening for hip, knee and calf muscles (Tanaka et al, 2013).
- Q8 *Increasing overall general physical activity levels during everyday life is important.*  
Aerobic exercise, such as walking or cycling, is beneficial for improving pain and physical (Bennell, Dobson & Hinman, 2014).

### IV) Exercise dosage

- Q9 *If knee pain increases in severity, I immediately withhold exercise activity.*  
A scale for pain monitoring during training can be followed, allowing pain up to 5 on a 0 to 10 point scale during and after the training session (Ageberg et al, 2013). In case of pre-session pain, weight-bearing activities were excluded while cycling and core stability exercise were continued (Bartholdy et al, 2014).
- Q11 *Exercise intensity should be altered if there is increased pain the following day.*  
Severe pain or swelling during or after exercise, overnight or even

the following day, indicate that exercise programme may be too intensive (Bennell, Dobson & Hinman, 2014).

Q12 *The greater the intensity of exercise training, the higher the treatment effect will be.*

A positive dose-response effect was obtained in a recent SR and MA findings. The effect of aerobic exercise on pain relief increased with an increased number of supervised sessions (Juhl et al, 2014).

#### V) Self-management

Q6 *Treatment may have been successful even if the pain fluctuates.*

Chronic pain management calls for activity and exercise. Although pain may never go away and affect certain functions, patients can gain control over their pain and improve overall functional levels (Vasudevan, 2015).

Q15 *Learning to cope with stress promotes wellbeing in knee pain.*

Prevalence of depressive symptoms is high (Sale, Gignac & Hawker, 2008). In ESCAPE-knee pain programme (Hurley et al, 2007a) and Pain Coping Skill Training programme (Bryant et al, 2014), relaxation for stress management was practised.

Q16 *Engage patients actively for goal setting and action planning.*

Optimal health outcomes will be enhanced by implementation of individually tailored goal-directed exercise programmes, mutuality in goal setting and an appropriate action plan (Marks, 2012).

#### VI Exercise adherence

Q13 *Beneficial effects of exercise last only as long as the patients with OA continue to participate in exercise.*

The effect of exercise for pain for OA hip and knee declines over time and finally disappear (van Baar et al, 2001).

Q14 *A person's confidence in their ability to carry out exercise increases the likelihood of continuing in the long-term.*

Adherence requires behaviour change (Hay-smith, 2016). To act, a person requires self-efficacy for the behaviour (Bandura, 1997). Treatment effect of physical activity was found to be mediated by self-efficacy (Anderson et al, 2010).

The responses were laid out in five categories of different degree of disagreement or agreement. For analysis, the categories were converted to a Likert scale of 0-4, with 0 being not agreeing to the statement and 4 agreeing totally. The responses of six questions (being 1, 2, 3, 5, 7 and 9) were put in a reverse order in the survey questionnaire. They were reversed back for data analysis. For the interpretation, disagreeing with the statements demonstrated that the participant had a view not consistent with the current evidence of knowledge on the disease and management of KOA.

Conversely, agreeing with the statements showed that the participant was aware of current thinking around KOA management. If the response chosen was “neither agree nor disagree”, it might be interpreted that the participant did not know what was the correct response in relation to best practice (See response categories in table 4.10). In areas of inadequate knowledge (not knowing right or wrong, Likert scale 2), or requiring evidence update (Likert scale 0 and 1), further training was included in the subsequent programme.

Table 4.10 Response categories and interpretation of the questions in the pre-training survey form.

Response categories	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Likert scale	0	1	2	3	4
Interpretation	Not consistent with current evidence of knowledge unfolded		Not knowing what's right or wrong	Knowledge of the disease and it's management updated and positive	

#### 4.5.3.3 The results of the pre-training survey

The two participating physiotherapists had at least four years of experience within the musculoskeletal speciality, yet had limited training on cognitive behavioural therapy or motivational interviewing. Their learning goals suggested they would like to improve knowledge on education, psychological interventions and an exercise training programme to help patients with KOA cope with their daily activities.

The pre-training survey showed that the therapists had some inaccuracies in the concept of KOA disease, having “wear and tear” in the painful joint that will worsen over time. Ageing increases the susceptibility of OA, but it is a dynamic reaction, catalysed by risk factors for example obesity, previous injury or operation and biomechanical load. Furthermore, one therapist had a notion that participation in physical activities and exercise might cause damage within the affected joint.

For exercise dosage, one therapist was not sure whether exercise should be withheld immediately if knee pain increases in severity. One therapist thought the greater intensity of exercise would not result in greater treatment effect. Although

there was no impact on the intensity of exercise training, high resistance strengthening showed similar but greater effect size compared with low resistance training (Jan et al, 2008). Supervised aerobic exercise performed three times a week demonstrated a greater level of pain relief but not strength compared with fewer sessions. In addition, one therapist somewhat disagreed that exercise benefit lasted as long as exercise was continued (Table 4.11). Both therapists demonstrated an understanding of the psychological impact on patients and the management programme. Clarification with updated evidence hence was included in the training programme.



Table 4.11 Individual therapist's profile of the pre-training survey results. Scores with 2 or below were followed up for clarification in the subsequent training programme with the therapists.

Areas of concern	Question	Brief description	Therapists' score (4 max)	
			A	B
I) Inaccurate understanding	Q.1	"Wear & tear" of joint worsening in the long-term <i>(score reversed)</i>	2	0
	Q.2	Physical activities damage OA joint <i>(score reversed)</i>	4	2
II) Psychological	Q.4	Depression associated with more OA symptoms	3	3
	Q.10	Psychological functioning important for OA management	4	4
III) Types of exercise	Q.3	No physical exercise for moderate pain <i>(score reversed)</i>	4	3
	Q.5	Weight-bearing exercise not for KOA <i>(score reversed)</i>	3	3
	Q.7	Strengthening exercise for quadriceps and hamstrings only <i>(score reversed)</i>	4	4
	Q.8	Increasing general physical activities important	3	3
IV) Exercise dosage	Q.9	Withhold exercise immediately if knee pain increases <i>(score reversed)</i>	3	2
	Q.11	Alter exercise intensity if pain increased the next day	3	3
	Q.12	Greater exercise intensity resulted in greater treatment effect	3	1
V) Self-management	Q.6	Treatment successful even if pain fluctuates	3	3
	Q.15	Coping with stress promotes wellbeing	4	3
	Q.16	Engage patients to set goal and action plans	4	4
VI) Exercise adherence	Q.13	Exercise benefits last only as long as exercise is being continued	1	3
	Q.14	Confidence in one's ability to exercise more likely for long-term practice	4	4

#### 4.5.3.4 Training programme

The seven-hour training programme was divided into three parts (evidence update, MI and briefing on ESCAPE-knee pain), to equip the two participating physiotherapists with updated evidence on KOA disease and management relating to exercise training and self-management. The first and second parts of training were completed before the ESCAPE-knee pain programme was conducted. The survey described above identified areas of insufficiency and inaccurate understanding, and emphasis, therefore, was focused on those areas. As for the ESCAPE-knee pain classes, in-depth discussion, topic by topic in the Facilitator's Handbook, was required for fidelity to the UK intervention.

The first part on current KOA disease and management consisted of a one-and-a-half-hour power-point presentation with interactive discussion (slide presentation see appendix K1). The second part covered knowledge and skills on motivational interviewing (MI) (slide presentation see appendix K2). The survey identified that the therapists had little training on MI and the programme was conducted in a group setting. Therefore, the training focused upon strategies to facilitate sharing within the group and linking amongst group members for establishing motivations to develop exercise behaviour (Wagner and Ingersoll, 2013). During the training, presentation and role-play were also conducted. Three hours were spent in total over three different dates on MI training (see table 4.12 for details).

Three and a half hours were spent on the third part of training to understand in detail the ESCAPE-knee pain programme. This section was broken down into 10 briefing sessions, two per week during the ESCAPE-pain programme. The two groups of ESCAPE-pain programme were started at the same time but on different days. A 20-minute briefing meeting/training was undertaken approximately 2 days before each session. This on-going briefing and support along with the programme allowed more in-depth discussion on the content and feedback for each session. It also served as a timely review of the previous session. Details of the training programme are laid out in table 4.12.

Table 4.12 Training programmes for physiotherapists delivering ESCAPE-knee pain programme

Evidence-based practice			
Objectives		Content	Format (time)
1	To update current evidence on KOA management	-definition & clinical presentation -prevalence -pathogenesis	Presentation Discussion (1.5 hours)
2	To clarify therapists' misconception	-practice guidelines on *exercise types, intensity, dosage, effect & adherence	
3	To introduce the SLR of clarify therapists' misconception	*self-management for arthritis, types & effect -SLR of integrating exercise and self-management (detailed in chapter 2)	
Motivational interviewing			
1	To introduce knowledge and skills on motivational interviewing (MI), for enhancing patients' motivation and adherence of self-management and exercise	-Creating ambivalence & discrepancy for change -Taste of MI for change -Definition of MI -MI spirits: partnership, acceptance, evocation, compassion -MI process: engaging, focusing, evoking, planning -Core skills: open-end questions, affirmation, reflection, summary, empathy	Presentation Role play (2 hours 15 minutes)
2	To introduce MI group	-Using group therapy techniques -MI group leader's tasks -MI group model: engaging the group, exploring perspectives, building momentum and moving into action	Presentation Discussion (45 minutes)
Training of ESCAPE-knee pain			
1	To have in-depth understanding on the content covered in each class of ESCAPE-knee pain programme	10 sessions – highlights & emphasis: -Cycles of change & exercise circuit -Joint pain & benefits of exercise -goal setting & action plan -pacing activities -healthy diet -ice & heat; mid-way review -anxiety, mood & pain -relaxation technique -drug management -managing flare-ups; exercising in the long-term	Briefing Discussion (10 sessions, two in a week during the ESCAPE-knee pain programme, 20 minutes each session)
2	To have a short review of the previous session	-Logistics for exercise training component/equipment/progression -Review on patient attendance -Safety and precautionary issues -Sharing on patients' feedback	

#### 4.5.3.5 Post-training evaluation of therapists

At the end of the training (which coincided with the end of the ESCAPE programme), a post-training evaluation survey was given to the two participating therapists (Appendix I2). It consisted of two sections including collecting therapists' feedback and evaluating any change in the therapists' knowledge of updated evidence on KOA management. A summary is provided below:

##### 1. Section 1 – Therapists' feedback (6 questions)

- Usefulness on the training programme – open-ended questions to solicit opinions
- The pace of the training - three choice with space for putting an additional comment
- The clinical examples discussed – an open-ended question
- The feedback during the role plays – an open-ended question
- Meeting the expectation of the training – an open-ended question
- Integrating exercise with self-management into general clinical work in the future – an open-ended question

##### 2. Section 2 – the same 16 statements used in the pre-training survey

#### 4.5.3.6 Results of the therapists post-training evaluation

##### 4.5.3.6.1 *Updating current evidence*

The knowledge gain for the disease and management of KOA was positive for both therapists in all the areas covered. They demonstrated a good understanding of the psychological factors influencing the disease and grasped the strategies of self-management and exercise adherence (all scores 3 or above, table 4.13). They were aware of the types of exercise recommended for patients with KOA, although remained slightly less confident regarding dosage (all scores remained at 3 only). See table 4.13 for details.

Table 4.13 Physiotherapists' profile before and after training on knowledge of knee osteoarthritis disease and management.

Areas of concern	Brief description		Therapists' score			
			A		B	
			pre	post	pre	post
I) Inaccurate understanding	Q.1	"Wear & tear" of joint worsening in the long-term	2	4	0	1
	Q.2	Physical activities damage OA joint	4	4	2	4
II) Psychological	Q.4	Depression associated with more OA symptoms	3	3	3	3
	Q.10	Psychological functioning important for OA management	4	4	4	4
III) Types of exercise	Q.3	No physical exercise for moderate pain	4	4	3	3
	Q.5	Weight-bearing exercise not for KOA	3	4	3	3
	Q.7	Strengthening exercise for quadriceps and hamstrings only	4	4	4	4
	Q.8	Increasing general physical activities important	3	4	3	4
IV) Exercise dosage	Q.9	Withhold exercise immediately if knee pain increases	3	3	2	3
	Q.11	Alter exercise intensity if pain increased the next day	3	3	3	3
	Q.12	Greater exercise intensity resulted in greater treatment effect	3	3	1	3
V) Self-management	Q.6	Treatment successful even if pain fluctuates	3	4	3	3
	Q.15	Coping with stress promotes wellbeing	4	4	3	4
	Q.16	Engage patients to set goal and action plans	4	4	4	4
VI) Exercise adherence	Q.13	Exercise benefits last only as long as exercise is being continued	1	3	3	3
	Q.14	Confidence in one's ability to exercise more likely for long-term practice	4	4	4	4

Key: KOA Knee osteoarthritis (average score range from 0 to 4, the higher the better).

The number of questions they scored maximally (or very assertive) increased to 11 (before treatment=7) for therapist A and 7 (before treatment=4) for therapist B. They also had 5 and 8 questions scored one or more rank higher respectively after training (see table 4.14).

Table 4.14 Improvement in knowledge of current evidence on KOA (higher ranks more consistent with current evidence)

	Therapist A		Therapist B	
	pre	post	pre	post
Number of questions with highest score	7	11	4	7
Number of questions scored $\geq 1$ rank higher	---	5	---	8

#### *4.5.3.6.2 Feedback on the content of training*

From their feedback, both therapists found the training programme useful in updating current evidence. It served to familiarise them with the class content, and they also had the opportunity to practice how to motivate patients to adhere to exercise. Incorporating related examples during the training was useful.

#### *4.5.3.6.3 Feedback on the training process*

The therapists found the pace of the training programme was acceptable. The role play and discussions following the scenarios were considered helpful in reflecting treatment approach, especially in ways to present open-end questions and interviewing skills.

#### *4.5.3.6.4 Feedback on the outcome after the training*

The therapists commented on the knowledge and skills acquired in the training programme were useful in their future clinical practice. They could explain pain and the dietetic advice to other patients for enhancing exercise treatment effect.

#### *4.5.3.6.5 Comment on ESCAPE-knee pain programme*

Both therapists commented that their expectations were met in the training and the actual delivery of the programme.

## **4.6 Discussion**

### **4.6.1 Summary of findings**

The patient information booklet was translated into Chinese and culturally adapted for HK use. While the core ESCAPE-knee pain features of education of self-management and exercise were maintained, the programme was adapted to 10 sessions. Suitable outcome measures were identified in the HK context and local physiotherapists were trained to deliver the intervention programme.

To prepare for the POC study on the ESCAPE-knee pain programme in HK, the patient information booklet was translated following a stringent process of forward translation, synthesis, “think-aloud” protocol face validity and field-testing in the

cognitive debriefing process. Linguistically, there were significant differences in language, and some changes were made due to Chinese use of language and relevance to culture. Overall, the amendments made were minor.

From the validity testing, the therapists were highly agreeable to the relevance (MES 4.48 out of 5) of the content for local education purpose on the patient group with KOA, yet they seemed to agree less for the patients to be able to understand (MES 4.12), especially on the items of aim, change cycle, pacing and relaxation. On the field-testing of cognitive debriefing, the patients highly agreed that the booklet was relevant (MES 4.46). They also highly agreed that they understood the content in the booklet, except that in the topic of drug management (MES 3.83).

In the process of replicating ESCAPE-knee pain in HK for this POC study, the core components of education on self-management and exercise regimen delivered by a physiotherapist were maintained. The only changes made were the total number of sessions reduced to 10 (12 originally), the class size increased to 10 (originally 8) with an addition of an assistant running the class because of the increase in patient number and hospital request for safety.

The outcome measures of this POC study on ESCAPE-knee pain were all different from the original study. Although WOMAC was used in the original trial, a license fee would be charged for using it in this POC study. Besides, KOOS is currently recommended to be used as an outcome measure in the ESCAPE-pain website. KOOS which was validated to be disease specific for KOA was selected to be the primary outcome measure. To evaluate individual functional status, PSFS was included. SEE-C was the process outcome selected to evaluate and understand how the change would occur if appropriate. HADS was used to evaluate the psychological status to measure any change from the intervention. The functional PROMs were substantiated by the performance tests of walking, chair stand and stairs.

The pre-training survey showed that there was inaccurate understanding about exercise benefits for KOA. Knowledge was inadequate about exercise dosage and need for continuation. There was a positive gain in the therapists' knowledge on the disease of KOA and the management. The content of self-management in the ESCAPE-knee pain programme was viewed as utilisable in future clinical practice.

#### **4.6.2 Translation of the information booklet**

Formal and structural procedures for cross-cultural adaptation of self-report measures have been developed (Beaton et al, 2000) which were adopted by the American Academy of Orthopaedic Surgeons Outcome Committee (Epstein et al, 2015).

For the present POC study, the information booklet was not an instrument for measurement. Instead, it was aimed at education. Equivalence in achieving relevance of the topics and meaning of the content of the booklet in both cultures was needed during the process. It was shown by the high level of agreement demonstrated by the therapist and the patient groups. The patients accepted the information booklet for equipping them with self-management because it was presented in a printed version and it served to be a guide and for revision later.

Cultural adaptation of concepts and activities were demonstrated in translating questionnaires from English to Chinese language for local relevance. Examples include measurement unit of walking distance in mile/yard in the original version changed to kilometer/meter in target version (Liu, Tao and Luo, 2009; Lue et al, 2008) or from distance-based unit changed to time-based unit (Chow and Chan, 2005). An item asking about sex was reported to be less appropriate to discuss in public in Chinese communities yet it was retained in the instrument for integrity (Liu, Tao and Luo, 2009; Lue et al, 2008; Chow and Chan, 2005; Lee et al, 2004). Yet in the information booklet, the picture of a naked male Greek-God statue was replaced by a sketch showing low mood. Changes were reported to provide examples of activities more relevant to the lifestyle of the local Chinese population such as adding "Mah-jong", "playing chess/checkers" (Lee et al, 2004). As in the information booklet, pictures showing popular physical activities, baseball in the original version was replaced by hiking.

In cognitive debriefing process to collect opinions qualitatively in translation of PROM, Furtado et al (2010) reported that clinical review was proven to be invaluable. Changes were typically made in alteration of specific terminology. Hence reviewers and translators should have good communication for clarification and the advice recommended. In this study, the doctoral candidate had a dual role of being reviewer and translator.



The high MES score obtained in the quantitative pre-test demonstrated that the content of the booklet was easy for the users to understand, including both the physiotherapists and patients, with the presentation lay-out attractive and helpful to aid learning of self-management.

#### **4.6.3 Replication of evidence-based programme**

For replicating evidence-based interventions in populations not in the same language and culture, cultural adaptation is required (Tornatzky et al, 2013; Chen et al, 2012b; Kelly et al, 2000) yet it is also important to maintain the fidelity of the programme. Lorig et al had translated self-management programmes from English to Spanish for Hispanic populations. In the Spanish Arthritis Self-management Programme, the detailed protocol was translated but there were important cultural adaptations like extensive materials on healthy eating, selection of products, portion size and meal planning (Lorig, Ritter and Jacquez, 2005; Lorig, Ritter and Gonzalez, 2003b). There were audio exercise tape, an illustrated booklet of the exercise outlines and an audio relaxation tape added to the programme.

Changes were made to the Arthritis Self-Management Program fit for older African American, Hispanic, and non-Hispanic white adults in the community – the Arthritis Self-Help Programme (Parker et al, 2012). The core components were maintained including weekly action plans, accomplishing goals, feedback from other participants, modelling of efficacy behaviours by peers and instructors and reinterpretation of symptoms through education (Parker et al, 2012). Through feedback drawn from patients and instructors leading, additional handouts for healthy eating, weight management, medications were included.

The above mentioned programmes illustrated the importance of maintaining core components but considering cultural changes. These principles were observed in the process of developing ESCAPE-knee pain for HK use. While cultural and language changes were made, the core components were maintained for content following the manualised physiotherapist facilitated discussion on self-management and structure of two sessions lasted for 5-6 weeks. Fidelity to the UK programme was further enhanced through staff training, which is discussed further in a later section.

#### **4.6.4 Outcome measures for local use**

The WOMAC was initially chosen as the PROM with the Chinese version obtained from a local academic. It was subsequently disappointing to discover that a license fee would be charged which would have limited the sustainability of using WOMAC clinically. The direct discussion with the KOOS developer and the researcher validating the HK Chinese version of KOOS helped to solve the problem of finding a suitable outcome measure.

Although the WOMAC is a widely used outcome measure for studies undertaken on KOA condition, it does not include any item on quality of life. Out of three outcome measures, the KOOS was selected as it reflected the domains that were important for patients, and was free for use, and therefore sustainable.

KOOS has been translated to other languages. Similar psychometric properties of the instrument were reported. Cronbach alpha measuring internal consistency of the scale and it was reported to be 0.89 in the Portuguese study (Goncalves et al, 2010) and within the range of 0.71-0.94 in the Dutch cohort (de Groot et al, 2008) as compared to greater than 0.70 of the HK Chinese cohort (Cheung, Ngai and Ho, 2016). Reliability of the scale was measured by ICC and was similarly reported to be over 0.70 in the Dutch (de Groot et al, 2008), Portuguese (Goncalves et al, 2010) and Singaporean Asian (Xie et al, 2006) cohorts as compared to 0.89-0.92 of the HK Chinese cohort (Cheung, Ngai and Ho, 2016). Construct validity of a measure is supported by evidence accumulated through testing the relationship that the measure exhibits with other validated measures (Harris et al, 2013). Short Form 36 (Ware et al, 1993) is a general health survey for comparison. Moderate and strong correlation was demonstrated in the convergent construct validity measuring similar properties and weak correlation found in the divergent construct validity measuring different properties (Goncalves et al 2010; de Groot et al, 2008; Xie et al, 2006). Similar properties were found in the HK Chinese version (Cheung, Ngai and Ho 2016).

With the developer's recommendation, three subscales of pain, physical function and quality of life were used and that reduced patients' burden. KOOS-PS, the shortened functional subscale, had been compared with other questionnaires measuring physical function. Harris et al (2013) reported a negative correlation

between KOOS-PS and OKS ( $r=-0.62$ ) on conservative physical therapy for KOA subjects as the two scales go in opposite directions. In a nine countries study on patients received total knee replacement, high correlation was demonstrated between KOOS-PS and WOMAC-function ( $r=0.84$ , range 0.75-0.91) (Mehta et al, 2016). In a study comparing KOOS-PS with WOMAC-function on a group of subjects receiving conservative treatment, 11 hypotheses (73%) in the KOOS-PS were confirmed out of the 15 *in priori* hypotheses, one confirmed hypothesis less than that for the WOMAC-function (80% in total) (Mahler et al, 2016). The authors reviewed that there was no consensus or guideline about the nature and number of hypotheses that should be tested and confirmed though responsiveness was considered positive if >75% of confirmed hypotheses was achieved. Moreover, there were fewer patients (10.6%) in the group improved in daily function after three months compared with those who reported their condition stable (80.7%). It is possible that the relatively small number of improved patients could have influenced the strength of the correlations the authors found.

On the website for ESCAPE-knee pain, the KOOS is now recommended as the outcome measure for evaluation. This meant that results obtained from this POC study could then be compared with other researches that used KOOS as an outcome measure. At present, it was used as a clinical outcome for all knee affects in the clinic in the local PWH to detect any change after physiotherapy.

#### **4.6.5 Training for therapists**

In this POC study, it was demonstrated that the physiotherapists in HK had their knowledge increased on KOA management and skills enhanced after additional MI training with briefing sessions and role plays. In a systematic review, educational meetings were shown to improve professional practice and healthcare outcomes on patients but the effect is mostly small (Forsetlund et al, 2009). Mixed interactive and didactic formats showed higher (median adjusted risk difference [RD] 13.6) effect compared with either didactic meetings (RD 6.9) or interactive meetings (RD 3.0) only. For changing complex behaviours, educational meetings alone are not likely to be effective (Forsetlund et al, 2009). This review findings provide further support for the didactic teaching of the current evidence update and MI processes, mixed with interactive format of discussion and role play.

In the Spanish Arthritis Self-Management Programme (Lorig, Gonzalez and Ritter, 1999), Hispanic Chronic Self-management programme (Lorig, Ritter and Jacquez, 2005; Lorig, Ritter and Gonzalez, 2003b) and the Spanish Diabetes Self-management Programme (Lorig et al, 2008b), lay leaders were taught from a standardised protocol that detailed both the content and process. The training consisted four days of training in the use of the protocol with practical teaching sessions. The trainer evaluated the final practice teaching to see whether the leader could lead the programme.

In the Arthritis Self-Management Programme led by lay leaders in patients with chronic inflammatory arthritis in HK, there was a “Train the Trainers program” to train lay leaders with similar inflammatory arthritis problems. They were trained in small group leadership and taught on basic principles of self-management and knowledge of chronic inflammatory arthritis by a rheumatologist. Lay leaders were given license after training to provide lay-led classes. The days of training, however, were not specified.

In the above mentioned programmes, the length of training was longer than the length of training provided in the ESCAPE-knee pain programme in HK. The difference could be attributable to the lay leaders in the self-help group while physiotherapists with experience working on musculoskeletal cases were selected for delivering the ESCAPE-knee pain programme in this POC study.

## **4.7 Strengths and limitation**

In reviewing the development work of the HK version of ESCAPE-knee pain programme, there were areas of strengths and limitations.

### **4.7.1 Strength of the programme development**

First of all, in the translation work, the doctoral candidate had past training and experience in translation in particular within the medical field. There were no problems encountered with the first translator’s role, but due to time constraints, it was not possible to identify another translator to repeat the forward translation. As recommended by McKenna and Doward (2005), an experienced bilingual professional was invited to undertake proof-reading which served as a check of accuracy and quality.

Two-staged cognitive pre-testing was undertaken on the usability test of the information booklet qualitatively and quantitatively. Refinement was done through the initial stage and confirmation of usability in the local context was achieved in the latter stage.

#### **4.7.2 Limitations**

Training on motivational interviewing was undertaken with the therapists. The doctoral candidate was not accredited to be a member of the Motivational Interviewing Network of Trainers, and it was only the sharing gained from previous training and experiences.

The doctoral candidate knew the participating physiotherapists, and as people generally want to be polite, it is possible that responses to feedback questions were answered in a socially desirable way, rather than an honest reflection, and as such the result may have been inflated (Collins, 2003).

Further to this, the physiotherapists trained were both proactive in relation to the principles of behaviour change and had overseas experiences in other cultural settings. As such, the effect of the training programme may not be generalisable to the other local physiotherapists.

#### **4.8 Conclusion**

The information booklet for patient was translated into Chinese and tested cognitively to be relevant and comprehensible. The ESCAPE-knee pain programme was appropriately adapted while maintaining the core components. Therapists who were involved in administering the ESCAPE-pain programme were trained in this competency. KOOS was identified to be a reliable and valid outcome measure in local and global scene. The project was ready to enter into the next phase, the Proof-of-Concept study. This is described in the next chapter.

# Chapter Five: Proof-of-Concept Study – a Mixed Method Approach

## 5.1 Background

### 5.1.1 Introduction

The systematic literature review in Chapter 3 demonstrated that there are limited studies on the combined approach of self-management and exercise for patients with KOA in native Chinese communities. Furthermore, results from the limited studies suggested that the exercise dosage and intensity might not be adequate to improve functional outcomes. The ESCAPE-knee pain programme, a clinically effective and cost-effective intervention, developed in the UK (Jessep et al, 2009; Hurley et al, 2007a) was culturally adapted for testing in the HK patient population as described in chapter 4. This POC study aimed to deliver an adapted evidence-based intervention in a new HK patient population and determine its potential suitability in another culture. A mixed method approach was selected to provide breadth (from quantitative research) and depth (from qualitative research) (Mason, 2006) to the research question. The data drawn from this study and understanding from participants' perspectives add to the knowledge of whether the ESCAPE-knee pain programme is applicable to the HK culture, and the local Chinese speaking population find it acceptable.

### 5.1.2 Background on mixed method research

#### 5.1.2.1 Purpose of mixed methods research

Mixed methods research means employing more than one type of research method. It can be a mix of quantitative and qualitative methods, a mix of quantitative methods or a mix of qualitative methods (Brannen, 2005). An important purpose of combining quantitative and qualitative methods, as commented by Ritchie et al (2014), is to have a more informative outcome, and they both ask distinctive questions about a social phenomenon. Within this study each of the two approaches is seen to provide a different kind of evidence:

- Quantitative research: the extent to which the ESCAPE-knee pain achieves required outcomes
- Qualitative research: an appraisal of the ESCAPE-knee pain experience

The second purpose of combining quantitative and qualitative approaches is triangulation – that is, describing a treatment intervention from different perspectives, with each perspective testing and adding to or validating the other (Ritchie et al, 2014). This enriches understanding and provides a fuller picture (Ritchie et al, 2014).

#### 5.1.2.2 Sequencing of quantitative and qualitative methods

Sequencing is the order in which the methods are employed. Qualitative research may precede statistical query, accompany it, or may be used as a follow-up study. In a scenario to follow-up on quantitative research, qualitative research can be used particularly in presenting findings that need further explanation or more detail or depth about a phenomenon (Ritchie et al, 2014). In this POC study, the subjects recruited into the qualitative research were those who had participated in the ESCAPE-knee pain programme. They had experienced the programme and were therefore able to provide an informed perspective which was not achievable with quantitative research alone.

#### 5.1.2.3 Focus groups in qualitative research

The Focus group is discussion between the researcher and a group of participants who give insights into participants' lives, experience or views (Ritchie et al, 2014). Focus groups are often used to uncover range and depth of experiences of health services users and chronically ill patients (Lehoux, Poland and Daudelin, 2006). The purpose of this qualitative research was not focused on each person's individual perspective but to explore the experiences of their common KOA disease and the ESCAPE-knee pain programme they all completed, therefore the Focus group, method was considered suitable.

The generated data was created specifically through an interaction in a focus group between the researcher and participants (Ritchie et al, 2014; McLafferty, 2004). A direct and explicit opportunity was given to participants to express their own feelings and explanations.

Focus group interaction involves discussion and hearing from others. More opportunities are allowed for participants to refine what they have to say and a wide range of views can be explored. Synergism of the group allows participants

to verbalise ideas that may not be disclosed in a one-on-one interview (Kitzinger, 1995). To bring a homogenous group of participants together that share similar characteristics, the fluidity and depth of discussions appear to work better (McLafferty, 2004). For capturing experience and opinions from more perspectives, diversity in group composition is recommended, though some commonality between people in their relationship to the research topic should be maintained (Ritchie et al, 2014).

Therefore in the purposive sampling of the focus group in this mixed method research, some selection criteria were set to ensure gender and attendance rate representation. Further details are laid out in the method section below.

## **5.2 Aims**

The aim of the POC study was to determine the suitability of the ESCAPE-knee pain programme in HK.

### **5.2.1 Objectives**

The two phases of this study related to the two objectives:

1. Deliver the ESCAPE-knee pain programme to a small cohort of people with KOA.
2. Explore the acceptability of the intervention with patients.

## **5.3 Methodology**

### **5.3.1 Phase 1 – Proof-of-concept study (quantitative part)**

This project was approved by the Clinical Research Ethics Committee (CREC Ref. number 2016.403) in Prince of Wales Hospital in Hong Kong (Appendix L1) and the Faculty Research Ethics Committee (UWE REC REF No. HAS.16.10.031) (Appendix L2)

#### **5.3.1.1 Study design**

This POC study was the first part of the two-phased mixed methods study to investigate feasibility criteria. This was to determine whether it was possible to



administer the ESCAPE-knee pain programme in a HK Chinese speaking KOA patient population.

This first part was a quantitative study recruiting patients to take part in the ESCAPE-knee pain programme. Upon completion, some of the participants were invited to participate in a focus group to explore the acceptability of the programme.

#### 5.3.1.2 Identification and sampling

The study population were patients referred to the out-patient physiotherapy clinic in the Prince of Wales Hospital for treatment of KOA. All patients on the waiting list were screened for the preliminary eligibility criteria – the diagnosis and age 45 or above (see figure 5.1 - flowchart).

All potential participants were contacted by phone to establish their preliminary interest, and a Patient Information Sheet (Appendix M1) was sent to them, followed by another telephone call 5 days later to determine their willingness to participate and to screen for the remaining eligibility criteria:

Inclusion:     1) able to walk with or without an assistive aid,  
                  2) willing to perform exercise, and  
                  3) understanding written Chinese and verbal Cantonese.

Exclusion:     1) received physiotherapy in the preceding 12 months for  
                  their KOA problem;  
                  2) co-morbidity of cardiac, pulmonary, inflammatory,  
                  oncological, neurological, psychiatric conditions that  
                  intensive exercise was not favourable; and  
                  3) received total knee replacement to one or both knees

Any query and eligibility were clarified in the second phone call. On receipt of verbal consent, an appointment was booked for each potential patient to obtain written consent (Appendix M2) in advance of baseline assessment. The number of patients contacted and the number rejected were recorded along with their reasons for non-participation if provided.

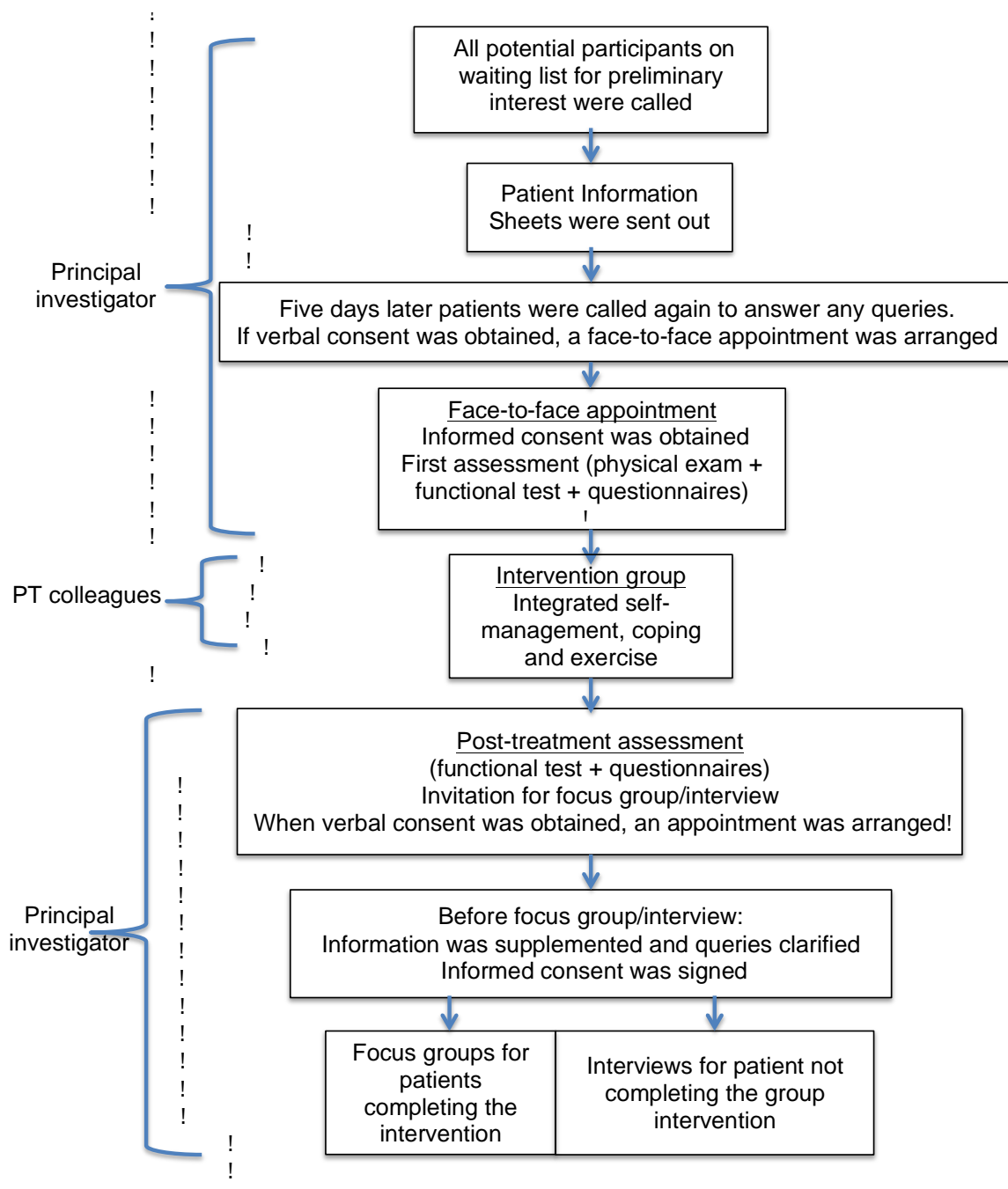


Figure 5.1 Flowchart showing the overall workflow of the Proof-of-Concept study of an integration programme of exercise, self-management and active coping on patients with knee osteoarthritis in Hong Kong Chinese speaking population.

### 5.3.1.3 Intervention

The intervention was a five-week group rehabilitation programme (2 sessions weekly) supervised by a physiotherapist and an assistant. Ten patients were assigned to each intervention group.

The physiotherapist firstly facilitated a discussion on a designated topic in each session for approximately 20-25 minutes, to enhance patients' understanding of their condition, to promote self-management and coping strategies of simple problem-solving and planning skills. Guidance was given to set goals and action plans. A power-point presentation in Chinese was used to facilitate discussion with patients. An education booklet (the detailed process of preparation is previously discussed in chapter 4) was given to each patient for review of content in each session and home tasks.

Further to the education component, exercise was carried out for approximately 40-45 minutes under the physiotherapist's supervision to increase strength, balance, co-ordination and confidence. Specifically exercises for lower limbs, aerobic fitness and balance were included. Pictures showing the exercises were put up prominently near to the exercise stations for facilitating practice. An exercise sheet was given to patients to enhance learning and home practice. Taking into account all their individual abilities with progression from simple exercises toward near maximum capabilities, an exercise diagram (Appendix N1) and an exercise diary (Appendix N2) was used for patients to record their exercise performance during each session. Upon completion of the programme, a home exercise regime, advice to remain active and information about local community exercise facilities were given.

As a safety precaution, all patients were screened for cardiovascular risk in performing exercise according to American College of Sports Medicine (2001). For patients with co-morbidities like hypertension and diabetes, blood pressure and heart rate were taken before and after the exercise sessions.

#### 5.3.1.4 Evaluation and outcome measures

An interview for initial subjective assessment was undertaken for all patients to screen red flags. Basic demographic data were taken including gender, age and history of knee pain. Physical examination was performed to document knee joint mobility, muscle strength and balance. At this session, patients were asked to complete a set of questionnaires in Chinese comprising of the following PROMs: 1) KOOS subscales of pain, physical function (PS) and quality of life (QoL); 2) PSFS;

3) SEE-C; and 4) HADS. The outcome measures were discussed in the previous section.

In addition, a patient satisfaction survey (Appendix O) was completed immediately following the post-programme data collection. This served as a evaluation tool or all participants to collect their feedback. The survey form covered three main topics of interest for the POC study, namely, 1) the environmental factors; 2) the content of the programme; and 3) the impact of the programme. (see table 5.1)

Table 5.1 Topics of concern and the details of the satisfaction survey used to capture the participants' opinion individually upon completing the ESCAPE-knee pain programme.

Topics of concern	Subtopics	Details
Environmental factors	Health care professionals	Therapists'/helpers' attitude, knowledge and skills
	Preparation	Information available before the class
Programme content	Exercise	Frequency of sessions
		Intensity appropriate to fitness level
		Types of exercise easy to follow
		Time period / total number of sessions
	Self-management	Usefulness of the education booklet
Impact of the programme	Benefit of the programme	Experience of the benefits from participating the class
	Adherence of self-exercise	Continuation of exercise in the long-term
	Other comment	

Some questions were designed to ask for binary 'yes' and 'no' responses.

Additional comments were invited. Some questions were open-ended for capturing original opinions from participants. The doctoral candidate helped to enter the comments given by the participants if they needed assistance with the open-ended questions. All the written comments were repeated to the participants immediately afterwards and agreement was obtained.

### 5.3.1.5 Safety measures

#### 5.3.1.5.1 *Screening for high risk group and monitoring*

The risk management guideline in the physiotherapy clinic in Prince of Wales Hospital adapted the recommendations from the American College of Sports Medicine (2001) in the following steps:

- Firstly screening was done to identify patients in high risk groups, e.g. diabetes. Then red dots were put on their name cards and record files for alerting staff at every visit.
- On the day of each class session, vital signs (blood pressure and pulse rate) were taken for this group of patients before and after exercise practice.

#### 5.3.1.5.2 *Guidance for exercising intensity and progression*

The therapist's role was to facilitate the patients to decide what they could do and what they wanted to do. It was important for them to 'listen to their own body' to determine the appropriate level of exercise. Patients were informed that it was alright to experience mild discomfort but nothing excessive or new. They should not be breathless, and should be able to talk during exercise. Listed below are some questions used by therapists within the exercise programmes to guide patients' progress:

- "Do you feel hot in your joint?"
- "Can you breathe all right while you are exercising?"
- "Do you find these exercises easy? Then probably you may make the exercise harder for yourself." It was not the therapists' role to tell them when to progress.

### 5.3.1.6 Treatment fidelity

Before and during the intervention programme, the provider therapists received seven hours of training covering:

- updated evidence on KOA disease and management relating to exercise and self-management;

- motivational interviewing to support autonomous choice and progression of exercise, active coping and self-management strategies, and:
- programme content of ESCAPE-knee pain with therapist's programme manual and slides to facilitate group interactive discussion on self-management.

The treatment fidelity was supported by the translated Chinese version of the patient information booklet, exercise charts for what exercise to do, log sheets to record the types, intensity and frequency of exercise performed in classes and exercise diary to show exercise adherence at home in between the classes.

The doctoral candidate was present throughout the ESCAPE-knee pain programme sessions observing the use of programme material, the interactive discussion on self-management and the exercise section. Feedback and debriefing meetings were held with the provider therapists before each of the following subsequent sessions to discuss previous delivery and aims of the subsequent session.

Delivering therapists were provided with the opportunity to ask for additional clarification of content in advance of delivery.

### **5.3.2 Phase two – focus group (qualitative part)**

#### **5.3.2.1 Invitation to participate in the focus group**

At the last session of the ESCAPE-knee pain programme, an invitation (see Appendix P) was given to all participants (N=19) to consider joining the focus group.

#### **5.3.2.2 Sample strategies and sample size**

Purposive sampling was adopted for the qualitative research (Ritchie et al, 2014). It was defined by its ability to represent criterion-based characteristics which allow detailed exploration and understanding (Bryman, 2012). The first selection criterion was to fulfill the requirement for 'symbolic representation' in qualitative sampling (Ritchie et al, 2014) – the participants chosen because they had completed the ESCAPE-knee pain programme held in HK. They had shared interactions and experiences in the programme and thus had common underlying

patterns of meaning (Flick, 2014). The second criterion was to ensure the sample was as diverse as possible within the boundaries of the defined population (Ritchie et al, 2014). The additional criteria were determined to be age, gender and number of sessions attended in the ESCAPE-pain programme. They are illustrated in the sample matrix below (Table 5.2).

The desired sample size of the focus group was estimated to be 6-8 (Ritchie et al, 2014), to ensure it was easily managed and maintained in-depth contribution across the whole sample. Smaller numbers may have missed key issues of discussion within the target population (Ritchie et al, 2014). The smaller number, however, limits the number of selection criteria. Here below shows the sample matrix (see table 5.2):

Table 5.2 showing how the sample selection was based on the criteria determining diversity of the qualitative sample who completed the programme.

	Attendance (sessions)			
	≤7		8-10	
	male	female	male	female
Age ≤ 60, young, working	1	2	1	2
Age > 60, old, not working	1	2	1	2

### 5.3.2.3 Preparation for fieldwork – the topic guide

An exploratory study is designed to understand underlying values and concepts. A more open approach is taken to encourage participants to take the lead and to shape their own narrative. On the other hand, more structured data generation had to be in place for an evaluative study, e.g. ESCAPE-pain programme in this doctoral project (Bryman, 2012; Marshall and Rossman, 2011).

A 'topic guide' is a document that outlines the key issues and subtopics to be explored with participants in the focus group. It emphasises the focus on topics rather than questions, ensuring the right degree of consistency in data collection whilst allowing flexibility to pursue the details with participants (Ritchie et al, 2014). This was informed by the schedule from the qualitative study undertaken by Hurley et al (2010) on the ESCAPE-knee pain programme in the UK. The focus group started from an introduction, the context setting, patients' perception of physiotherapy and experience of their KOA disease. The discussion was then

focused on their ESCAPE-knee pain experience, firstly on self-management and then on exercise practice. A full version of topic guide for the ESCAPE-knee pain is attached as Appendix Q1. A short guide of one page was prepared for the doctoral candidate to navigate the group discussion (see Appendix Q2).

#### 5.3.2.4 The Focus group

Patients who completed the ESCAPE-knee pain programme were invited to participate in a focus group in the physiotherapy clinic. Two focus groups were planned if there were more than 10 patients showing interest. Patient Information Sheets (see Appendix R1) were given and explained on the day of post-treatment evaluation. A Consent form (Appendix R2) was signed on the day of the focus group that was scheduled one week later. The doctoral candidate was the facilitator. The group met once for 1.5 hours. The participants chose a pseudonym they preferred to be addressed by during the discussion such that their true identity would not be disclosed in the audiotape. An assistant was present to take fieldnotes and the whole discussion was audiotaped using an electronic tape recorder, Sony Corporation. It was transcribed verbatim and stored in the doctoral candidate's personal computer which was locked and accessed by the doctoral candidate only.

## **5.4 Data analysis**

### **5.4.1 Data analysis for quantitative research**

A descriptive statistical analysis protocol was followed. According to Portney and Watkins (2014), descriptions of subjects and responses were checked for central tendency using graphical presentation to reveal the shape of distributions. Responses were summarised – score average (mean, median or mode) for continuous data and frequency (in percentage) for categorical data. Measures of variance using range, standard deviation and 95% confidence intervals were used to show the score spread. There was a question on an overall rating of the programme of 21 points of Likert scale from -10 to 0, then to +10, where “0” represented no change, “-10” worst possible change and “+10” best possible change. This “0-10” scale was a commonly accepted concept in everyday use amongst the local Chinese community in HK (Tsang et al, 2016). The results were



categorised as “improved”, “unchanged” and “worse” for later comparison of outcomes. See figure 5.2 for details:

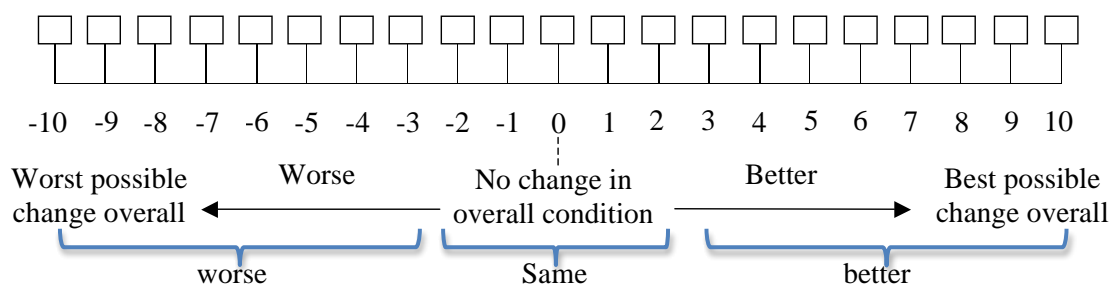


Figure 5.2 showing the numeric global rate of change where  
 Scores of -2 to 0 and then to 2 will be interpreted as “same”;  
 Scores of  $\geq 3$  will be interpreted as “improved”;  
 Scores of  $\leq -3$  will be interpreted as “worse”.

A positive response to the ESCAPE-knee pain programme was defined conservatively as having  $\geq 15\%$  improvement in each of the three KOOS subscales (Ageberg et al, 2013; Hurley et al, 2012). This percentage of change in each KOOS subscale score was calculated by the method used by Nicholas, Hefford and Tumilty (2012), taking the actual change in score divided by the possible change to achieve 100% resolution. For example, a patient moving from a 30 to 80 in KOOS-pain subscale would have a 71% resolution (a change of 50 out of a possible 70). The percentage of responders was calculated for each KOOS subscale.

For cohort studies, the minimal important change (MIC) is mean difference (from baseline) that is considered clinically relevant (Harris et al, 2013). MIC is discerned as meaningful by patients. In clinical trials, minimal important difference (MID) is used to assess whether any difference in change between two arms of treatment is clinically relevant (Harris et al, 2013). There are different methods in calculating MIC and MID and they vary in population groups (Sayers et al, 2017; Terwee et al, 2010). From limited evidence, the MIC over time after receiving physiotherapy, the KOOS Pain, PS and QoL subscales were reported to be 14.2 points, 12 points and 10.9 points respectively (Ingelsrud et al, 2014; Harris et al, 2013). They were lower than those reported for total joint replacement. The percentage of patients showing effect up to MIC was calculated for each KOOS subscales.

In the secondary outcomes, the data obtained with HADS were compared with the cut-off points to screen for any potential psychological disorders.

### **5.4.2 Data analysis for patient opinion survey**

All patients were invited to complete the survey form at post-intervention. If required (due to literacy reasons), the interviewer (the doctoral candidate) helped patients complete the comments. The participants who required help read through the written comment in Chinese to confirm their opinions immediately afterwards. The close-end questions were analysed quantitatively with descriptive statistics. The comments provided in the open-end questions were translated.

The doctoral candidate (translator one) translated the participants' comments into English. One of the doctoral candidate's colleagues (translator two) who was fluent both in English and Chinese helped to proof-read the whole document of the satisfaction survey to confirm reliability. Any discrepancies were brought to a meeting for discussion until consensus was reached.

### **5.4.3 Data analysis for qualitative research**

To achieve triangulation of the data obtained in this mixed method approach, the quantitative data from the POC study, the patient opinion survey data and the focus group data were analysed together.

#### **5.4.3.1 Transcription and translation of data**

The audiotape was transcribed verbatim into Chinese by the doctoral candidate. A second translator assisted the candidate to listen to the audio data and proof-read the written Chinese data. Anonymization was achieved by incorporating pseudonyms from the outset of audiotaping.

The doctoral candidate then translated the data from Chinese to English. The English translation was proof-read by another translator to confirm content. Then the entire transcript was back translated again by a further translator. Whenever there was any query or discrepancy the doctoral candidate discussed with the other translators involved until consensus was reached.

#### 5.4.3.2 Data analysis

The data were analysed using thematic analysis (TA) (Clarke and Braun, 2014). TA is a method for identifying and interpreting patterns of meaning across qualitative data. The candidate was not familiar with NVivo, as such all analysis was undertaken via typing into excel table and hard copy. The data from the opinion survey was more quantitative than qualitative. The qualitative data were analysed separately from the focus group data.. A six-phase process was involved (based on Clarke and Braun, 2014) and each is described in detail in the following section:

- I. Familiarising yourself with the data and identifying items of potential interest
- II. Generating initial codes
- III. Searching for themes
- IV. Reviewing potential themes
- V. Defining and naming themes
- VI. Producing the report

##### *I) Familiarising with data*

In familiarising with the data, the doctoral candidate was the first translator who transcribed verbatim by listening to the audiotape repeatedly. Proof-reading was undertaken with the another translator doing the forward translation and later with the further translator doing the backward translation. The doctoral candidate immersed in the dataset by reading and re-reading. Potentially interesting features, relevant to the research question were identified and noted. The focus group data were familiarised and coded independently by the doctoral candidate and one of the supervising team (JP). An excel table documenting the transcript was made available for the supervisors to cross check. The full complete focus group data set after the backward translation was sent electronically to the supervising team member for second coding separately.

##### *II) Generating initial codes*

A code was given to potentially meaningful data, at the basic level. Codes either summarised the (surface) meaning of the data or investigated further for potential interpretation of meaning. A list of codes was compiled with the data relevant to each code sorted.

### *III) Searching for themes*

The analysis was shifted to a wider focus. Coded data were organized into a theme by putting a large and complex code or clustering similar codes together to make it meaningful and important for answering the research question. Each theme was distinctive, yet with some sense of relationship between potential themes (to be represented in a thematic map), and collation of the coded data relevant to each theme.

### *IV) Reviewing potential themes*

Two levels of reviewing potential themes:

1. check that the themes 'work' in relation to the coded data, capturing most important features of the coded data relevant to the research question;
2. check that they work in relation to the whole dataset

The process of coding and clustering of codes continued with potential themes rechecked until data saturation was achieved. Each theme was coherent and substantial with a distinct central concept. The process ended with a final, definitive set of themes.

### *V) Defining and naming themes*

This was the most substantive and interpretive analytic phase. Detailed and complex definitions of each theme were provided and links were made between themes. Data extracts were selected for use in the final report, with each theme clearly addressing the research question. Each theme was named to capture the 'essence'. The result, analysis and discussion of the data were integrated.

### *VI) Producing the report*

This was the final refining of the analysis in relation to the wider literature. The aim was to tell the rich and complex story of the analysis. The key themes are laid out in the section 5.6.6.

## **5.4.4 Data synthesis**

In this mixed method research, the data from different sources (POC study, opinion survey and focus group) were analysed separately. In the result section,

the quantitative data from the POC study is presented first, then the data from the opinion survey is presented afterwards. In the focus group data, the data from the POC and opinion survey are presented in an integrated manner as the qualitative data substantively providing details of the patient journey in the ESCAPE-knee pain programme, even if the methods were conducted separately or sequentially (Bazeley, 2015). This allows triangulations (or convergence) of the results obtained independently using the two methods.

#### **5.4.5 Reflexivity**

The doctoral candidate had previous personal experience of cultural contact with the UK which might have influenced the process of translation of the programme materials. Being a health care professional with clinical experience in musculoskeletal areas and a clinical educator, there might have been pre-set viewpoints from past experiences that may also have influenced the interpretation. Furthermore, observations of the ESCAPE-knee pain classes might have rendered some personal judgement from the doctoral candidate that impacted on the data generating process in the focus group. Nevertheless, summaries were made at various time-points within the focus group for the participants to confirm the data generated was true to them.

### **5.6 Results**

#### **5.6.1 Participants**

From the waiting list in the out-patient physiotherapy clinic, 68 patients diagnosed with KOA and aged 45 or above were identified. From the eligibility screening, 26 (38%) patients were excluded due to severe, unstable co-morbidity that moderate exercise was not recommended, 16 (24%) patients were unable to attend due to work, family or personal issues and 5 (7%) patients were non-contactable (See figure 5.3 for details).

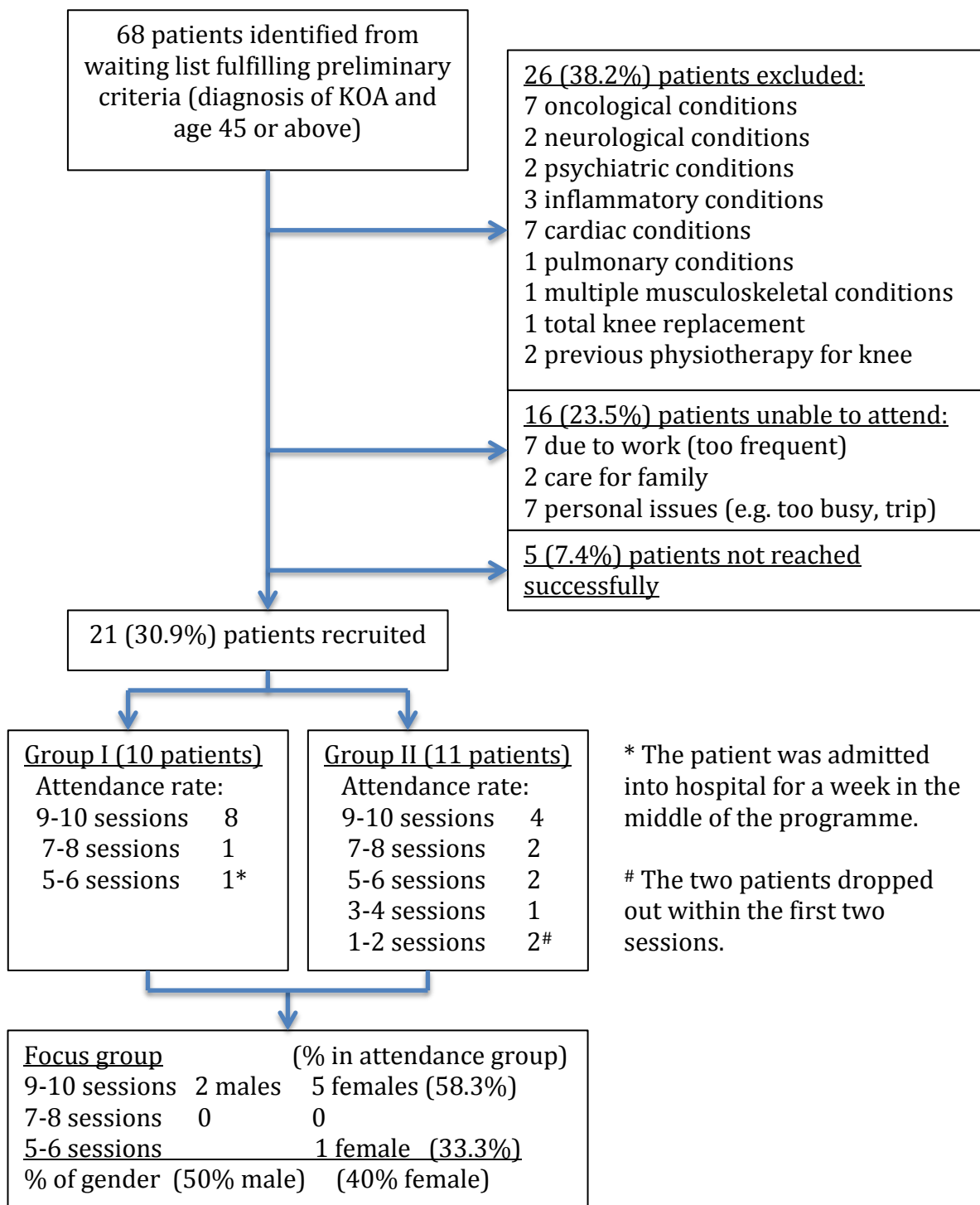


Figure 5.3 Flowchart showing the recruitment and attendance of the participants in the proof-of-concept study of integrated exercise and self-management programme for patients with knee osteoarthritis in a Hong Kong population, both for the quantitative phase and the subsequent qualitative phase.

Twenty-one (30.9%) patients were recruited with more than three quarters female, median age 62, body mass index (BMI) 28.01 and median history of knee pain 24 months. The patients were allocated to two similar identical groups according to their availability. There was 10% more female, and the history of knee pain much less, with lower BMI in group II. The two groups started one day apart. The baseline demographic data are presented in Table 5.3.

Table 5.3 showing the baseline characteristics of the two groups of participants that were similar except the history of knee pain.

		Group I	Group II	Overall
Sex	Female no. (%)	7 (70%)	9 (81.8%)	16 (76.2%)
Age in years	median (range)	62 (57 – 76)	62 (51-75)	62 (51-76)
History of knee pain in months	median (range)	90 (6 – 240)	6 (1 – 48)	24 (1-240)
BMI	median (range)	28.4 (23.4–39.4)	25.8 (20.9–40.0)	28.0 (20.9–40.0)

In the focus group, two male patients (50% of all males) and six female patients (40% of all female) participated. One patient had attended six sessions while the rest had attended nine to ten sessions.

### 5.6.2 Attendance and attrition

Two patients dropped out after attending one and two sessions respectively, both were in group II. From follow-up telephone calls to ascertain their reasons for dropping-out, one patient found that her condition was not as bad as the other patients, and suggested that the fee charged for the whole course was too much for her to bear. The other patient said he was too busy and declined to continue. For both of them, the exercise sheet and education booklet were given. Both suggested they would continue to exercise independently.

Including the aforementioned drop-outs, the overall attendance rate was 82.61%, median at 9 sessions. For the rest of the analysis, the 2 drop-outs were not included. Of the completers, 14 (73.68%) patients showed high attendance (80% or more of the programme) while two (10.53%) patients showed low attendance (50% or below). Three patients (15.79%) showed medium attendance (above 50% & below 80%).

There was a tendency found in the baseline characteristics amongst the three groups of attendance. The two patients who showed low attendance were younger, with lower body weight. Both of them scored higher in the KOOS, indicating less

pain, better functional status and higher quality of life. Their PSFS was higher than the other two groups, and they demonstrated higher physical functional ability in the chair-stand and stair-climb tests. Details are shown in table 5.4.

Table 5.4 shows the baseline characteristics for participants stratified into the attendance rate

Def: attendance %		Attendance (N=19)		
		High ≥80%	Medium <80%&>50%	Low ≤50%
No. of patients (%)		14 (73.68%)	3 (15.79%)	2 (10.53%)
Age (median)		61	62	59
BMI		27.71	32.97	22.7
<i>Outcome</i>	KOOS-Pain (↑better)	59.13	51.85	77.78
	KOOS-PS (↑better)	63.98	66.60	94.40
	KOOS-QoL (↑better)	38.39	43.75	75.00
	PSFS (↑better)	4.41	4.83	6.95
	40-metre walk speed (↑better)	1.16	0.88	1.12
	30-second chair-stand (↑better)	11.64	9.00	15
	12-step stair-climb (↓better)	24.75	39.76	17.38

Key: BMI Body mass index; KOOS Knee injury and Osteoarthritis Outcome; PS Physical function; QoL Quality of life; PSFS Patient specific function scale

### 5.6.3 Clinical Outcomes

#### 5.6.3.1 KOOS

The mean improvement of the three subscales of the KOOS in pain, PS and QoL was 17.25 (SD 11.29), 10.13 (SD 8.57) and 14.47 (SD15.60) points respectively. In the analysis according to their attendance rate, those with high attendance consistently showed the largest mean difference at the end of the programme for all subscales of pain, physical function and quality of life. (see table 5.5).



Table 5.5 showing the KOOS outcomes pre- and post-intervention stratified into three groups of attendance: 1) high ( $\geq 80\%$ ); 2) medium (above 50% and below 80%); and 3) low ( $\leq 50\%$ ).

KOOS		Attendance			Overall n=19(100%)
		High n=14(73.68%)	Medium n=3(15.79%)	Low n=2(10.52%)	
Pain Mean(SD)	Pre	59.13(12.91)	51.85(20.85)	77.78(0)	59.95(14.68)
	Post	78.17(13.82)	63.89(23.73)	90.28(9.82)	77.19(15.97)
	<i>MD(SD)</i>	<b>19.05(12.42)</b>	<b>12.04(3.21)</b>	<b>12.50(9.82)</b>	<b>17.25(11.29)</b>
PS Mean(SD)	Pre	63.98(5.34)	66.60(13.63)	94.4(0)	67.59(11.46)
	Post	77.43(8.20)	67.73(15.11)	94.75(7.42)	77.72(11.22)
	<i>MD(SD)</i>	<b>13.45(7.8)</b>	<b>1.13(1.96)</b>	<b>0.35(7.42)</b>	<b>10.13(8.57)</b>
QoL Mean(SD)	Pre	38.39(11.20)	43.75(33.07)	75(8.84)	43.09(18.62)
	Post	58.48(11.91)	50.00(22.53)	62.50(8.84)	57.57(13.27)
	<i>MD(SD)</i>	<b>20.09(11.54)</b>	<b>6.25(10.83)</b>	<b>-12.50(17.68)</b>	<b>14.47(15.60)</b>

Key: KOOS Knee injury and Osteoarthritis Outcome; MD Mean difference; PS Physical function; QoL Quality of life; SD Standard deviation.

There were 18 (95%) patients who scored three or above in the overall satisfaction item and were categorised as showing improvement. One patient scored two and was categorised as the “same” group. However, the subscale improvement for the PS and QoL in the “same” group was higher than the mean difference of the “better” group. (table 5.6).

Table 5.6 showing the results of KOOS subscales in participants categorised into “better” (overall change score  $\geq 3$ ) and “same” (overall change score -2 to 2) while no participant was categorized into the “worse” group.

KOOS subscales	Better n=18 (95%)	Same n=1 (5%)	Worse nil
Pain MD (95%CI)	17.44 (11.68 to 23.20)	13.89	---
PS MD (95%CI)	10.07 (5.69 to 14.45)	11.10	---
QoL MD (95%CI)	13.89 (6.01 to 21.76)	25.00	---

Key: PS Physical function; QoL Quality of life; MD Mean difference; CI Confidence interval.

For responsiveness, the percentage of responders meeting the 15% improvement criteria was highest in KOOS-Pain (84%) and lowest in KOOS-QoL (74%). See Fig. 5.4 for the distribution of the proportion of responders to non-responders across the three KOOS subscales. The largest group (74%) of participants reported meaningful clinical change in the KOOS-QoL with 42% and 47% for pain and physical function respectively. (See table 5.7)

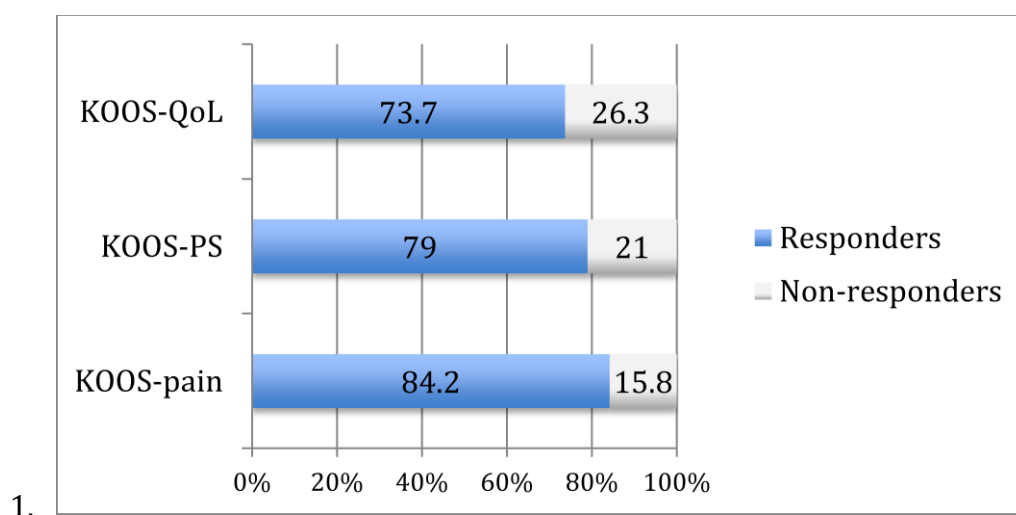
Table 5.7 showing the responsiveness in the Proof-of-Concept study of ESCAPE-knee pain programme by the 15% responding criteria and improvement up to the meaningful minimal important change

KOOS	Responsiveness				MIC ref.
	Responders n (%)	Non-responders n (%)	Up to MIC n (%)	Non-MIC n (%)	
Pain	16 (84%)	3 (16%)	8 (42%)	11 (58%)	14.2 <sup>^</sup>
PS	15 (79%)	4 (21%)	9 (47%)	10 (53%)	12 <sup>*</sup>
QoL	14 (74%)	5 (26%)	14 (74%)	5 (26%)	10.9 <sup>^</sup>

Key: MIC minimal important change; n number; Ref reference.

Reference: <sup>^</sup>Ingelsrud et al 2014; <sup>\*</sup>Harris et al 2013

Fig. 5.4 showing percentage of responders and non-responders for the three KOOS subscales. An individual improving 15% of full possible change was considered as responding to treatment.



### 5.6.3.2 Self-efficacy for exercise

Self-efficacy for exercise improved across three groups of participants having different attendance rates, with the overall mean improvement of 1.02 (SD 1.47) points (Table 5.8). The medium attendance (above 50% and below 80%, n=16%) group had lowest self-efficacy at baseline of 3.26 (SD 0.64) points. This group of patients had greater improvement of 1.85 (SD 2.11) points. For the other two

groups having baseline self-efficacy higher than 5 points, their proportion of improvement was shown to be lower.

Table 5.8 showing the outcomes in pre- and post-intervention stratified into three groups of attendance: 1) high ( $\geq 80\%$ ); 2) medium (above 50% and below 80%); and 3) low ( $\leq 50\%$ ).

Outcome measures		Attendance			
		High n=14(74%)	Medium n=3(16%)	Low n=2(11%)	Overall n=19(100%)
SEE-C mean(SD)	Pre	5.99 (2.46)	3.26 (0.64)	5.74 (1.36)	5.53 (2.36)
	Post	6.83 (2.02)	5.11 (1.47)	6.72 (0.40)	6.55 (1.90)
	<i>MD(SD)</i>	<b>0.84</b> (1.37)	<b>1.85</b> (2.11)	<b>0.99</b> (1.76)	<b>1.02</b> (1.47)
PSFS mean(SD)	Pre	4.41 (1.40)	4.83 (1.08)	6.95 (0.92)	4.75 (1.49)
	Post	6.98 (1.24)	6.78 (0.94)	8.82 (0.69)	7.14 (1.26)
	<i>MD(SD)</i>	<b>2.56</b> (1.58)	<b>1.95</b> (0.48)	<b>1.86</b> (1.61)	<b>2.39</b> (1.44)
HADS mean(SD)	Pre	8.36 (4.29)	11.67 (10.12)	10.50 (2.12)	9.11 (5.16)
	Post	4.21 (3.04)	2.67 (2.08)	9.50 (0.71)	4.53 (3.26)
	<i>MD(SD)</i>	<b>-4.14</b> (4.31)	<b>-9.00</b> (8.72)	<b>-1.00</b> (1.41)	<b>-4.58</b> (5.18)

Key: MD Mean difference; PSFS Patient specific functional scale; SEE-C Self-efficacy of exercise – Chinese; HADS Hospital anxiety and depression scale.

Relating to the overall rating of change, the group categorised as “better” showed mean increase (95%CI) of 1.07 (0.33 to 1.81) (See table 5.9).

Table 5.9 showing change of the secondary outcomes of SEE-C, PSFS and HADS, for participants having improved (overall change  $\geq 3$ ) and same (overall change -2 to 2) while there was no participant reporting worse condition after the ESCAPE- knee pain

Other outcomes	Better n=18 (95%)	Same n=1	Worse nil
SEE-C MD (95%CI)	1.07 (0.33 to 1.81)	0.08	---
PSFS MD (95%CI)	2.51 (1.82 to 3.20)	0.3	---
HADS MD (95%CI)	-4.78 (-7.39 to -2.17)	-1	---

Key: SEE-C Self-efficacy of exercise – Chinese; PSFS Patient specific functional scale; HADS Hospital anxiety and depression scale

#### 5.6.3.3 Patient-specific Functional scale

The patient-specific functional ability showed improvement at the individual level for the three groups of attendance rate with the overall mean improvement of 2.39 (SD 1.44) points (see table 5.8). The group with higher (80% or above, n=14)

attendance improved by 2.56 (SD 1.58) points. Those reported better in the overall improved by 2.51 (1.82 to 3.20) (mean difference, 95%CI) points (see table 5.9).

For the individual specific functional needs, there were 63 entries expressed, grouped into 18 activities. Half of the activities were basic functional mobility tasks while four were related to doing household chores or jobs. The other five were leisure activities. The top three activities were stairs, walking on level ground and squatting (see table 5.10).

Table 5.10 showed the activities named by the participants in the Patient Specific Functional Scale that they had difficulties to perform yet they would like to do.

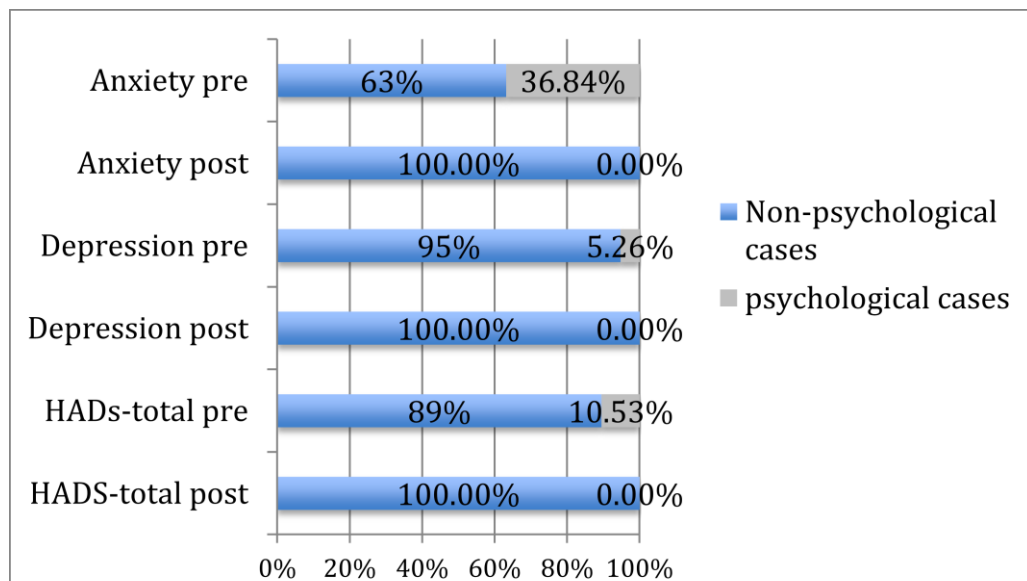
Basic activities of daily living (frequency)	Instrumental activities of daily living (frequency)	Leisure activities (frequency)
Stairs (19)	Shopping (2)	Swimming (1)
Walking on level ground (18)	Cooking (1)	Hiking (1)
Squatting (11)	Changing bedsheet (1)	Playing badminton (1)
Walking on slope (3)	On/off vehicle (1)	Cycling (1)
Bending (1)		Climbing (1)
Kneeling (1)		
Low sitting (1)		
Sit-to-stand (1)		
Sit down on floor (1)		

#### 5.6.3.4 Hospital Anxiety and Depression scale

The mean (SD) for HADS total, depression and anxiety scores at baseline was 9.11 (5.16), 3.95 (3.37) and 2.21 (1.96) respectively. In screening for any potential psychological disorders amongst the participants at baseline, there were two patients in the total score, one in depression and seven whose anxiety scored above the cut-offs points. After the ESCAPE-knee pain programme, all participants scored below the cut-off points for all three categories (see fig. 5.5).

There was improvement after the intervention with mean differences of total, depression and anxiety scores of -4.58 (5.18), -1.63 (3.61) and -2.95 (2.30) respectively.

Fig 5.5 showing percentage of non-psychological participants with potential participants with psychological disorders of anxiety and depression, with the total HADs score. Cut-offs for HADS-anxiety=6, depression=9 and total score=16.



#### 5.6.3.5 Performance testing

All patients improved in the lowest level of physical demand of walk speed with an average of 0.19 (SD 0.09) m/sec in 40-meter walking trial. The chair-stand test improved by a mean of 2.21 (SD 3.08) repetitions and they managed 12 steps better, shortened by 3.83 (SD3.52) seconds (see table 5.11).

Table 5.11 showing the performance test outcomes pre- and post-intervention stratified into three groups of attendance: 1) high ( $\geq 80\%$ ); 2) medium (above 50% and below 80%); and 3) low ( $\leq 50\%$ ).

Outcome measures		Attendance			Overall n=19(100%)
		High n=14(74%)	Medium n=3(16%)	Low n=2(11%)	
40-m walk test	PreM(SD)	1.16 (0.21)	0.88 (0.13)	1.12 (0.07)	1.11 (0.21)
	PostM(SD)	1.35 (0.17)	1.01 (0.18)	1.37 (0.08)	1.30 (0.20)
	<b>MD(SD)</b>	<b>0.20 (0.09)</b>	<b>0.13 (0.08)</b>	<b>0.26 (0.09)</b>	<b>0.19 (0.09)</b>
30-sec sit-to-stand	PreM(SD)	11.64 (3.15)	9.00 (1.0)	15.00 (2.83)	11.58 (3.19)
	PostM(SD)	14.14 (2.69)	11.00 (1.0)	15.50 (2.12)	13.79 (2.70)
	<b>MD(SD)</b>	<b>2.50 (3.48)</b>	<b>2.0 (1.73)</b>	<b>0.50 (0.71)</b>	<b>2.21 (3.08)</b>
12-step stair climb	PreM(SD)	24.75(6.47)	39.76(11.18)	17.38(2.30)	26.34(9.24)
	PostM(SD)	20.81(4.75)	35.16(10.36)	15.49(1.07)	22.51(7.92)
	<b>MD(SD)</b>	<b>-3.94 (3.92)</b>	<b>-4.60 (1.14)</b>	<b>-1.89 (3.37)</b>	<b>-3.83 (3.52)</b>

Key: M Mean; MD Mean difference; 40-m walk 40-meter walk test; 30-second sit-to-stand test.

Majority of patients (n=18) improved were categorised as better after the intervention and their mean difference improved in all walk speed, chair stand and stair climb tests. (see table 5.12)

Table 5.12 showing changes of the performance tests of walking speed, repetitions of arising from sitting to standing and the time spanned on walking up and down 12 steps continuously for the proportion of participants having improved (overall change  $\geq 3$ ) and same (overall change -2 to 2) while there was no participant reporting worse condition after the ESCAPE-knee pain

Performance tests	Better n=18	Same n=1	Worse nil
40-meter walk speed MD (95%CI)	0.20 (0.15 to 0.25)	0.11	---
30-s sit-to-stand MD (95%CI)	2.00 (0.49 to 3.51)	6	---
12-step stair-climb MD (95%CI)	-3.99 (-5.76 to -2.22)	-0.97	---

Key: MD Mean difference; n number; 95% CI 95% confidence interval.

## 5.6.4 Adverse events

### 5.6.4.1 Incident and management

After the second session of the ESCAPE-pain programme a patient fell as he was making a subsequent appointment at the registration counter. For safety purposes he was put on a bed with vital signs monitored. There was no loss of consciousness. This patient also had diabetes mellitus, and it was later discovered

that he had not managed his diabetes appropriately that morning. With care and monitoring, the patient recovered fully after one and a half hours of rest. Advice on food intake and diabetic medication was given. The adverse event was reported to the ethics committee. There were no further adverse events in subsequent sessions.

## **5.6.5 Satisfaction survey**

### **5.6.5.1 Conducting the satisfaction survey**

All patients were invited to complete the survey form. Six required the interviewer (the doctoral candidate) to write the comments for them. All participants read through the written comments in Chinese immediately afterwards to confirm their opinions. The doctoral candidate (translator one) translated the participants' comments into English. One of the doctoral candidate's colleagues (translator two) who was fluent both in English and Chinese helped to proof read the whole document of the satisfaction survey to confirm reliability. Any discrepancies were brought to a meeting for discussion until consensus was reached.

### **5.6.5.2 The translation process**

A few discrepancies in translation were discussed. They were classified into three situations namely:

1. to adopt a better use of an English expression
2. to have a better choice of word to translate more accurately
3. to require some clarification of the scenario for accurate translation

Below are some examples of the three situations.

#### **5.6.5.2.1 *Better use of an English expression***

There were comments on the information booklet. Translators 1 and 2 had a different translation. After discussion, they modified and adopted a final version (table 5.13).

Table 5.13 showing texts of translated version from the first and second translators initially with the final reconciled version after discussion on better use of language.

First translation	Second translation	Final reconciled version
"The more not to move, the more stiff it will become."	"Move less would be more stiff."	"The more inactive you are, the more stiff you'll become."
"She (the therapist) talked nicely and easily understandable."	"Her talk was good, easy to understand."	"She talked nicely and was easily understood."
"She (the therapist) taught us with much endurance."	"She was very patient in teaching us."	"She was very patient in teaching us."

#### 5.6.5.2.2 Better choice of word(s) for accuracy of translation

In the open-end question asking whether the participants benefited from the KOA class, the use of words in Chinese carried a slightly different meaning. The two translators met to discuss the final version (see table 5.14).

Table 5.14 showed the choice of words or expression presenting a more accurate translation.

First translation	Second translation	Final reconciled version
"My legs <u>are</u> stronger."	"My legs <u>feel</u> stronger."	"My legs <u>became</u> stronger."
" <u>Let me know</u> that exercise helps you."	" <u>I know</u> that doing exercise is helpful."	" <u>It made me understand</u> that exercise can help you."

#### 5.6.5.2.3 Clarification required for more accurate translation

One participant mentioned that she did not climb stairs before the exercise class. During the exercise class practice, there were steps for her to practice, from lower level to higher level for progression, and she now knew that she could manage this. With some deliberation, a final reconciled version was adopted (see table 5.15)



Table 5.15 showed that clarification of the scenario amongst translators is necessary for accurate translation.

First translation	Second translation	Final reconciled version
“ <u>I used to take lift as I saw that before and not walked up stairs.</u> Now I know keeping on with the exercise is the way to protect our body.”	“ <u>Now I would take lift if I can find one instead of walking stairs.</u> I know keeping on with exercise is the way to protect our body.”	“ <u>I used to take lift as I saw that before, instead of walking up stairs,</u> but now I know keeping on with exercise is the way to protect our body.”

### 5.6.5.3 The survey results

#### 5.6.5.3.1 *The physiotherapists*

All the participants agreed that the physiotherapists were approachable, enthusiastic and knowledgeable. Half of patients provided written comments. They appreciated the therapists’ attitude to be kind, patient and friendly. The therapists taught them new knowledge and answered questions clearly.

#### 5.6.5.3.2 *Receiving information about the class before starting*

Around 85% of the participants agreed that they had received information about the class before it commenced. One participant mentioned that she was not clear what benefit the exercise could bring at the beginning.

#### 5.6.5.3.3 *The programme content of exercise component*

##### *I) Frequency –*

There were approximately one-third of the patients (n=6) who expressed difficulty in attending the programme twice a week while the rest (n=13) found no problem. Their difficulties related to taking care of grandchildren and going to work. For the preferred frequency, most of them found twice a week appropriate. Only one participant suggested once a week and the other once every two weeks to be preferable.

##### *II) Intensity –*

All participants expressed that the intensity of the class was appropriate to their level of fitness.

*III) Types* – Eighteen participants agreed that the exercises were easy to follow. The remaining participant did not provide comment here.

#### *5.6.5.3.4 Total number of sessions –*

One participant expressed that 10 sessions was not sufficient.

#### *5.6.5.3.5 The programme content of self-management – usefulness of the information booklet*

Apart from one participant not giving feedback, all others agreed that the information booklet was useful and helpful, including the exercise chart that showed them how to perform the exercises which they could refer to later. Specifically, the booklet helped them to know the benefits of exercise, and its relationship with diet, how to manage pain and the use of medication.

#### *5.6.5.3.6 Benefits of the OA knee class*

All the participants agreed that they felt they benefited from the KOA class.

##### *I) Clarification of some misconception – exercise helped my knee*

The participants found that some beliefs were clarified in the classes. They learned that exercise helped to protect their body.

##### *II) Learning to do some exercise correctly and that was helpful*

The physiotherapists taught the participants to do different kinds of exercise, with instruction. As the participants did them, they found them helpful and their knees improved.

##### *III) Learning some self-management skills to cope with pain*

Some participants acquired some knowledge of knee care. With the increased knowledge, they knew what to do in managing pain, like pacing, relaxation and understanding mood and pain. They also knew that doing exercise would reduce pain.

#### 5.6.5.3.7 Improved outcomes on pain, strength and fitness

The participants reported that their pain was reduced and their legs stronger in strength. They could walk for longer distances.

#### 5.6.5.3.8 Adherence to exercise in the long-term

All participants expressed that they would continue to do KOA exercise in their own time. The majority (n=12) would perform individually while two participants planned to exercise in groups as there would be more encouragement to keep the momentum.

The most frequent choice of venue was home (57.89%). Some would choose an outdoor playground (26.32%) or gymnasium (21.05%). One participant mentioned leisure physical activities of hiking and swimming.

### 5.6.6 The data from focus group and synthesis with survey data

The focus group was transcribed according to the method described in section 5.4.3.1. The forward and backward translation of the focus group data was close to the meaning of the substance being discussed. In this section, the focus group data and the survey data are presented together.

Codes were generated from the data separately from the candidate and one member of the supervising team (JP). Table 5.16 below demonstrates the codes generated by the candidate (see summary code in Appendix S1) and the supervisor (see independent coding in Appendix S2).

Table 5.16 The codes generated by candidate and supervisor independently.

<b>By candidate</b>	<b>By supervisor</b>
History of knee pain	History of present condition
Received passive treatment before	Previous treatment
Beliefs for knee pain	Beliefs about cause of knee OA
Impact of knee pain	Change in behaviour due to OA
	Attendance at the programme
Reasons of attendance	Reasons for attending the ESCAPE-pain class
	Current treatment
	Views on content of ESCAPE-pain course
	Positive views on ESCAPE-pain programme
Self-management – learning new knowledge to help self	Education session helpful, learnt how to help self
	Increasing knowledge of how to manage

	OA
Self-management	Positive experience of social aspect of the course
Self-management – diet & exercise	Engagement with documentation
Self-management – action plan	Goal setting
Level of being active before class	Level of PA
Exercise section	Benefits of ESCAPE –increased knowledge adaptation to current habit
Back pain and exercise	Personal context
Effects after class - outcome	Positive physical impact of ESCAPE-pain
Effect – increased strength	Benefits of ESCAPE – increased strength
Effect – increased in functions	Benefits of ESCAPE – increased function
	Benefits of ESCAPE – improvement in PA
Self-management - supplement	Benefits of ESCAPE – reducing health costs
	Benefits of ESCAPE – changed health beliefs
Effect – more active lifestyle	Change in behaviour – moved more
Confidence in doing exercise	Benefits of ESCAPE – increased confidence
Barriers	Barriers to attending ESCAPE-pain
Therapists' role – gave guidance to health-related problems	Physiotherapist added value, made information their own
Continue exercise in the future	Adherence to the programme
	Adherence to self-management
Diet control and exercise amount	Adherence to life-style changes
Therapists' role – taught new knowledge	Evaluation – positive – information giving
Therapists' role – correct ways of exercise	Evaluation – positive –correct advice
Therapists' role - helpful	Evaluation – positive – about therapists
Class organization – exercise room	Evaluation – positive – room environment
Class organization – frequency & duration	Evaluation – negative – limited time to exercise
Class organization – group size and guidance	Evaluation – negative – lack of direction
Confusion in class management- patients get confused in early sessions	Evaluation – negative – management of group when exercise
	Sharing non-ESCAPE endorsed information
Recommending the programme to others	Recommendation of ESCAPE

There were four themes with 12 subthemes identified from qualitative data from the focus group and elaborations in the satisfaction survey. The themes and subthemes are listed below. Concept maps in detail, simplified and for presentation were developed (See Appendix T1-3).

Theme 1: Knee pain – a burden to patients

- 1.1 *Chronic knee pain not relieved with passive treatment*
- 1.2 *Significant impact on daily functioning due to knee pain*
- 1.3 *Belief on overloading the knee to cause pain*

Theme 2: Interactive education on active coping for self-management

- 2.1 *Interactive learning for self-efficacy*
- 2.2 *Relevant and valuable pain-coping strategies for self-management*
- 2.3 *Goal setting*

Theme 3: Doing exercise to stay active

- 3.1 *Starting exercise and progressing*
- 3.2 *Walked better and squatted lower after exercise*
- 3.3 *Limiting barriers manageable with resilience*
- 3.4 *Confidence built up with vitality*

Theme 4: Therapists motivating change in patients

- 4.1 *Creating interactive and collaborative environment to motivate change*
- 4.2 *Nurturing mastery of exercise practice to increase self-confidence*

#### 5.6.6.1 Theme 1: Knee pain – a burden to patients

Both data sources of the focus group and quantitative study showed that the patients with KOA suffered from chronic pain that was worsening. Their knee problems had a great impact on their daily functioning, including walking ability or coping with their job. They believed biomechanical issues caused their pain; including overload at work like prolonged standing, stair climbing and heavy lifting. They also associated being overweight and excessive physical activity like hiking, as contributing to 'wearing out' of their knee joint. Despite having sought passive treatment of medication, manipulation, Chinese medicine and acupuncture, there was no persistent effect on their pain.

There were three subthemes under this theme which are illustrated in the quotes below. All the names shown here were pseudonyms and the quotes were taken from the focus group. Triangulation of the data was done from the source of satisfaction survey as well where the patients were numbered from 1 to 19.

#### 5.6.6.1.1 Subtheme 1.1: Chronic knee pain not relieved with passive treatment

The patients described that they had knee pain which had fluctuated for months and years, but had gradually got worse. They sought treatment from western doctors for medication or TCM practitioners, yet the problems were persistent.

*May: "I have had pain at my leg for over 20 years. The pain started when I started working. I went to see doctor but there wasn't much help."*

*Jessy: "I've had the knee pain for over 10 years but I had not taken care of that. I would just receive treatment from acupuncture, herbal treatment or bonesetter (doctoral candidate's remark: TCM practitioner who is specialized in musculoskeletal condition) when it got painful. It has gotten worse this year."*

The chronic knee pain that the participants experienced was not intense or very disabling when it was started, but over months or years, the pain got worse. TCM practitioners were commonly sought for managing chronic illness amongst local Chinese. The treatment offered by TCM practitioners included acupuncture, herbal treatment or bonesetter, and were all passive modalities. The patients also consulted western medical doctors who prescribed medication for pain relief – no substantive change was seen. There was no advice from either Chinese or Western medical professionals to improve physical activity and self-management behaviours.

#### 5.6.6.1.2 Subtheme 1.2: Significant impact on daily functioning due to knee pain

Because of their knee pain, their walking ability was greatly affected. They lost motivation to walk or do stairs. When they went out, they often searched for a seat and changed their walking pattern so as not to provoke pain. One of the participants shared that her pain was so intense that she had to quit her job. Below are some illustrative quotes:

*Jessy: "I had to sit after walking for a while. Walking in a mall from this side to the other, I had to sit down whenever there's a seat. I sat down because of the pain."*

*Lincoln: "... I refused to walk as I went into a mall. 'You (his wife) go ahead and I'll go to watch a war film.' It's like that many times. It was so sore that I didn't want to walk."*

Knee pain was associated with disability and the weight-bearing involved in daily functions of standing, walking or stair climbing. The patients commonly took

action to avoid provoking pain, hence to walk in a particular way to ease the pain or to lean onto something for support, or take a seat rather than walk.

#### 5.6.6.1.3 Subtheme 1.3: *Belief on overloading the knee to cause pain*

The participants believed that mechanically overloading through body weight and excessive standing, stair climbing, heavy lifting or physical activity was related to their knee pain. Here are some quotes illustrated:

*May: "I had to lift heavy loads up and down the stairs."*

*Kassy: "It may be my body weight."*

Much of the participants' attention considered the loads exerted on their knees that caused their knee pain. The mechanical loads affected them throughout the day during standing or walking. Duties at work in weight-bearing positions were also considered to aggravate their pain. Heavy lifting, stair climbing and hiking were blamed more for the cause because they were considered vigorous lower limb activities. Apart from these risk factors considered to provoke knee pain, explanations that were given to patients regarding the pathology within their joint, notably degeneration made them reluctant to put any weight on their knees or undertake any lower limb activity.

The patients' belief of overload on their degenerated knee renders them fearful to undertake physical activities. They moved less and walked less, thus they put on weight, adding more stress to their knees. Taking a passive stance, i.e. relying on others to manage their chronic pain did not help to break through this vicious cycle of fear avoidance, nor could they build up an active life-style. These patients with KOA were burdened before the ESCAPE-knee pain programme.

#### 5.6.6.2 Theme 2: Interactive education on active coping for self-management

The participants learned new knowledge through interactive engagement. They were motivated and participative in sharing experiences. They learned what could help and how to help themselves. They learned the benefits of exercise. They valued the active coping strategies of pacing and pain relief strategies. Their attitude toward use of medication seemed going extreme. Control of diet and weight control needed further support. More importantly, goals helped to drive them forward.

#### 5.6.6.2.1 Subtheme 2.1: Interactive learning for self-efficacy

The participants accepted the format of interactive discussion in the education on self-management. There were opportunities for them to ask questions, and sharing individual experiences served as vicarious learning. They were motivated, curious and had capacity to learn. Here are some quotes illustrating this:

CC: *"In the first couple of sessions, I found nothing special. I had thought of giving up. Later I told myself to keep coming. Then more materials were presented and we asked more. So, I started to find it useful. So I continued to complete the course."*

CC: *"Sometimes when I heard others share, you realized that their situations were similar to mine. They would also suggest, 'I would do in this way.' All these were correct which were valuable experiences."*

The patients were motivated to attend as they wanted to gain knowledge and skills to help their chronic pain problem. The ESCAPE-pain programme started with 20 minutes discussion on self-management each time. The therapists adopted a motivational interviewing approach during the discussion. The patients were prompted to ask questions throughout and sharing with others was encouraged to promote vicarious learning.

#### 5.6.6.2.2 Subtheme 2.2: Relevant and valuable pain-coping strategies for self-management

Both sources of data on qualitative research (from the focus group and satisfaction survey) showed that patients learned what could help and how to help themselves through the discussion topics. They learned that exercise helped to protect their body and decrease knee pain. Coping strategies included pacing technique, pain-relieving strategies and appropriate use of medication. They valued the knowledge acquired.

Patient 5: *"I understand these exercise help me. Now I know keeping on with exercise is the way to protect our body."*

Jessy: *"We were taught on moods and medication. We learnt to help ourselves by using ice when it was painful and not necessarily to depend on painkiller alone. I know more now. I used to apply some ointment or medicine tapes before. Now I know more about the knee, like weight. Very useful."*



A number of self-help strategies were recalled by the participants after the class. The first of the active coping strategies was doing exercise, where exposure to the intervention reduced fear. What exercise to do and how to do were tackled both in theory during the discussion and practical during the exercise section. Other pain coping strategies included pacing technique to regulate daily activities. Patients were encouraged not to force themselves to work beyond their capacity. Activities could be broken up into smaller portions that did not provoke any symptoms, with rest taken in between. Pain relieving modalities such as ice and heat were encouraged. In addition, the impact of pain on mood was discussed.

The participants' attitude toward medication use varied. Some participants never took any medication while some had taken them previously but stopped because they were not helpful. One participant found analgesics most important. This phenomenon could be related to the various levels of severity. Here are some quotes for illustration:

*Phillip: "Now I don't take that medication. The doctor said, 'As you have pain, I give you some pain killers.' I took them but it wasn't helpful. I don't take them now."*

*Kassy: "I find that taking pain killer medicine is the most important. Applying ointment seems not helpful."*

Patients' attitude toward medication seemed extreme, they would either not take it or find it most important for their knees. Some of them did try some mild form of topical medication. Developing knowledge of how to use medication properly was one of the self-management strategies discussed. Different level of medication use might also reflect the level of severity of their conditions.

A few participants recorded daily food intake versus physical activities amount for a few days. That helped to alert them on balancing food intake with energy output:

*CC: "I actually compared and paid more attention, to see if a balance could be achieved between my food intake and amount of exercise. I paid more attention, especially on my diet."*

When that person documented his/her level of physical activities on that day, he/she could compare and see if there was a balance between the food intake and exercise (energy) output. An excess of food intake implied putting on weight, i.e.

adding load to the knee joint. This is a very effective, but short-term self-reflection, whereas diet control demands more resilience.

Diet control was a difficult issue, especially for someone fond of eating. It was tempting to lose control at the times of festive celebration, social gathering or having good mood.

*May: "I had much difficulty in controlling the amount I ate."*

Festive dining was also another pitfall that people found hard to resist. It was useful to recognise these common situations that hinder diet control and plan management accordingly.

Psychologically, participants could relate their mood to their knee pain, and the practice of relaxation helped. All patients' score for depression and anxiety were below the cut-off point for clinical diagnosis (section 5.6.3.4). They found exercise relaxing and helped to manage fear.

*May: "I don't feel stressed when I did exercise in the class. That was relaxing. These helped me to relax."*

*Lincoln: "It was so sore that I didn't want to walk...It was not pain but soreness. Pain was little but you really didn't want to walk. Now I don't have this condition any more. It's quite OK for me to walk for more than an hour."*

The patients were aware that pain and mood were related, and were conscious of the benefits of keeping calm as their pain reduced.

Interactive discussion with a motivational interviewing approach enhanced participants' learning. The new knowledge they gathered helped to overcome their old beliefs of knee pain, and challenge the methods they could adopt to manage their symptoms. Self-experience and vicarious learning was more convincing than the information given by therapists alone.

#### *5.6.6.2.3 Subtheme 2.3: Goal setting*

The idea of setting a goal and action planning was not easy for patients to grasp and follow. Quite a few participants had left that part of the workbook blank but two patients tried to make plans for doing exercise. They increased the exercise level and found improvement. Here are the quotes:

*Jessy: "Now the exercises I learned here become the basis when I exercise*

*back home. I can follow the exercise chart and practise daily. This turned out to be a goal day by day as I did them. My goal is to practise these exercise taught in class. I hoped to help my legs by strengthening the muscles. "*

The exercise practice starting from simple and lower level was not difficult for the participants to pick up and their confidence was increased. With some behavioural modifying strategies – exercise diagrams and logsheets which were checked every treatment session – the participants were motivated to do home practice. When their condition improved, they increased the intensity of exercise. Through their achievement and advancement of goals, they progressed further.

The new knowledge the participants gained on the pain coping strategies and mood management built up their confidence in self-management. They learned that exercise helped to protect their joint, and coupled with the practical component they enhanced their confidence in exercise.

#### 5.6.6.3 Theme 3: Doing exercise to stay active

Before the ESCAPE-knee pain programme, the participants had engaged in low intensity of exercise only or not knowing what specific exercise they could do. They put on weight when food intake was not balanced with exercise work-out. In the programme, there were opportunities for them to do exercise together. They gradually picked up how to do the exercises and progressed in repetitions and intensity. Their confidence in doing exercise increased as they had a better mastery of doing the exercise.

##### 5.6.6.3.1 Subtheme 3.1: *Starting exercise and progressing*

Initially most of the participants' exercise level was low, like engaging in daily chores, window-shopping or doing some flexibility exercise. It was difficult for those who were still working. Here are some quotes for illustration:

*Kassy: "I went out every morning, exercised, went shopping, chatted with friends and went to supermarket."*

*Jessy: "I didn't have any. I'm used to having dim sum tea early each morning. Then I would go to the park and do some mobilizing activities. I would observe how others were moving and I followed."*

In the local setting, accessing facilities within walking distance aided participation such as going to the nearby market, restaurant or park. Those who did not engage in work, like Kassy and Jessy, went to a restaurant for breakfast, and then went to

a park or market. They did not know what specific exercises to do, so mostly engaged in some kind of mobilising activities. For the group at work, the work hours were long and tiring and exercise work-out for a whole week was low. The calorific intake from food usually out-balanced the energy expenditure through exercise, resulting in weight gain and worsening knee pain.

When the exercise class started, the participants did not know what types of exercise were suitable or how to do them properly. The class gave them an opportunity to learn and push themselves, although there was some confusion at the beginning when the exercises were new to them. Here are some quotes:

*Lincoln: "It's better to know those exercises now. I performed a bit of exercise, but sometimes I didn't know what movement was right in the past."*

*May: "It's a bit confusing at the first session because we're not familiar with the exercises. As we came to know them later, I found the time not enough. It's too short."*

The exercises were introduced to the whole group in the first session, then they were free to practice the exercises afterwards and in the subsequent sessions. These exercises were new to the participants and they needed some practice before they could do them accurately. They found the class management was rather chaotic at the beginning and supervision was not enough. Despite this, the group exercise gave the participants an opportunity to push themselves to do exercise together.

However, when the participants became more familiar with the exercises they progressed the repetition, intensity and level of difficulty as shown in the illustration from both the focus group and survey data:

*CC: "I've learnt more exercises that help my knee pain and I can do these exercises. I increased the level of difficulty each time I exercise. It becomes an improvement."*

*Jessy: "At first I got confused. Later as I did more, I found that I didn't need to have steps any more. She (the therapist) had taught me how to do. I could then follow the sequence myself. I didn't have to take note of others as each person's pace could be different, fast or slow.... Within the 10 sessions, I had my own sequence in cycling, doing that exercise, pulling elastic band over there, wall squatting on the other side..."*

During the 10 sessions of exercise practice, the participants not only learned how to do those exercises, but also set their own choice and sequence. Gradually, they

started to challenge themselves by increasing repetitions and the level of difficulty. They could appreciate their improvement in their body. The most powerful component to improve self-efficacy of any particular behaviour is mastery of the skill (Bandura, 2004). When the participants learned well how to do those exercises that can help their knees and how to progress onward, their confidence in doing exercise to protect their knees increased.

The participants found that it was important for the therapists to teach them how to do the exercises. The exercise chart for them to carry out home exercise was helpful as a reminder. Here are the quotes from both sources of data:

Jessy: *“The one (exercise chart) taught us what to do.”*

CC: *“You need to have someone teaching you before you know how to do. You may not understand just by looking at the diagrams.”*

Physiotherapists were experienced health care professionals who could teach the participants to do exercise accurately, and correct the practice which the participants appreciated.

#### *5.6.6.3.2 Subtheme 3.2: Walked better and squatted lower after exercise*

The participants generally experienced decrease in pain, increase in strength, and in their walking and squatting ability. One participant found her physical condition improved to such a state she could resume work. In general they were not afraid to do physical activities and their tolerance in doing physical activities increased.

Kassy: *“Gradually as I continued to exercise, I could walk noticeably for longer distances and stood for longer periods. I didn’t have to find a seat after I did something for a little while.”*

Jessy: *“Now 10 sessions completed and I found some effect. I was not able to squat down or arise before. Now I’m able to do it gradually. I can. It turned out to be better, so I persist in exercising.”*

Physically the patients experienced improvement in their leg strength reflected in their improved sit-to-stand ability, increased walking speed and ability to squat down. The participants were quite skeptical at the beginning, yet they were able to do more and their ability improved after the class practice. Once again, these improvements enhanced their belief of exercise helping their knee conditions.

#### 5.6.6.3.3 Subtheme 3.3: Limiting barriers manageable with resilience

The participants were aware of some barriers affecting their exercise adherence, mainly taking care of family or work, reduced motivation or bodily constraint. After going through the class, the participants identified some ways to manage their time in their busy daily schedule, finding someone to help with other tasks or doing exercise at home. Here are some illustrations:

*Jessy: “So taking care of grandchildren, one two-and-a-half years old and the other five-and-a-half, is very bothersome. I’ve spent a lot of time on them. I’m eager to do exercise but I haven’t enough time. Now I steal some time to do it. I get up before them. Then I do as many exercises on the bed as possible. When they get up, I bring them to the park and I do exercise there. I do this according to what they said, ‘Do more the better.’ I can’t segregate other time. I do want to do. Anyway I adhere to do what I was taught to.”*

*Kassy: “I stopped only because I had to take care of my grandchild. Now I don’t have to care for him. I brought him back (to China).”*

The traditional Chinese family relationship had changed quite a lot. The elders (the study population of the current research) were no longer the most respected persons in the family, and they contributed by taking care of grandchildren or cooking for the family. Taking care of grandchildren was burdensome, sometimes to the detriment of their own medical care requirements. It was very motivating for Jessy to solve her problem by good time management. Nevertheless, full-time jobs, other responsibilities or weak physical condition were still barriers to exercise. Some strategies of exercise principles did help, like breaking exercise into short bouts, doing exercise at home, and doing the types of exercise that merged into daily routine. These learning points were reflected in the group discussion.

#### 5.6.6.3.4 Subtheme 3.4: Confidence built up with vitality

The participants were optimistic and more confident to adhere to exercise in the future. They were aware of the unhelpful behavior of ‘pain – then not moving’ but rather they were more convinced of an attitude to ‘do more the better’. They commented on a willingness to keep themselves active and to continue to exercise in the future. Here are some quotes for illustration from both qualitative data sources:

*Lincoln: “To build up confidence again. That leg became stronger. Erh, it’s*

*true, but you have to keep perseverance in doing exercise. That's very important."*

Jessy: *"... I do this according to what they said, 'Do more the better.'..."*

The ability to do more was convincing; now they were more convinced and confidence had increased to keep on exercising. Perseverance was empowered within the participants themselves. One of the therapists said to them about a metaphor of keeping the unhelpful belief of "not to move because of pain" was equal to being "caught in a trap". Instead, the therapist gave them a short but encouraging slogan "Do more the better" motivating toward the behaviour change.

Here are some quotes illustrating their change in attitude and practice:

Jessy: *"I have some motivation after coming to do exercise. We were taught that pain was a trap – not to move la, not to move la. Now it's not the same. Sometimes it's better to walk for a while when there is pain. Walking around is better than sitting whole day long for someone who's fat like me."*

May: *"I've already registered to be a member in the Rehabilitation Community Network and have applied for a class right on that day...Also, I filled in an application form to sports centre for drawing lot."*

People were more convinced of the things they verbalised themselves (motivational interviewing). They realised the more inactive they were, the more stiff they would become. They made an effort to keep active, like regular exercise, walking more instead of sitting (and that was a way out to combat overweight), enrolling in activity classes, more choices of exercise in a fitness centre, walking up and down stairs in daily activities. They changed from a passive stance to facing their knee pain and taking up a more active life-style behaviour.

#### 5.6.6.4 Theme 4: Therapists motivating change in patients

Both the qualitative data from focus group and satisfaction survey showed that the therapists played an important role in the ESCAPE-knee pain programme. They created an interactive environment for the patients to discuss on new knowledge. The physiotherapists invited partnership from patients to contribute their questions and share their experience with the group. The physiotherapists were described as helpful and responsive. Besides, they were exercise experts who nurtured the individual patients to become confident in themselves for exercise practice.

#### *5.6.6.4.1 Subtheme 4.1: Creating interactive and collaborative environment to motivate change*

Different from the one-way one-off presentation on educating new knowledge, the physiotherapists facilitated a discussion on various topics on exercise and self-management strategies following the ESCAPE-knee pain protocol. They created an interactive and collaborative platform for questions and answers, or sharing of common experiences. The patients became curious with a quest to learn more. When they brought up their questions, the responses were positive and helpful. This in-turn facilitated them to rectify their belief of adopting exercise actively to manage their knee pain.

*Patient 6: "She made me understand that exercise can help you."*

The physiotherapists adopted the adult learning principles of arousing patients' needs and interest during the discussion session. Life situations were fed in by the participants' experience sharing. The active discussion was an opportunity to seek group collaboration to search for new ways to help themselves and the collaboration enhanced motivation.

#### *5.6.6.4.2 Subtheme 4.2: Nurturing mastery of exercise practice to increase self-confidence in patients*

Before the ESCAPE-knee pain programme, the patients were not sure what type of exercise they could do on their knees, irrespective of whether they had engaged in regular exercise habits or not. Physiotherapists were experts in teaching and training patients to exercise with progression. They taught the patients what exercises to do and how to do them. The patients particularly appreciated that the physiotherapists corrected them as they were exercising. They appreciated the guidance obtained from the therapists despite there was some confusion in exercise section at the beginning.

*Patient 15: "Now I know doing exercise can decrease knee pain. Therapist had taught me to do exercise and I did try, to see if these could help."*

There were opportunities for the participants to progress their exercise intensity according to their different pace. They increased the repetitions or intensity of exercise themselves gradually. They knew what exercises they could do at home, in the park or in fitness centre. This mastery developed in the exercise practice



was observed amongst the patients and reported in the focus group. The patients' self-confidence in doing exercise themselves increased, from the way they described and in the quantitative data. "I know exercise can help" (need), "I can walk for longer distance" (ability), "I did the exercise" (action) and "registered in community class" (taking steps) were all "change talks" steering toward the direction of change in MI theory. The patients were prepared and mobilised toward the change of doing more exercise. The physiotherapists motivated the patients toward the change behaviour.

## **5.7 Discussion**

This POC study aimed to determine the suitability of the ESCAPE-knee pain programme in HK. It was delivered to a small cohort of people with KOA and acceptability of the intervention was explored.

In the POC study, 30.9% of patients were recruited in the target population. The retention of participants for this 10-session ESCAPE-pain programme was 82%. For the practicability of patient-reported outcomes, KOOS was used for evaluating knee functioning status and SEE-C for evaluating self-efficacy amongst the Chinese populations.

All participants showed improvement in all KOOS subscales, with the mean change of 17.25 (SD 11.29) for pain, 10.13 (SD 8.57) for PS and 14.47 (SD 15.60) for QoL. Looking at the responsiveness toward the intervention, 84% of participants were responders for pain, 79% for PS and 74% for QoL who fulfilled 15% of possible improvement criteria. For the improvement up to the MIC as reported in previous articles, 42% of participants showed mean change up to MIC for pain, 47% for PS and 74% for QoL.

A similar trend of improvement was shown in the PSFS with mean change of 2.39 (SD 1.44) as in the KOOS-PS subscale. 50% of the functional activities chosen were basic activities while the other 50% coping with outdoor or leisure activities. The top three activities were walking, stair-climb and squatting. The performance-based testing also supported the patient-reported outcomes. The mean walk speed was 0.19 (SD 0.09) m/sec faster. The participants could rise from chair on

average 2.21 (SD 3.08) times more within 30 seconds. They could cope with 12 steps of stair, up & down, shortened by a mean of 3.83 (SD 3.52) seconds.

As a process indicator, self-efficacy for exercise was found to be improved by a mean change of 1.02 (1.47). Improvement was also detected in the psychological status of anxiety and depression. The mean change of the overall score of the HADS was -4.58 (SD 5.18). After the treatment, all participants scored below the cut-off points for the HADS-total, -anxiety and –depression scores.

From the satisfaction survey, the participants found exercise frequency, intensity, types and time-period suitable, and self-management strategies useful. They experienced benefits of reduced pain, improved strength and physical fitness. All participants expressed their intent to continue to exercise independently.

The four themes emerging from the focus group and satisfaction survey data gave more understanding to this group. They suffered from knee pain and were burdened by it and sought passive treatment with no improvement. The interactive education on active coping self-management in ESCAPE-knee pain programme enriched their knowledge. They were prompted to set goals and continued exercising. Through the exercise class, they learned and progressed the exercise repetitions and intensity. They reported improved physical functional outcomes that were supported by the quantitative data. Some barriers were identified but solutions were reported alongside. Participants' confidence to exercise improved and they were more willing to stay active. Within this ESCAPE-pain programme, the therapists were noted as the key in motivating change in patients.

### **5.7.1 The primary outcome**

#### **5.7.1.1 KOOS**

For reducing the burden for the participants to complete, the shortened version of KOOS was used in this POC study. The choice of these three subscales was supported by Collins et al (2016) in their recent review on KOOS. These subscales have the greatest relevance and usability for patients with KOA.

Improvement of 17.25 points for pain, 10.13 points for PS and 14.47 points for QoL was obtained in this POS study. Several studies showed patient relevant improvement after exercise programmes. There was variation of the findings

reported. Gonçalves et al (2010) reported mean difference of 17.98 points, 14.13 points and 12.26 points for the pain, PS and QoL subscales respectively after conventional physiotherapy treatment. The values are close to the mean difference obtained in this POC study except that for the PS. The mean differences for a group after receiving a “neuromuscular training” programme while waiting for total knee replacement were lower to be 5.3 points for pain, 8.5 points for ADL and 4.8 points for QoL (Ageberg et al. 2013). The lower side was echoed in a single-centre study reporting KOOS-PS of 4.54 points after physiotherapy intervention (Harris et al, 2013). The data obtained in this POC study fall within the range reported in these articles.

#### 5.7.1.2 The responsiveness

There was a high percentage (74-84%) of responders fulfilling 15% of possible improvement. It was supported by 95% of patients reporting improvement. This was higher than the responses reported by Ageberg et al (2013). 45 – 61% of participants were categorised as responders across the various KOOS subscales after receiving an exercise protocol. In this current POC study of ESCAPE-knee pain programme, an enhanced integrated programme of self-management education with exercise training up to an individual exercise capacity was administered. That may account for a higher proportion of responders. In the ESCAPE-knee pain study reported by Hurley et al (2012), the responders’ percentage was 61% at 30 months.

The number of participants was small in this POC study. It was not our objective to identify meaningful improvement change within our study subjects. An attempt was made to compare our data with the MIC reported in other studies (Ingelsrud et al, 2014; Harris et al, 2013). Approximately 50% of participants had improvement up to MIC in pain and PS while 75% in QoL. However, the MIC was reported to be dependent on the population and intervention, so direct comparison may not be optimal (Terwee et al, 2010).

## **5.7.2 The secondary outcomes**

### **5.7.2.1 Patient Specific Functional Scale**

PSFS, reporting functional abilities, showed a similar trend of improvement as in KOOS. Other studies using PSFS as outcome measures showed similar findings concurring with the increase of 2.5 points found in this POC study. Minimal important difference had been reported to be 2.3 (Abbot et al, 2014) to 2.5 (Chatman et al, 1997) for lower limb or knee dysfunction in particular after receiving physiotherapy. The findings support an inference that the ESCAPE-knee pain programme brought meaningful functional improvement to the participants.

The top three physical functions (walking, stair-climb and squatting) named by this cohort of participants with KOA were very close to the performance testing taken in this study. Squatting and chair-stand activities demand higher leg strength and these activities were included in the exercise component of the ESCAPE-knee pain. Although squatting is often an activity commonly discouraged amongst KOA patients, the patients in HK often wanted to improve their ability in this activity.

### **5.7.2.2 Performance-based testing**

The improvement in KOOS and PSFS was aligned to the improvement shown in all the objective performance testing of walk speed, chair-stand in 30 second and stair-climb of 12 steps. This is the first study to support the Chinese version of the two PROMs (KOOS and PSFS) tested in the HK local population experiencing KOA. This is in line with the result found by Gill et al (2012), who showed moderately high correlation between the walk speed and chair stand test to have Spearman's rho correlation coefficient = 0.42 and -0.62 respectively with another commonly used PROM WOMAC Function scale for KOA.

### **5.7.2.3 Self-efficacy for Exercise**

Self-efficacy beliefs are increasingly shown with evidence to be powerful predictors and/or mediators of a variety of health-related behaviours (Marks, 2012). SEE predicts adoption of physical activity. People who exercised more regularly scored higher SEE-C scores than those who did less (Lee et al, 2009). It also serves as a process indicator, showing more details for how the ESCAPE-knee

pain programme led to the improved outcome. There were self-efficacy enhancing interventions including information, verbal persuasion or encouragement, exposure to someone similar doing exercise successfully, skills training, incentives and goal setting.

In the current POC study, the SEE-C score improved from baseline 5.5 to 6.6 with mean difference of 1.0. Triangulating with the data obtained from the qualitative research, the self-efficacy enhancing interventions were experienced and reported by participants in the focus group. The improvement in SEE-C mediated the improved treatment outcomes. In a study reported by Wright, Zautram and Going (2008), higher self-efficacy belief was linked to lower pain and better function through resilience. It was supported by better emotional wellbeing amongst the participants with less anxiety and distress levels in this study. Another study investigated self-efficacy mediating functional activities like walking and stair climbing with positive results (Focht et al, 2005). The improved SEE findings obtained in this study concur with other studies reported.

A mean difference of 0.76 in SEE was demonstrated in a 12 week Asian community-based cycling exercise programme for participants with knee pain (Rawiworrakul et al, 2007). In another programme of Staying Active with Arthritis the participants with KOA (83% white) were trained in clinics to do lower-extremity exercises. Subsequently they were followed up to continue with the exercises and participated in fitness walking for 6 months (Schlenk et al, 2011). A mean difference of 0.61 in SEE was reported.

Furthermore, there is evidence of self-efficacy impact across cultures. A range of low SEE (2.39) in an Asian (Thai) community (Rawiworrakul et al, 2007) to high SEE (5.78) in resourceful Caucasian communities (Schlenk et al, 2011; Resnick & Jenkins, 2000) have been reported. For the preliminary data obtained in this POC, the baseline SEE-C of 5.5 in this HK cohort indicates that they were more confident to exercise themselves as compared to the Thai cohort population.

#### 5.7.2.4 Hospital Anxiety and Depression Scale

The positive result of the HADS, especially shown in the anxiety domain, after the ESCAPE-knee pain programme shows that the integrated programme of exercise and self-management brings beneficial effect to the psychological state for a

person suffering from KOA. The earlier study on HADS by Leung et al (1999) was undertaken in the medical clinic of the same local hospital as this POC study. The majority of participants in our study were non-psychiatric cases with the total score of 9.11, depression 3.95 and anxiety 5.16 points. The findings were similar to the profiles of the non-psychiatric patients amongst the medically ill where they found the HADS total score 10.75, depression 5.69 and anxiety 5.06. The present KOA cohort scored less on depression. Another study reported by Breeman et al (2015) on the normative data for United Kingdom, reported the HADS-anxiety score was 6 for women and 5 for men while the depression score was 3 for both sexes. The findings concur with this study.

Before the ESCAPE-pain programme, there were more than one-third of participants who had anxiety and 5% participants had depression. After the programme, all of the participants scored below the cut-off points for clinical diagnosis. Instead of having fear and avoiding, they could confront their problems through exercise and some simple ways of pain management.

### **5.7.3 Focus group**

#### **5.7.3.1 The group participation**

Focus group research was very scant amongst Chinese populations. After Twinn (1998) demonstrated that focus groups could contribute as a method of qualitative data collection within Chinese populations, the present study supported this view.

As pointed out by Ritchie (2014) regarding group membership, the participants invited to the focus group shared the ESCAPE experience, but were as diverse as possible. There were 40% and 50% female and male gender representatives respectively of the original sample. Participants joining the focus group with high attendance in the ESCAPE-pain programme represented 58.3% of the original sample, while 33.3% from the low attendance group.

#### **5.7.3.2 The transcript**

It was time consuming transcribing verbatim and the translation process for the focus group data. This situation had been commented before by Krueger (1995)

about collecting qualitative data by focus group, particularly when translation was involved.

The analysis of data was undertaken using the English version, not the source language to allow review from the supervisory team. Twinn (1998) commented that Cantonese (a spoken dialect of Chinese community commonly used in HK) was very colloquial and there was little similarity of English and Chinese, particularly no tenses and personal pronouns used in Chinese. She recommended the data analysis be undertaken in the original language of the focus group discussion. To guarantee an accurate and good transcript in the current project, several steps were planned and undertaken. These robust procedures were followed closely with the essential components recommended by Krueger (2006) for a good focus group transcript:

- I. *Mastery of languages* – The doctoral candidate, being fluent in the spoken Cantonese, written Chinese and English, was equipped with knowledge in translation.
- II. *Common experience in non-sensitive issue* – The topic of discussion was not over any sensitive issue. The participants all had common experiences over their KOA and the group programme together. It was demonstrated in the data that different viewpoints were openly discussed at length.
- III. *Summary feedback to group participants* – The doctoral candidate, being the transcriber as well, was present at the focus group as the moderator. No vital information was missed. Besides, reflection of feelings and experiences of the participants were made with summary at the end of each section of discussion. Participants were asked for verification at the end of the focus group.
- IV. *Re-checking by listening to audiotape* – The accuracy of transcription was checked by listening to the audiotape again. It was done separately by the transcriber and another person experienced in transcription.

The translation process involved forward translation, synthesis and backward translation. It was adapted from the procedure set by Epstein, Santo and Guillemin (2015) and Wild et al (2005) for translating and culturally adapting patient-reported outcomes. All the translators were native Chinese living in HK and fluent in English in this research. Based on the first forward translation, the second translator

refined the wording in the target language. As argued by Weeks, Swerissen and Belfrage (2007), the process of backward translation improved the quality of translation by examining the source and target versions. The accuracy of the final version of the target version could be controlled. Nonetheless, translation of the transcript was not an absolute procedure if it was not intended for a doctoral dissertation. Analysis could well be done in the source language where discussion could be had with the local research team (Twinn, 1998).

### 5.7.3.3 The analysis

Validity of a study concerns whether the evidence has been verified. In qualitative research, validation is focused on assessing how well participants' meanings have been 'captured' and interpreted (Ritchie et al, 2014). The analysis of this qualitative data was systematic. The six-phase process followed thematic analysis (Clarke and Braun, 2014; Braun and Clarke, 2012).

The process was consistent and predictable as stressed by Krueger (2006). The data collecting procedure in this research followed the pre-set topic guide with reflections and summaries given to the participants at the end of each section and the overall conclusion of the group. The doctoral candidate was present in the group discussion. The data produced by the whole group were analysed without delineating individual contributions. The coding was done separately by the doctoral candidate and one of the supervising team (JP). The definitive codes generated were very similar.

Triangulation of different sources of information from quantitative and qualitative data helped to compare and confirm the validity of all the data obtained.

Participants initially had poor, passive and conflicting beliefs in managing their knee pain. After going through the programme, the majority of patients showed positive effects; they had more knowledge and were aware of a range of treatment options to manage their knee pain. In particular, patients had an increased knowledge regarding how to use exercise to manage their OA and reduce the burden of OA symptoms. As a results of attending the programme the majority of participants had positive experience in improving their pain, physical and psychological functioning. Their self-confidence to exercise (self-efficacy of



exercise) improved. Mastery of exercise built up their self-confidence of using exercise to manage their knee pain. The physiotherapists motivated the participants for change by creating an interactive and collaborative environment. Similar findings were shown by Hurley et al (2010) interviewing participants of ESCAPE-knee pain individually in the UK. Positive experience and increased knowledge, along with confidence to use exercise to effect improvement were reported.

In a recent Cochrane mixed method systematic review undertaken on exercise interventions and patient beliefs for people with KOA, it was demonstrated that pain was reduced (absolute percent 6%, 95% CI -9% to -4%) and physical function improved (5.6%, 95% CI -7.6% to 2.0%) ( Hurley et al, 2018). Self-efficacy was increased by 1.66% (absolute percent 1.66%, 95%CI 1.08 to 2.20) which was equivalent to improving the exercise beliefs score. From the qualitative review of 12 high quality studies investigating people's beliefs and experiences of exercise (Fisken et al, 2016; Hinman et al, 2016; Stone and Baker, 2015; Larmer, Kersten and Dangan, 2014b; Moody, Hale and Waters, 2012; Morden Jinks and Ong, 2011; Hurley et al, 2010; Petursdottir, Arnadottir and Halldorsdottir, 2010; Hendry et al, 2006; Thorstensson et al, 2006; Veenhoof et al, 2006; Campbell, 2001), people were confused about the cause of their knee pain. Without adequate information from medical professionals, they avoided physical activity and exercise as they worried exercise might cause damage and more pain to their knees (Hurley et al, 2018). People had positive experiences in taking part of exercise programmes and increased their beliefs that exercise could improve pain, physical and psychological health and quality of life in general. The authors concluded that better information and advice about the safety and value of exercise, with challenge inappropriate health beliefs, should be included in exercise interventions and might encourage greater exercise participation.

The findings from this study were obtained from a group of Chinese speaking patients with KOA in an out-patient physiotherapy clinic in HK. As argued by Lincoln and Guba (1985), the findings can be transferred and applied to a congruent context in which this research took place.

## **5.8 Strengths of the study**

The mixed method approach of research presented in this chapter allowed triangulation of the data sources obtained from the POC study, the satisfaction survey and the focus group. This allows validation of the data sets obtained and demonstrated the support of findings substantively.

Considerable amount of translation work was involved in this research. Having previous relevant training and research experience, the doctoral candidate undertook the role of the first translator. As a professional healthcare worker and translator (Professional diploma in trilingual translation), this facilitated the translation to be accurate and efficient to be accomplished.

## **5.9 Limitations of the study**

The number of participants included in this POC study was small and were only recruited from one centre in the territory of HK. This may affect the representativeness. However, the baseline characteristics of this population group were similar to other cohorts with the disease.

In the process of translating the descriptive data obtained from the satisfaction survey, only the doctoral candidate had received formal training in translation. The other translator was fluent both in English and Chinese. However, frank and open dialogue was undertaken to discuss the discrepancies encountered. Examples were shown within the chapter recording the final reconciled version. In analysing the focus group data, one of the supervising team worked on the coding as well and that was found to be very similar. Only one person (the doctoral candidate) worked to draw up the themes, this might have a chance of bias and weaken the reliability. However, an excel table documenting the transcript was made available for the supervisors to cross check. However the time spent on translation of the focus group data was considerable, especially within the time-frame of a doctoral research study.

The doctoral candidate also played a role of collecting data in the focus group which might have influenced or reinforcing the discussion in the group , although summaries were made for the participants to confirm their opinions during the discussion.

The investigator who performed the baseline and post-intervention evaluation was present in the exercise sessions. This may have led to an inflation of the study result.

## **5.10 Conclusion**

The ESCAPE-knee pain programme was feasible and practicable to be delivered in the Chinese speaking population of the KOA patients in HK. The participants found this programme acceptable and experienced promising improvements in pain, physical and psychological functioning. Around 75 to 85% of them showed clinically important differences. Self-efficacy for exercise improved to give more details showing the potential pathway for the change. The participants found the exercise content appropriate to their fitness level and some were able to progress. They found also the education on self-management helpful, and their beliefs turned from passive and burdensome to taking exercise actively in their daily life. They expressed their willingness to continue exercise in the long-term. Physiotherapists were shown to motivate changes in patients. A large scale study in the future may serve to determine the effectiveness and cost-effectiveness of ESCAPE-knee pain in HK population.

## Chapter Six: Summary and discussion of thesis

This chapter provides a summary of the findings, and discusses the implications of this work.

### 6.1. Thesis aim

The overall aim of this thesis was to determine the suitability of ESCAPE-knee pain, an integrated programme of exercise, self-management and active coping strategies, for a HK Chinese speaking population with KOA.

The objectives were:

1. Systematically review the literature to identify integrated exercise and self-management programmes for Chinese populations
2. Develop the ESCAPE-knee pain programme for local use in HK including:
  - a. translation
  - b. cultural adaptation
  - c. physiotherapist training
  - d. identification of suitable outcome measures
3. Establish proof-of-concept through delivery of the ESCAPE-knee pain programme to a small cohort of people with KOA
4. Explore the acceptability of the intervention with patients.

These aims were addressed to follow the evidence-based practice through the sequence of Ask-Acquire-Appraise-Apply-Assess (Dijkers, 2012).

The SLR of the evidence for combined approaches of self-management and exercise for KOA in Chinese populations demonstrated that whilst minimal literature was available, interventions that were identified showed a positive effect on pain and self-efficacy but not on functional disability. The exercise dosage and intensity was variable. The findings supported the necessity for an evidence-based intervention to promote long-term effects on pain and function.

The subsequent work presented a translation and cultural adaptation of the intervention with assistance from patients and professionals; training of local physiotherapists to conduct the programme; identification of suitable outcome measures; a POC and acceptability study.

The POC study investigated the feasibility of this novel intervention and its acceptability to a small cohort of Chinese patients. The contributions and limitations of the feasibility study provide information showing ESCAPE-knee pain has some practical potential in HK. Feasibility of this programme in HK (N=21) was established by a recruitment rate of 30.9%, retention rate 82.6% and positive change of outcomes after the intervention. Only one minor adverse event occurred. Acceptability of the programme was explored through a focus group (n=8). The findings showed the participants learned active coping for self-management through interactive education. They set goals to facilitate continued exercise participation and expressed their willingness to stay active. Increased confidence to undertake exercise and improved function were reported.

## **6.2 Original contribution**

Although combined approaches to self-management and exercise are advocated with evidence, standard protocol to facilitate clinical application in both of the components is not clear, particularly on the weighting given to each component. The approach adopted in the ESCAPE programme, whereby a less didactic, but facilitated approach to patient management is followed, is a novel concept in HK. As such determining the suitability of this approach in a HK Chinese population was novel.

### **6.2.1 Summary of findings**

The studies presented in this thesis contributed to the original knowledge base in a number of ways and they will be elaborated further in subsequent sections. In summary they are:

1. The SLR of combined programmes for Chinese populations showed significant short-term effect in pain relief but long-term evidence was limited though self-efficacy improved. Only limited evidence was available for the short-term effect on disability. The exercise dosage and intensity was variable.
2. The patient information booklet to support the ESCAPE programme was translated and tested for cultural acceptance for use in HK.
3. Suitable outcome measures (KOOS) and process outcome of self-efficacy for exercise (SEE-C) were tested for suitability for programme evaluation.

4. The POC of ESCAPE-knee pain programme in HK was established through the ability to recruit, train physiotherapists to deliver the programme, and attendance and positive impact on patient outcomes after the intervention.
5. The ESCAPE-knee pain programme appeared to be acceptable to the KOA patients as shown by the high retention rate, along with their reported increased knowledge of self-management and active coping strategies. Their confidence to exercise improved and participants expressed willingness to stay active.

### **6.2.2 Qualitative and mixed methods approach**

Focus groups have been used for uncovering the range and depth of experiences of health services users and chronically ill individuals (Lehoux, Poland and Daudelin, 2006). Some critiques of focus group have pointed out that the group brings participants together who share similar characteristics for the researcher's purpose and as such a contrived discussion can result (Lehoux, Poland and Daudelin, 2006). Furthermore the moderator facilitating the group process and content can have some influence (Lehoux, Poland and Daudelin, 2006). The doctoral candidate who facilitated the focus group was present in the ESCAPE-knee pain-HK programme. The data generated from the focus group in this research was triangulated with the data from the quantitative study and the patient opinion survey from all the participants. The mixed method study and data synthesis support the reliability of the data collection and analysis (Ritchie et al, 2014). Overall the mixed methods approach was deemed appropriate and may be considered for similar future studies.

The data generated from the focus group in the POC study was rich and informative to explore how the participants found the intervention programme, the strengths and the areas for improvement. Though time-consuming, the qualitative study method was a fruitful journey for the candidate to undertake. The studies in this thesis indicated that qualitative enquiry is a method worthy of development in the rehabilitative services. The data from the focus group in this thesis was translated to English for the supervisors' reference and backward for robustness. Data analysis undertaken in the original language is preferred as recommended by Twinn (1998).

## **6.2.3 Evidence for the integrated intervention of exercise and self-management**

### **6.2.3.1 Summary of exercise intervention**

In the SLR (chapter 3) of trials amongst Chinese populations (Wu et al, 2011; Yip et al, 2008; Zhao, Huang & Teng, 2005; Yip, Sit & Wong, 2004), there was limited evidence to suggest a positive effect on pain but studies did not demonstrate any effect on function and facilitated exercise time was varied with unclear intensity and progression. More benefit on functional improvement is anticipated with more observed exercise (Zacharias et al, 2014).

The reviewed trials (in chapter 3) proved to be effective for short-term pain relief but long-term evidence was limited. Only short-term effect in function was shown in one study (Zhao, Huang & Teng, 2005) where 10 sessions of treatment were given. Although the patient number recruited in the POC study was small, all of the patients demonstrated improvements in the KOOS pain and physical function subscales. Looking at responsiveness (fulfilling 15% of possible improvement criteria), 84% and 79% of patients responded to the ESCAPE-pain programme positively as measured by KOOS pain and physical function subscales respectively. Improvements in function were seen in performance tests of chair stand, level walking and stair climbing. As noted by Hinman and colleagues (2007), the improvement in objective performance tests support the true improvement of interventions, not a placebo effect. A combination of functional and self-reported outcome measures allow a more realistic appraisal of functional ability than self-reported outcome alone (Boonstra, De Waal Malefijt and Verdonschot, 2008).

From SLRs and meta-analysis (MA) not limited to Chinese populations, positive findings were reported on pain and function after exercise programmes for KOA (Fransen et al, 2015; McAlindon et al, 2014; Juhl et al, 2014; Tanaka et al, 2013; Escalante, Gracia-Hermoso and Saavedra, 2011). The treatment effect was comparable to that reported with NSAIDs (Fransen, McConnell and Bell, 2003). In exercise therapy combining strength training, active range of motion exercise and aerobic activity for KOA, the estimated effect size for pain was reported to range from 0.34 to 0.63 and 0.25 for function (McAlindon et al, 2014). In the updated

Cochrane review undertaken by Fransen et al (2015), short-term benefits on pain and physical function sustained for at least two to six months post-treatment were reported. Benefits on pain were also reported in other SLRs (Juhl et al, 2014; Tanaka et al, 2013). Other reviews found that various exercise programmes improved functional aerobic capacity like walking tolerance (six-minute walk test) (Escalante, Gracia-Hermoso and Saavedra, 2011), and maximal oxygen uptake (Tanaka et al, 2013).

The resultant benefits of the HK ESCAPE-knee programme are possibly attributable to its strong exercise component and to the self-management education. The supervised exercise programme of two times per week for five weeks (400 minutes in total) is a comparatively high dosage despite two sessions less compared with the original ESCAPE-pain programme (Hurley et al, 2007a). The ESCAPE-pain programme undertaken by Jessep et al (2009) was ten sessions with positive results demonstrated. A dose-response effect of aerobic exercise on pain relief found in a recent SLR and MA has lent its support to the importance of dosage (Juhl, et al, 2014). Higher intensity of strengthening exercise was shown to yield larger effect size for improving pain and physical function compared with low intensity strengthening exercise in a recent SLR and MA study (Li et al, 2016). From the recent Cochrane Review, high-quality evidence indicated exercise reduced pain while moderate-quality evidence showed exercise improved physical function (Fransen et al, 2015).

Progression of exercise was allowable in the ESCAPE programme. The challenge of exercise was increased incrementally according to the individual's pace, like increasing step height, resistance for strengthening, time of aerobic exercise (a sample of a patient's exercise log sheet in Appendix N3). The patients were motivated to progress their level of exercise intensity during the course of intervention and it was their decision to do so. The design of exercise progression or increasing challenges of exercise is an integral component of exercise programmes for KOA patients.

A mixed type of exercise programme was included in the original ESCAPE-knee pain programme and maintained in the HK version. There is uncertainty regarding which type of exercise is more effective for KOA management. Juhl and colleagues (2014) reported findings from a SLR showing similar effects in reducing



pain and disability found for aerobic, resistance and performance exercise, with single-type exercise programmes being more efficacious than programmes including different types. However, Beckwee et al (2013) undertook a synthesis study to explore the mechanism through which exercise potentially work. From citations of the proposed pathways involved in the 22 original included studies, they formed five categories including neuromuscular (e.g. muscle, proprioception, balance, motor learning, energy absorbing and joint stability), peri-articular (e.g. flexibility of connective tissue and bone mineralisation), intra-articular (e.g. cartilage and joint fluid), psychosocial components (e.g. increase of well-being and self-efficacy, and decrease of depression), and general fitness and health (e.g. weight loss and aerobic fitness). To achieve these various aims, they recommended a mixed programme for patients with KOA including aerobic, strengthening and proprioception exercise, with task-specific exercise (e.g. stair climbing) (Beckwee et al, 2013). On the other hand, stronger hip abductors were shown to reduce compressive force (adduction moment) at the knee (Hinman et al, 2007). From their findings, they concluded that exercise induced improvement contributed both from hip and knee muscle strength. In a recent review, hip and knee muscle strengthening, along with aerobic exercise combined with dietary restriction was recommended for reducing pain and improving physical function in patients with KOA (Bennell, Dobson and Hinman, 2014). As such, the combined exercise programme in the HK ESCAPE pain programme is well grounded in recent evidence on exercise type.

#### 6.2.3.2 Summary of the primary outcome measure

The KOOS (Cheung, Ngai & Ho, 2016; Roos et al, 1998) was the outcome measure selected for evaluating the ESCAPE-knee pain-HK programme and KOOS-PS was validated with the performance tests in this study. While this short KOOS-PS subscale was developed for reducing participants' burden and item redundancy, it was criticised for not covering activities of daily living adequately (Stratford and Kennedy, 2014). In ESCAPE-knee pain-HK programme, no floor effect was observed before treatment and only one patient (5.2%) reached ceiling at post-treatment score (n=19). However, data from KOA patients (n=177) receiving out-patient physiotherapy in local Prince of Wales Hospital, showed no

floor effect, while 3 patients (1.7%) reached the maximum score at discharge (unpublished data, PWH, 2016). Upon preliminary observation of the data, all three patients had mild functional deficit, with their baseline KOOS-PS value greater than 80%. For future recommendation, KOOS-PS is applicable in routine clinical use while KOOS-function may be considered if participants with mild KOA are to be recruited.

#### 6.2.3.3 Support for theory-based self-management

The three trials reviewed in chapter 3 investigated theory-based self-management (Wu et al, 2011; Yip et al, 2008; Yip, Sit & Wong, 2004). Bandura's concept of Social Cognitive Theory and Self-efficacy model were adopted for behaviour change. It is consistent with the current views that behaviour change theories and strategies are recognised as crucial elements of successful behaviour change interventions (Mitchie et al, 2011). The stated behaviour change interventions were the ASMP or derivatives that lay-persons/healthcare practitioner could lead (Coleman et al, 2012; Wu et al, 2011; Yip et al, 2008; Yip, Sit & Wong, 2004). The patient education, self-management and active coping strategies designed in ESCAPE-knee pain programme were based on the same theories but led by physiotherapists.

The National Institutes of Health Behaviour Change Consortium Treatment Fidelity developed a checklist for use in pragmatic behaviour change studies (Borrelli, 2011), addressing five fidelity domains: study design, training of providers, treatment delivery, treatment receipt and treatment enactment. The fidelity of ESCAPE-knee pain programme in HK met the checklist as discussed below:

- I. Study design – The ESCAPE-knee pain-HK programme followed the original study, stating a priori number of sessions, length and frequency of contact. There was a facilitator's manual from the UK programme, with modules for programme delivery, along with legends for the education slides used for each session.
- II. Training for providers (what is actually taught) – There was a plan for training providers, their characteristics articulated with their attitudes considered, and their knowledge change measured afterwards. A recent review found a paucity of report on training for providers in physiotherapy-

delivered group education and exercise interventions to promote self-management (Toomey et al, 2015b). Very few of the reviewed studies (N=22) measured the skill acquisition of providers (4.5%), assessed provider attitude toward the intervention (0%) or used a training plan to take into account trainees' different education and experience (5.5%).

- III. Treatment delivery – During the five-week ESCAPE programme, weekly briefing was given to the delivering physiotherapists to maintain consistency and accuracy of information. Feedback was also given to the physiotherapists to enhance treatment delivery
- IV. Treatment receipt (what is learned) – Reflecting how much the patients had gained from the programme, they were given the opportunity to discuss and reflect during class discussions, and could revisit information at home using the information booklet. In addition, self-monitoring exercise diaries and activity logs of their action plans provided feedback on their engagement with the activity concept.
- V. Treatment enactment (what is actually used) – Assessment and monitoring was focused on whether the patients performed exercise actively to manage their knee pain. The treatment enactment was assessed through patient opinion survey to all participants and the focus group after the programme. In the opinion survey, the participants expressed their willingness to continue exercise individually (63%) or in groups to keep the momentum (10%). Most of them planned to do exercise at home (58%) with others at outdoor playgrounds (26%) or sports centre (21%). The participants in the focus group reported their actions of joining exercise class and going to sports centre continuously. The novel ESCAPE-knee pain intervention in HK provided an opportunity for the participants to learn and adopt active coping strategies to manage their knee pain.

The robust procedures ensuring the fidelity of the ESCAPE programme in HK were seen in other arthritis-specific self-management programmes reported in the literature for patients with KOA. Coleman et al (2012) conducted a quality assurance trial on a self-management programme implemented by health care professionals, (physiotherapists, occupational therapists and nurses). Highly structured nature of the intervention they designed and facilitator's manual with

modules for programme delivery each session were reportedly important for the consistent and reliable delivery of interventions (Coleman et al, 2012). Appropriate training is a key building block to equip clinicians to deliver psychologically informed practice (Main and George, 2011). Therefore physiotherapists in HK, with some training programme and manuals facilitating, can be equipped to provide self-management that includes some psychological element.

Training for the biopsychosocial model of pain is currently at post-graduate level in the physiotherapy curriculum in HK. The training for the providers undertaken in this doctoral research was shown to be effective in equipping clinical physiotherapists to deliver the ESCAPE-knee pain programme. Thus, the relatively simple, manualised self-management programme is a feasible and practicable intervention to educate patients on the course of disease, effective treatment options, and influences their self-efficacy for exercise and engagement with treatment (Mitchell & Hurley, 2008).

The ESCAPE-knee pain programme applied Leventhal's self-regulation model of illness (Leventhal, Diefenbach and Leventhal, 1992), which proposes that people search to understand their illness, developing a model of what the illness is, its cause and effects, how long it will last and whether it can be cured or controlled. This self-regulatory model is alterable by positive or negative experiences and information about their illness beliefs (Leventhal, Diefenbach and Leventhal, 1992). Interventions aimed at developing adaptive beliefs and behaviour will encourage active coping efforts, improving pain, physical and psychological well-being (Pimm and Weinman, 1998). Self-management in the ESCAPE-knee pain programme is based on Social Cognitive Theory (SCT) and the concept of self-efficacy (Mark, 2012; Bandura, 2004). The behavioural change techniques employed included knowledge of the disease, benefits of exercise, goal setting and action plan, instruction on how to perform the exercise, exercise diary for self-monitoring, relapse management, barriers with problem solving, past success and social support as facilitators. All these behavioural change techniques were also listed in the checklist found in a recent review (Stacey et al, 2015). These strategies are commonly employed for promoting physical activity maintenance in the long term (Fjeldsoe et al, 2011).

Following participation in the ESCAPE-knee pain-HK programme, patients reported more confidence in using exercise to manage their knee problem. There was a small increase in SEE (one point out of ten). There was improvement of psychological status (Hospital Anxiety and Depression Scale, KOOS-QoL).

Self-efficacy was also improved in behaviour for performing exercise (Lee et al, 2009; Resnick & Jenkins, 2000), physical activities (Degerstedt et al, 2015), along with pain and psychological aspects (small to moderate effect) (Brady, for ASMP/CDSMP meta-analysis project team, 2011) specific to KOA patients. For measuring self-efficacy in KOA programmes, ASES was selected in some studies (Degerstedt et al, 2015; Wu et al, 2011; Yip et al, 2008; Cross et al, 2004; Yip, Sit and Wong, 2004) while SEE was selected in others (Azizan, Justine and Kuan, 2013; Schlenk et al, 2011; Resnick and Jenkins, 2000; Lee et al, 2009). To understand the development and uses of scales, ASES was for measuring arthritis-specific self-efficacy (Brady, 2011; Lorig et al, 1989) while SEE is a general domain-specific measure (van Hartingsveld et al, 2010; McAuley, Courneya and Lettunich, 1991). The ASES measures patients' beliefs and behaviours to cope with consequences of arthritis (like reducing pain, functions and other symptoms such as fatigue, depression and frustration) (Cross et al, 2006; Lorig et al, 1989) but the SEE measures the situational-specific form of confidence to assess individual's beliefs to perform exercise under various circumstances (Lee et al, 2009; Resnick and Jenkins, 2000; McAuley, Courneya and Lettunich, 1991). The measure for understanding the coping for fatigue, depression and daily activities relating to arthritis is lacking when SEE is taken only. Kroon et al (2014) recently concluded that self-management programmes for chronic pain like OA should assess knowledge change and self-management skills. In this doctorate, the post-treatment opinion survey and focus group supplemented the change in the participants' knowledge and attitude. They expressed that they learnt exercise to protect their body, pacing to regulate activities, healthy eating and what to do in managing pain and mood. For studies in the future, self-efficacy on health literacy change could be explored (Kroon et al, 2014).

Psychological status of anxiety and depression was improved after the ESCAPE-knee pain-HK programme. Due to the recent implementation of a licence

agreement and a user fee for all users (HADS), other outcome measures have to be explored for further study in capturing psychological change.

#### 6.2.3.4 The patients' journey in participating in the ESCAPE-knee pain programme

An exploration of the patients' journey of what they gained from participation in the intervention was undertaken in the focus group. From the discussion of information and sharing relating to their past experience amongst the participants, they acquired knowledge and active coping strategies. They were exposed to exercise activities and some of their feared tasks, yet they practised and set goals to do exercise at home continuously. They experienced a decrease in symptoms and their legs became stronger. They had taken up their decision-making for choice and ownership of their knee pain problem. Their exercise self-efficacy was increased to support the behaviour change:

- Decision-making:* "Exercise should target appropriately toward one's own choice and level. As you feel easier, you can step up the level of difficulty."
- Ownership:* "I wanted to challenge myself to do more repetitions compared to the session before."  
"Do more the better."
- Self-efficacy:* "...build up confidence again."

This was reflected in the original findings of ESCAPE-knee pain of improvement in patients' pain, physical and psychosocial functioning, increased knowledge of their disease and their ability to use exercise to control symptoms (Hurley et al, 2010). Their fear for possible harm of exercise reduced and their confidence in their ability to use exercise to effect improvement increased. Collectively the patient journey of ESCAPE-knee pain both in the UK and HK were similar. Thus, the integrated programme of exercise and self-management in HK was supported by this cohort.

## **6.2.4 Cultural differences and developing ESCAPE-knee pain programme in HK for adoption**

### **6.2.4.1 Cultural difference between the UK and HK in delivering ESCAPE-knee pain**

Adapting an evidence-based intervention for another culture whilst retaining core treatment components helps boost engagement and retention of participants (Barrera et al, 2013). Whilst the patients participated in the discussion section in the ESCAPE-knee pain-HK programme, they wanted didactic and pragmatic guidance for the exercise section. The request was particularly strong at the beginning of the class when they were not familiar with the group and the way to perform the exercise. In spite of the encouragement of autonomy and choice, they felt more comfortable with guidance toward exercise choice made by the therapist. The participants engaged with more independent choices of exercise as the classes progressed. The same preference for participants listening to others was reported in a group cognitive stimulation therapy for Chinese elderly with dementia (Wong et al, 2017). There was a difference between western independent culture in the UK and collectivistic interdependent culture in HK (Fung, 2013). The older Chinese have their personal values closer to the cultural values. Interpersonal relatedness is a particularly influencing factor for personality development amongst Chinese, to a greater extent with age (Fung, 2013). Adherence to norms and group acceptance may explain why the participants felt more secure within a group. Being nurtured in an open, motivating environment, the participants in the ESCAPE-knee pain programme started to focus on their own values, make their own decisions and set their goals. To help engagement and retention of participants in the intervention programme, more structured exercise demonstration, class routine and practice is recommended at the beginning such that they can learn the exercises well before initiating their own choices.

It was not easy for the participants in this study to grasp the idea of goal setting or making subsequent plans of increasing their level of physical activities. In a recent study, Chinese populations were found to be more pragmatic and concerned with practical affairs (Kolstad and Gjesvik, 2014). They enjoyed doing exercise more than setting goals of what they wanted to achieve, when to do or how to do. Cognitively they were more based on intuition, rather than logical reasoning and

abstract theorisation. Pushing persons from collectivistic backgrounds toward using individualistic self-care strategies can lead to problematic outcomes (Hwang, 2006). Chinese people are more conservative and less inclined to talk about themselves to someone not in a close relationship (Wong, et al, 2017; Hwang, 2006). It takes time for the participants to be more open and discuss what they enjoy and choose a goal for subsequent action plans with guidance. Thus, better patient engagement and stronger therapist-patient alliance may need to be established in order to motivate patients' initiative for self-care (Rollnick et al, 2010; Hwang, 2006). As goal setting is a predictor for short and long term behavioural change (Samdal et al, 2017), more effort can be put into this technique. Initial guidance on realistic goal setting can be given, with acknowledgement and recognition of their effort shown (Wong et al, 2017). A later stage transition can be made toward encouraging them to set goals and plans of their own choice for adherence in the long-term (Glasgow et al, 2009).

The ESCAPE-knee pain programme in HK was modified to a shorter version (from 12 sessions to 10). The programme content was not changed except merging the sessions of "sharing in mid-term review" and the "long-term exercise" with the other sessions. The group size was increased to 10 (five to eight in the UK programmes) with an assistant helping to address logistics and safety issues in the group intervention. The safety measures became more stringent following a minor incident (participant had dizziness and fell due to alteration in blood sugar level) after the second session. The role of the assistant was to facilitate the logistics of setting up rooms and equipment, check vital signs for patients with high cardiovascular risks and supervise exercise in the practical section. These changes were described as the elements added for local pragmatics (Barrera et al, 2013).

The core tension always exists between fidelity and adaptation. The debate focuses on a cultural adaptation model that typically aims to adapt an intervention for one or more diverse groups while retaining fidelity to the core components of the original intervention (Gonzales, 2017). Adopters or clinicians, weigh the evidence against contextual factors (e.g. financial costing) and acceptance from other healthcare professionals (Fitzgerald et al, 2002). During the adaptation processes, the programme length was shortened in many studies (Tabak et al,



2015). The active ingredients of the original ESCAPE-knee pain programme of education, exercise experience and group interaction supporting self-efficacy, along with the caring support from the physiotherapist (Hurley et al, 2010) were closely maintained in the HK version. The original ESCAPE-knee pain programme in the UK was successfully delivered in 10 sessions with a review session 4 months after completion of the programme for reinforcing key messages and reviewing and altering the participant's home exercise regime if appropriate (Jessep et al, 2009; Hurley et al, 2007). If it is practicable, a review session can be considered in the HK ESCAPE-knee pain programme.

The patients attributed their change after the ESCAPE-knee pain-HK programme to the class content (knowledge of self-management and active coping strategies), structure (group practice up to 10 sessions) and support and expertise of the physiotherapists. Mahony and colleagues (2016) commented on a crucial point of physiotherapist's role of being a facilitator for adult learning, providing clear instruction and guiding exercise progression. In another systematic review for behaviour change for physical activity and healthy eating in obese adults with KOA, the use of a person-centred and autonomy supportive counselling approach adopted by the healthcare workers as in Motivational Interviewing was found to be important to maintain behaviour over time (Samdal et al, 2017).

A few cultural adaptation stage models were reported in the literature (Ramaiya et al, 2017; Wong et al, 2017; Barrera et al, 2013). In the cultural adaptation stage model for behavioural health interventions, Barrera et al (2013) laid out five stages of information gathering, preliminary adaptation design, preliminary adaptation tests, adaptation refinement and cultural adaptation trial. They are discussed below and illustrated with the processes completed in this doctorate:

- I. Information gathering – The cultural adaptation process is justified if there is cultural difference. There is a possibility of difference in pathways that explain health outcomes and mechanisms targeted for change in interventions (Barrera et al, 2013). Group cultural differences were identified in the Chinese interdependent society regarding adherence to norms and traditions, along with the family obligatory role and paternalistic medical system. They were considered barriers for self-management that calls for autonomy, choice and self-maximisation.

- II. Preliminary adaptation design – The “top-down” initial efficacy intervention as starting points and then adding “bottom-up” elements from subcultural members to design a preliminary adapted version (Barrera et al, 2013). The “top-down” efficacious intervention of ESCAPE-knee pain programme was fused with the cultural adaptation work being the “bottom-up” elements. Core components of ESCAPE-pain programme were identified from the literature (Hurley et al, 2010) though not explicitly stated. Intervention materials were commonly required for translation or reading-level adjustment (Barrera et al, 2013). Effort was made to confirm equivalence in translation by having a second translator for proof-reading, verified by an advisory group. Content validity was tested with a group of physiotherapists and usability tested with a group of patients. Provider training showed the local physiotherapists could be equipped with knowledge and skills for facilitating self-management programmes.
- III. Preliminary adaptation test – The preliminary adapted version was subjected to a test and evaluated quantitatively and qualitatively (Barrera et al, 2013). A mixed method POC study was undertaken. Weekly meetings with the staff member who implemented the ESCAPE-knee pain programme assured continuous feedback for intervention fidelity. The process self-efficacy outcome and clinical outcome of KOOS showed that the intervention had an ability to change these outcomes. The exit opinion survey and focus group provided ways to collect participants’ views and determine ways of improving the adaptation.
- IV. Adaptation refinement – Quantitative and qualitative data from stage III showed that the literacy level of the information booklet could be adjusted to age 12 level with more pictures and less words (refer to section 6.2.4.2 below).
- V. Cultural adaptation trial – Quantitative outcome research phase of two-armed studies in which the cultural adaptation can be compared to a control condition for a real world delivery (refer to section 6.3.2.1).

#### 6.2.4.2 Translation of the patient information booklet

Although translations are considered to be superficial structure changes, they are crucial and critical adaptations (Barrera et al, 2013). The patient information booklet was translated into Chinese to support the programme. For local relevance, the content in the prevalence of KOA in the UK was changed to the prevalence of that in HK. To facilitate pragmatic understanding of exercise frequency amongst local elderly patients, “most days in a week” was changed to “5 to 7 days a week”. Changes to supporting photographs were made to be more culturally acceptable. For continuing long-term exercise, available resources of physical activities were presented like going to nearby parks or playgrounds that were within walking distance of their districts and a picture of home exercise was provided to display at home. Wong et al (2017) also reported use of drawing to facilitate a culturally adapted programme of activities with a group of elderly people in HK for the high rate of illiteracy or low-literacy (Wong et al, 2017). Similarly in a study adapting a psychotherapy programme for native Aboriginals, a variety of different methods of presentation including pictures were used (Bennett-Levy et al, 2014), and in that for rural Nepali women, hand-outs given to clients were text-free and replaced with graphic aids (Ramaiya et al, 2017).

The information on a healthy diet was significantly amended. The illustration of “eat-well food plate” was “replaced by “food pyramid” that included rice at the base level. Rice is the main source of energy in Southern Chinese diet. It was more common to steam food than grill locally for giving an advice for a healthy way of food preparation. In the focus group, the participants expressed barriers to diet control in having “dim sum” with friends and dining for festive celebrations. In the future, the discussion on healthy diet should include choice of steamed “dim sum” with higher vegetable ingredients and appropriate quantity of food especially at the time of festive family gatherings. In previous cultural adaptation studies for preventive diabetes interventions for Spanish-speaking clients, culturally tailored dietary advice was given on grocery shopping skills on Latino foods and healthy cooking skills (Ockene et al, 2012) and culturally relevant nutrition behaviours (Vazquez et al, 1998). Ramaiya et al (2017) reported a mindful eating exercise adapted for Nepali women using apple, as geographically they were the major exporter of the fruit.

In the section of psychological issues associated with arthritic pain in the patient information booklet, an illustration showing a statue of a naked Greek-God was not acceptable by local conservative cultural value, especially amongst elderly Chinese women. It was replaced by an emoji diagram showing a miserable face. Cultural values are commonly accounted for in cultural adaptation of interventions (Mier et al, 2010). In a culturally adapted psychotherapy programme targeted for rural Nepali self-harming women, there was no equivalent word for “self-respect”. That was omitted, with emphasis then put on action for personal and interpersonal values (Ramiya et al, 2017).

In the content models of cultural adaptation, domains to be addressed were identified. The ecological validity model involves language, persons, metaphors, content, concepts, goals, methods and context (Bernal, et al, 2009; Bernal, Bonilla and Bellido, 1995). The other model addresses the superficial domains of the target population (e.g. places, language, food) while deep domains involve culture, social, environmental and psychological influences on the target behaviour (Resnicow, et al, 2000). Adapting these domains is necessary to improve programme quality, and make it fit with an institution and its context in the community (Gonzales, 2017).

In the field notes of the focus group after the ESCAPE-knee pain programme, only one participant returned with the information book and shared her goal-setting in the programme. It reflected the scarcity of patients who referred back to the information booklet. However in the cognitive debriefing session and patient satisfaction survey collected after the ESCAPE-knee pain-HK programme, the majority of patients commented the information booklet was relevant, useful and helpful. Personal communication with the Director of Studies (Walsh) suggests that this was similar to UK participants. The problem could be related to the presentation of the booklet. A few of the physiotherapists had commented that there were “too many words” in the draft booklet for our elderly patients. Despite the two patient partners initially finding the literacy level acceptable, refinement is recommended to adjust the literacy- and reading-level of the information booklet to the age of twelve. Furthermore, combining the exercise diagrams and diary into the booklet may encourage patients’ use. As raised in previous literature, further refinement of the programme material can be undertaken following the quantitative

test and qualitative formative study, as appropriate with justification (Barrera et al, 2013). Reading level of target participants, cultural values, and attractiveness of the intervention materials should be addressed (McKleroy et al, 2006). In a recent study, programme participants requested simplifying reading materials to accommodate lower literacy in an arthritis self-help programme (Parker et al, 2012). Appropriate literacy-level for participants in their own language was found to be associated with the intervention success for culturally sensitive nutrition and exercise programmes in a critical review (Mier et al, 2010). Appropriate reading level of age twelve for intervention materials of OA self-management programmes is frequently adopted in primary care practice as low literacy is common (Allen et al, 2008). The information booklet for the original ESCAPE-knee programme was A4 in size. More diagrams (Wong et al, 2017), pictures (Bennett-Levy et al, 2014) and graphic aids (Ramaiya et al, 2017) with less text (Ramaiya et al, 2017) can be considered.

## **6.2.5 Feasibility and acceptability of the intervention**

### **6.2.5.1 The feasibility of HK ESCAPE-knee pain programme in HK**

The ESCAPE-knee pain programme in HK was feasible and safe, with average recruitment of 30.9% observed, and with no serious adverse events. The recruitment rate for the present study was slightly less than those of the ESCAPE-knee pain studies in the UK with (38%-39.5%) (Jessep et al, 2009; Hurley et al, 2007a) but it fell within the range (30.3% - 78.8%) in recently published behavioural studies involving self-management and physical activities with KOA (da Silva et al, 2015; Palmer et al, 2014; O'Brien, Bassett and McNair, 2013; Brosseau et al, 2012; Coleman et al, 2012; Pisters et al, 2010; Hughes et al, 2004). In a recent pilot study of self-management on nutrition and physical activities intervention for cancer survivors, the recruitment rate was 38% (Miller et al, 2016). Reasons for the exclusion in this proof-of-concept study were co-morbidity (33.8%) in which heart and oncological problems were the main group (20.1%), previous physiotherapy for the knee and joint replacement. Barriers for patients participating included work and care for family (23.5%) and duration of the programme. These exclusion criteria are commonly seen in similar studies like serious comorbidity (Hughes et al, 2004; O'Brien et al, 2013; Coleman et al, 2012), waitlist for knee replacement (Coleman et al, 2012; Pisters et al, 2010), time commitment (Brosseau et al, 2012) and receiving previous physiotherapy (O'Brien et al, 2013; Pisters et al, 2010).

The retention rate of 82.6% observed in the present study is slightly lower than the UK ESCAPE-knee pain programmes (88.1% to 89.7%) (Jessep et al, 2009; Hurley et al, 2007). The lower retention rate was related to holidays, work, caring for grandchildren, other commitments and financial costs (the out-of-pocket charging at the point-of-care). The retention rate fell in the range of 56% to 96% found in other existing integrated studies of KOA (da Silva, 2015; Palmar et al, 2014; O'Brien, 2013; Brosseau et al, 2012; Coleman et al, 2012; Pisters et al, 2010; Hughes et al, 2004). Similar retention rate (84% to 86%) is also reported in recent self-management programmes with exercise (Jones et al, 2016; Miller et al, 2016).

The lower recruitment rate in HK can be explained partly by the exclusion criteria and partly by cultural issues. Most patients affected were older women whose

priorities are to their parents and their husband, not their own health (Chan and Chui, 2011; Holroyd, 2001). The elderly women, who had knee pain, were engaged to providing care for their husbands and grandchildren, on top of the household chores (Lee and Kwok, 2005).

#### 6.2.5.2 The acceptability of HK ESCAPE-knee pain programme in HK

The present study was the first to use ESCAPE-knee pain to manage patients with KOA in HK. The findings suggest that the programme was acceptable to staff and highly acceptable to patients.

The two physiotherapists showed increased competence in the management of KOA with current evidence after training. They reported the content useful, role play and discussion helpful and skills utilisable in their future practice. Forsetlund et al (2009) had demonstrated that mixed interactive and didactic formats of education meetings may increase the effectiveness of training. A study also reported positive knowledge gain for physiotherapists to learn cognitive behavioural self-management strategies that they delivered to patients with chronic pain and disability (Bach et al, 2013). The physiotherapists reported that they felt comfortable in providing the self-management programme to clients with continual use of part of the programme after the training. This supports the acceptability of the ESCAPE-knee pain programme and the approach amongst physiotherapists, though it cannot be generalised in this study.

It is likely that the education on self-management in an interactive way contributed to the high levels of acceptability amongst patients and their participation observed. During the study, subjects who faced fluctuating symptoms in the knees experienced adjustment and pacing of activities, yet they were still able to continue a less vigorous intensity and dosage of activity level (e.g. lowering step height or reducing number of repetitions). Their activity levels were regained after the flare-up episode. This flexibility allowed participants the ability to continue at their own level of engagement rather than withdraw. In the focus group and satisfaction survey, the participants commented on overall improvement in their functioning level in walking, both with respect to confidence and endurance. They reported using exercise as a means to protect their body and decrease their knee pain.

They also reported that they progressed their exercise level as the sessions went on and that was evidenced by their exercise logsheets in class. The results revealed improvement in pain, disability, physical status, self-efficacy, psychological status and QoL following ESCAPE-knee pain programme in this HK cohort. During the intervention, the patients were not directed to progress exercise, but rather they were motivated intrinsically. Their self-efficacy for exercise was supported. Hence internally not only they felt more confident but also determined in performing exercise for their knee pain. In the original trial of ESCAPE-knee pain in the UK, participants' knowledge about their disease and self-management strategies was enhanced, and their confidence in their ability to use exercise to effect improvement increased (Hurley et al, 2010). Similar exercise behaviour of knowledge and confidence gain to exercise, with group effects of learning from peers, particularly self-management strategies in dealing with flare were reported to show acceptability amongst patients after a group integrated self-management and exercise programme (Martin et al, 2016).

#### 6.2.5.3 Cultural issues

From the focus group findings, people in HK accepted the self-management strategies well. They valued the social learning opportunity and the physical practical component of the intervention. The supportive and motivating approach of ESCAPE-knee pain was accepted by the participants. Although goal setting was not an easy and commonly attempted task, they did try and motivate themselves to adhere to exercise. Their internal drives pushed them to do exercise and progressed to higher level. This is contrasted in the recent multi-centre mixed method study conducted cognitive stimulation therapy amongst HK Chinese older people with dementia (Wong et al, 2017). The clients were less active opinion sharing in group discussion and the author proposed the reason as conservatism or cautiousness.

Women's obligatory role to care for family, however, was still a prominent barrier impeding them to seek medical care (Chan and Chui, 2011). This prevented them from being recruited (see recruitment in Fig. 5.3) into the programme or they had to be absent from class sessions (from observation in the POC study). The shorter programme (10 sessions) in the HK ESCAPE-knee pain is more accommodating



for them. Besides more flexible class scheduling, individual sessions may facilitate their participation (Hurley et al, 2007a).

During the class sessions, the interactive sharing and supportive approach enhanced an active learning atmosphere amongst the participants. From the initial phase of waiting to be directed, they gradually developed their plans and made independent decisions. With more continuous effort of exercise, they experienced improvement in their knee pain and function. As Hurley and his team (2010) reported, 'doing is believing'. The patients did not seek other modalities of care to manage their condition. The findings in this thesis support that the ethos of the ESCAPE-knee pain programme is also applicable to the Chinese speaking patients in HK.

## **6.3 Implications for research**

### **6.3.1 Methodology**

#### **6.3.1.1 Cultural adaptation of ESCAPE-knee pain programme**

A key strength of the HK version of ESCAPE-knee pain programme is its development consistent with the cultural adaptation stage model for behavioural health intervention (Barrera et al, 2013). This programme has laid out a robust structure of self-management for chronic arthritic patients. The processes included translation of the intervention materials (tested by physiotherapists and patients), local pragmatics sorted, provider training and outcome measures for evaluation. The background for such processes required stemmed from the cultural differences between the source and the target countries as discussed in chapter one. It is frequently reported that these aspects of language and photographs were addressed in cultural adaptation while maintaining the deeper messages communicated during the intervention (Marsiglia and Booth, 2015). Afterwards, the preliminary culturally adapted ESCAPE-knee pain-HK programme was tested quantitatively and qualitatively. As pointed out by McKleroy et al (2006), a POC study was used to refine adaptation. A few recommendations arose for programme refinement on the patient information booklet with more pictures and less text as discussed previously. The emphasis was not put on obtaining absolute

accuracy in the target language, but rather the meaning and concept equivalence without creating controversy in cultural values (Ramaiya et al, 2017).

To enhance the fit to the institution, written feedback can be collected from providers after each session as done in adapting an arthritis self-help programme by Parker et al (2012). In their report, some content was added, some parts expanded and some alterations made in programme delivery. All these changes made the programme more feasible and therefore sustainable for the host sites. The acceptability from the providers' perspective can be further explored by a focus group or interviews at the end of the ESCAPE-knee pain programme for gathering their views, experiences, challenges and success (Visram, 2017; Bach et al, 2013).

As Kroon et al (2014) pointed out the necessity of health literacy change, the patients can be asked by completing a simple feedback form for:

- 1) whether they recalled being instructed in any specific arthritis self-management techniques;
- 2) whether they had practised the technique in the past week;
- 3) if yes, how often they practised the techniques;
- 4) whether they found the techniques helpful in managing their knee problem.

This method was shown to check the percentage of the participants who recalled being instructed, and the frequency with which self-management techniques were tried (Bach et al, 2013).

The process of adaptation is iterative. Refinement to the intervention is needed at every stage based on the evidence generated in the prior stage (Marsiglia & Booth, 2015).

To understand the uptake of an active lifestyle, feedback or physical activity measures at long-term follow-up can be taken by a self-reported exercise table (with frequency, duration or intensity), a single Likert Scale item pre-and post-intervention question, or pedometer/accelerometer steps. The latter gadgets provide additional measures of physical activity.

### 6.3.1.2 Follow-up arrangement in the intervention

In view of the time constraints of this research programme, no follow-up was designed for the POC study. Maintenance of behavioural change for chronic conditions is higher if an intervention employs follow-up arrangement as a strategy (Fjeldsoe et al, 2011). The American Heart Association Council recommended six months post-intervention for behaviour change for physical activities (Marcus et al, 2006). It can be designed as an additional face-to-face contact after some period of time for revising the exercise regime and fortifying participants' behaviour (Jessep et al, 2009), telephone contact or text messaging the participants as prompts. In a recent systematic review, booster sessions of exercise programmes revealed a small to medium significant pooled effect on improving mid-long-term exercise adherence by providing ongoing contact and reinforcement (Nicolson et al, 2017).

Modest support for using telephone delivery to maintain post-intervention was found to achieve maintenance of behavioural change (Goode et al, 2012). The methodology will still have to be defined whether the telephone counselling delivered via human advice or automated, and whether brief telephone counselling or longer motivational interviewing-focused. With modern technology, cell phone and text messaging is widespread. The technology, however, is more for the young and middle-aged populations with promising effectiveness for physical activity text messaging interventions (Buchholz et al, 2013).

## **6.3.2 Further evaluation of the intervention**

### 6.3.2.1 Feasibility of an efficacy/effectiveness study

The studies in this thesis indicated the ESCAPE-knee pain programme can be delivered to the HK Chinese speaking population with KOA and the target patients responded to the intervention positively as measured quantitatively in questionnaires and test performance, along with in-depth qualitative feedback (chapter 4 and 5). The studies also indicated the physiotherapists involved can be well equipped with the related skills and knowledge and delivered the programme, to motivate the patients taking up exercise and self-management strategies.

The next step is to investigate whether ESCAPE-knee pain programme is effective in HK by conducting a small-scale randomised trial mimicking the intended efficacy study to derive an effect-size estimate of the intervention before a full scale evaluation trial. A randomised controlled trial is the usual design for the purpose of greatest internal validity (to maximise the confidence of causal relationship of the change attributable to the intervention) (Bowen et al, 2009). For the control arm, patients on the waiting list or receiving usual care can be considered. It is evaluated at the individual level with the outcome measures validated in the pilot test. In addition, cost effectiveness analysis can also be analysed (Allen et al, 2016). That can be categorised into cost attributable to OA, overall costs encompassing comorbidities that are often present in persons with OA, or related to the impact of the programme on the budget or affordability (Allen et al, 2016).

As discussed earlier, elements of long-term follow-up (e.g. 6 months post-intervention) and prompts for exercise adherence (e.g. text messaging, telephone or booster session) can be incorporated.

## **6.4 Implications for clinical practice**

The research studies presented in this thesis confirmed the need for exercise for patients with KOA to improve strength and weight reduction if they are overweight. However the patients in general were not sure what to do, afraid and worried that exercise would make their knees worse, leading to inactivity and decreased function. In parallel, healthcare professionals underutilised efficacious evidence-based lifestyle behaviour management strategies like exercise and weight loss (Basedow and Esterman, 2015). The gap can result from the common misconception of trivialisation of OA as a condition of normal ageing, along with the perception that treatment options are limited (Hunter and Bowden, 2017). Whilst there are holistic models of care for KOA established in the global setting (Allen et al, 2016), a multidisciplinary model of care for KOA was set up recently in one of the local university affiliated hospitals in HK. Twelve sessions of graded progressive exercise training were offered by a physiotherapist while pacing of activities from an occupational therapist, medication information from a nurse and

complicated psychological issues cared by a clinical psychologist. Favourable results were presented but it is still in the experimenting stage. The HK version of ESCAPE-knee pain programme was shown to be acceptable to the local context. Several messages can be brought forth to the clinical practice, including physiotherapists' role, theory-based self-management, exercise intensity and availability to patients.

#### **6.4.1 Physiotherapists' role in caring for patients' physical and psychological needs**

Patients who experience physical problems may have psychological issues that interact, maintain or progress their disease. Through education, physiotherapists may enhance their knowledge and skills for motivating their clients while they are managing their physical problems as presented in chapter 4. The treatment aims for patients with KOA are not simply to rectify the immediate pain or stiffness in that episode of pain or weakness, but rather towards lifestyle behaviour change management strategies as chronic care. The autonomy-supportive and motivating approach was welcomed by patients and they were also encouraged to take up the decisions for what they plan to do and progress. The relatively simple manualised ESCAPE-knee pain programme can be adopted as the first-line management for patients under single disciplinary care. This approach is novel but promising in the local context. More communication can be linked up with other healthcare professionals for difficult and non-responding patients.

#### **6.4.2 Theory-based intervention**

As described above, the medical model was predominant locally, i.e. identifying physical problems and providing medical treatment accordingly. 'Self-management' commonly is interpreted as providing directive advice to patients to care for themselves at home, through a didactic group talk, video or a leaflet. Theory-based intervention is not a common practice for chronic case management, especially in physiotherapy practice. In the global setting and systematic reviews, the use of theory is fundamental to the development and implementation of programmes for KOA management (Allen et al, 2016). While researchers have noted the theory-based interventions to be more beneficial amongst the

rehabilitative services for chronic conditions (Button et al, 2015; Richardson et al, 2014), it is good timing for the ESCAPE-knee pain programme to be rolled out for enhancing patients' benefits.

#### **6.4.3 Progressive and mixed type of exercise regime for KOA patients**

Whilst evidence is emerging for exercise regimes given to patients with KOA, it is still not clear on the intensity, types, frequency and duration, the dosage of exercise regime (Holden et al, 2017). The gap can also be attributable to providers' lack of awareness on knowledge, coupled with resource constraint, like manpower, long patient waiting list, lack of space and equipment for mixed type of exercise programmes. As mentioned earlier, education helps knowledge update and that is the first step to behaviour change, both for patients' and providers' perspectives. Exercise can also be extended to daily physical activities that are incorporated in daily living or leisure activities they enjoy for long-term adherence. Not only is this a message to be given to the patients, but also the exercise regime and duration long enough for them to experience what they can do (Hunter & Bowden, 2017; Teichtahl et al, 2015; Hunter, 2011).

#### **6.4.4 Improving access to self-management interventions**

Due to work and family obligations, some patients find difficulty in accessing self-management interventions in a clinic of regular office hours. There is a need for organisational flexibility to offer late afternoon, evening or weekend programmes for improving access for these patients. Individual intervention programmes were found to be equally effective but with more flexibility (Hurley et al, 2007a). With wider dissemination and more staff training, the programme can also be adopted in smaller community centres where staff may treat less number of patients, thus increasing flexibility and accessibility for patients. This type of community programme, ESCAPE-into the community, has been tested by the ESCAPE-pain team (Hurley and Carter, 2016).

## 6.5 Strengths and limitations

This thesis is about cultural adaptations. The ESCAPE-knee pain programme is a well-designed intervention which is underpinned by theory. During the translation process, the essence or core components of the programme were maintained. From the source language English to the target Chinese language, the doctoral candidate and her team were proficient in both languages. Although the forward and backward translation of the focus group generated data was time consuming, all the translation processes were accomplished reliably and transparently.

In the local adaptation, patients were involved at all levels. As target users, patients were the first group to be involved in the 'Think-Aloud' process to check the fluency and face validity of the translated draft of the information booklet. A patient group was involved in cognitive testing of relevance and comprehension of the information and the layout of the booklet. The feedback they provided was used to change the intervention for improving the participants' comprehension. In the field notes and focus group observation, the use of the information booklet was not optimal. The literacy level of the information booklet is recommended to be adjusted.

The patients who participated in this POC study were predominantly female, with median age 62 (range 51-76), Chinese patients referred to a physiotherapy outpatient clinic for conservative treatment. As with any qualitative research, these findings in acceptability solely reflect the views of the participants, which limits the generalisability to the wider population in HK. Moreover, the doctoral candidate was physically present in the ESCAPE-knee pain class sessions. The data collection, fieldwork and analyses were conducted by the doctoral candidate alone with comment from the supervisors only which could have created potential bias. However, triangulation of data in a mixed methods approach enhances the reliability of evaluation. Quotes from patients' verbatim support the dependability of the qualitative findings.

Only one focus group was conducted which may limit any additional insights from other participants. Nevertheless, the representation of gender was representative, but there was over representation of patients with high attendance. Another limitation was that the doctoral candidate conducted the focus group. The patients

may have been inclined to provide acceptable and 'pleasing' responses, and given their attendance, this group might be more motivated to attend. However, the patient opinion survey captured all participants' feedback at the end of the programme and showed similar outcomes.

Qualitative evaluation was not conducted for the physiotherapists who delivered the programme, to review the difficulty they encountered and their views of the programme. Their views were captured informally and amendments to the logistics of programme delivery was undertaken immediately. At the post-training feedback, they commented positively about the content of motivational interviewing and self-management covered. They also expressed they could practise these skills on other patients.

The recruitment of patients in the POC study was on the low side after excluding those with serious co-morbidity and those who were unavailable. The representation of patients with backgrounds like these could not be captured. They might be more inactive and less responsive to the intervention. On the contrary they might have higher needs to equip them with self-management strategies and being motivated to learn exercise and adhere in a long term for managing their chronic diseases. To increase coverage, the exclusion criteria can be less stringent. The intervention programme can be offered outside regular office hours in the future studies to cover more patients if the administration supports.

## **6.6 Personal reflection**

Contributing to the physiotherapy profession was the main reason I enrolled into this programme, with a hope to equip myself with more knowledge and skills. In the past five years, the journey of learning, conducting research and writing the thesis have been a tremendous challenge to me. When I confirmed my interest in research on KOA, I had interest to know more about self-management but I only knew the term by name. Since then, I appreciate very much the support of my supervising team who have given me guidance and set achievable goals with unceasing encouragement.

The compulsory taught modules of research methods, good clinical practice in research, critical appraisal skill and independent study helped build my skills in the



SLR and research design. Being a distance learner, the two weeks of campus-based experience was very fruitful with expedited achievement in research preparation. Qualitative research was very new to me. The informal tuition during that period equipped me with the necessary knowledge and skills to conduct the focus group as a starter. With the support from a local academic, I was able to tease out themes from the data and carry on with the abstraction and interpretation. It is a great milestone to me.

My past clinical experience and training has supported me to accomplish this research and thesis writing, and the translation course prepared me for the translation tasks with confidence. The psychosocial approach to physiotherapy training in the past and at an overseas training course in the UK assured me of the indispensable management approach for our chronic patients. Training for clinical educators and motivational interviewing also equipped me to design and conduct a training programme for our fellow physiotherapists. As I have been going through my research, my knowledge of the disease and management has increased. The research presented in this thesis has been disseminated at various talks within the physiotherapy profession, medical partners and senior management.

Dissemination was made at local magazine (Appendix U). Abstract submissions (Appendix V) and poster presentation (Appendix W) were made in the local physiotherapy conference, resulting in me winning the gold award (Appendix X).

Growing as a novice clinical researcher, I would like to continue to contribute to the body of knowledge in advancing rehabilitative science to care for our patients.

## **6.7 Thesis summary**

KOA is a prevalent chronic condition associated with pain and disability. Patients are burdened by the myth of inactivity, psychological stress and fear. The modifiable risk factors of muscle weakness and obesity are key to managing this dynamic reactive disease. Exercise to strengthen muscles and weight reduction and education on self-management are the core management recommended to all KOA patients of all levels of severity. The obligatory responsibility in Chinese family and over-reliance on the highly subsidised medical system in HK pose barriers for patients to take up self-management for their chronic arthritis.

The evidence-based ESCAPE-knee pain programme in the UK, a combined intervention of exercise and active coping self-management, was translated and culturally adapted for use in HK. Suitable outcome measures were identified and physiotherapists were equipped to deliver this programme in a physiotherapy out-patient clinic in HK. The patients that participated in a POC study showed positive results in a disease-specific outcome and a patient-specific outcome, supported by improvement in physical walking test and chair-stand test. Self-efficacy in exercise was found to increase as well and the self-confidence is likely the mediating factor for the improvement.

From a qualitative study, patients accepted the programme well. They learned and experienced exercise as a protection strategy for their knee, along with some self-management strategies. With the promising results in this acceptability research, the next step is to plan for an RCT efficacy study.

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## Appendix A

### Data Extraction Form – Study Design and Intervention Characteristics Study design and participant characteristics

Author(s)	Name
Location of study	Country
Study design	RCT?
Study aim	1) Main aim/objective of the study 2) Secondary aims/objectives
Gender	Male/female distribution
Population	Chinese speaking participants Knee osteoarthritis / knee degeneration
Age range of participants	Age range (and mean if detailed)

### Intervention features

Intervention types	Educational / Behavioural change + structured physical activities / Motivational interviewing behavioural counselling (Brady, 2012)
Intervention focus	Targeted behaviour – e.g. physical activity, weight loss
Mode of delivery	Class or individual
Intervention components	Details of self-management component: <ul style="list-style-type: none"> <li>- goal setting</li> <li>- action planning</li> <li>- coping strategies</li> <li>- management of relapse</li> <li>- problem solving skills</li> </ul> Details of exercise component: <ul style="list-style-type: none"> <li>- types</li> <li>- frequency</li> <li>- intensity</li> <li>- repetition/set</li> </ul> (Bennell, Dobson & Hinman, 2014)
Intervention tailored	Yes/No (details of how the intervention was tailored)
Theory/model of behaviour used for intervention development	Yes/No If yes, details of how theory was used to select/develop intervention techniques
Behaviour change technique used	Details of behaviour change techniques used
Primary outcome measure	Details of the primary outcome measure, including quality-reliability/validity of tool(s) used
Secondary outcome measure	Details of secondary outcome measure, including quality – reliability/validity of tool(s) used
Duration of intervention and assessment/follow-up points	Details of intervention duration and all assessment time-points

### Intervention results

Sample size	Whole study and group sizes
Findings	Main statistical findings / effect sizes (including effect size at follow-up)
Number of intervention contacts	Number
No of defaulters	Number and percentage, intention-to-treat analysis?

Wu et al. (2011) Effects of an osteoarthritis self-management programme. *Journal of Advanced Nursing*. 67(7), pp.1491-1501.

Data Extraction Form – Study Design and Intervention Characteristics  
Study design and participant characteristics

Author(s)	Wu, S-F.V., Kao, M-J., WU, M-P., Tsai, M-W. & Chang, W-W.
Location of study	Taiwan
Study design	Quasi-experimental study of cluster RCT
Study aim	Primary aim – To develop a self-management [Taipei Osteoarthritis Programme (SOAP)] for community residents. Secondary aim – To evaluate the outcomes of TOAP.
Gender	70% female
Population	Chinese speaking participants (aged ≥50) in communities of 4 districts amongst the 12 in Taipei city. They were recruited in community centres either self-reported knee osteoarthritis (KOA) or being diagnosed by physicians through physical examination with clinical criteria –morning stiffness within 30 minutes, crepitus during active motion or bony tenderness and enlargement without joint warmth
Age range of participants	Mean age (range) 67 (50-80)

Intervention features

Intervention types	Behavioural change + structured physical activities / (Brady, 2012)
Intervention focus	Targeted behaviour – physical activity
Mode of delivery	Class of 10-15 participants
Intervention components	Details of self-management component covering information about OA, coping strategies, problem solving skills and skills that enhance self efficacy. Details of exercise component included muscle strengthening and stretching of whole body, especially lower limbs. Each intervention session last for 80 minutes: - 20 minutes lecture facilitated by a research assistance trained with basic principles of self-management in small groups. - 20 minutes exercise facilitated by a health professional physical therapist. - 40 minutes efficacy enhancing counseling facilitated by the research assistant, to foster self efficacy enhancing skills, share self-goal setting and peer support.
Intervention tailored	No
Control group	Normal routine care of regular health patient education, provided by nurse educators and nutritionists no other treatment
Theory/model of	Yes, Bandura's concept of self-efficacy enhanced by

behaviour used for intervention development	performance accomplishments, various learning techniques, verbal persuasion and physiological information.
Behaviour change technique used	Details of behaviour change techniques used
Primary outcome measure	Arthritis Self-efficacy (ASE) scale (0-10) – higher score indicating greater confidence with positive result: ASE-pain – certainty of coping with pain ASE-OS – certainty of coping with Content validity of outcome measures by a panel of five experts in musculoskeletal field 0.90 Consistence reliability 0.81-0.91 1-wk test and re-test reliability 0.9 to 0.95 Test-retest reliability for ASE 0.85-0.90 Validity and reliability of the Chinese version of ASE not detailed.
Secondary outcome measure	Survey of Pain Attitude (SOPA-35) measured the beliefs of patients with chronic pain that influenced their adjustment to pain Control subscale (0-4): higher score showing better control Unplanned medical consultation Pain days & disability days: in the last week with pain not affecting daily life and disability affecting daily life
Duration of intervention and assessment/follow-up points	Four weekly 80-minute class Assessment time-points: T1-baseline, T2-post 1-week FU (week 5), T3-post 8-week FU (week 12),

#### Intervention results

Sample size	Total intake of 259 participants: <u>Baseline</u> <u>5-week</u> <u>12-week</u> Intervention group 134   126(94%)   114(85%) Control group        125   110(88%)   91 (72.8%)
Findings	Mean difference (SD) score of intervention group vs control group (T3-T1): ASE-pain 2.25(8.9) vs 1.44(12.38), p<0.001 ASE-OS   2.05(13.34) vs 1.24(7.09), p<0.049 Pain belief 0.65(4.76) vs 0.14(2.76), p=0.33 Decreased no. unplanned medical consultation p=.003 No confidence interval shown
No of defaulters	intention-to-treat analysis Intervention group (5.9%) Control group (12%) Overall retention rate 79%



Yip et al. (2008) A 1-year follow-up of an experimental study of a self-management arthritis programme with an added exercise component of clients with osteoarthritis of the knee. *Psychology, Health & Medicine*. 13(4), pp.402-414.

Data Extraction Form – Study Design and Intervention Characteristics

Study design and participant characteristics

Author(s)	Yip Y-B, Sit J.W., Wong D.Y.S., Chong S.Y.C. & Chung L-H
Location of study	Hong Kong
Study design	RCT
Study aim	To evaluate the effectiveness of adapted Arthritis Self-Management Program (ASMP) with an added exercise component amongst Chinese osteoarthritic knee sufferers
Gender	85% female
Population	Chinese speaking participants diagnosed of knee osteoarthritis by physical examination done by a registered nurse of a physiotherapist based on clinical criteria, supplemented by medical history. Recruited in a general out-patient clinic & the Telehealth wellness clinic
Age range of participants	Mean age - 63

Intervention features

Intervention types	Behavioural change + structured physical activities / (Brady, 2012)
Intervention focus	Targeted behaviour – physical activity
Mode of delivery	Class
Intervention components	<p>Details of self-management component (standard ASMP):</p> <ul style="list-style-type: none"> <li>- goal setting</li> <li>- action planning (of 3 types of ex)</li> <li>- coping strategies</li> <li>- management of relapse</li> <li>- problem solving skills</li> </ul> <p>Details of exercise component (goal-directed ex):</p> <ul style="list-style-type: none"> <li>- types (stretching ex, walking ex &amp; Taichi-gentle &amp; slow for 0.5 hr. each session)</li> <li>- frequency (twice in each session)</li> <li>- intensity</li> <li>- repetition/set</li> <li>- a pedometer given to the group for 3 days at baseline</li> </ul>
Intervention tailored	Yes, individual goals and action plans on exercise types were set during a face-to-face interview.
Control group	Routine conventional care, no other treatment
Theory/model of behaviour used for	Yes, Bandura's social learning theory and self-efficacy model were based for the modified self-management

intervention development	intervention.
Behaviour change technique used	Details of behaviour change techniques used
Primary outcome measure	Arthritis Self-efficacy (ASE) scale - pain (5-50) and other symptoms (6-60) with higher score indicating greater perceived ability to control various aspects of arthritis Content validity 0.89 Inter-rater reliability 0.84 1-wk test and re-test reliability 0.9 to 0.95 Validity and reliability of the Chinese version of ASE not detailed.
Secondary outcome measure	Arthritis pain VAS – current, at night, during walking, sitting → standing Arthritis fatigue scale Self-rated health (1-5), higher score showing better perceived health Modified Health Assessment Questionnaire – ability to perform a range of daily activities (0-3) with higher score showing greater physical impairment Unplanned arthritis-related medical consultations
Duration of intervention and assessment/follow-up points	Six weekly 2-hour ASMP + exercise class Assessment time-points: T1-baseline, T2-post 1-week FU, T3-post 16-week F-U, T4-post 1-year FU

#### Intervention results

Sample size	Total intake of 95 participants: Intervention group 45 and control group 50 T2 77 (81.1%) completed, T3 74(77.9%), T4 53 (55.8%)
Findings	Mean change score = mean score T4 – mean score T1 Effect sizes: ASE-pain 0.58, Pain (sit→stand) 0.28, ASE-other symptoms 0.64 Fatigue 0.25, Pain (current) 0.89, Self-rated health 0.49, Pain (at night) 0.74, HAQ (ADL limit) 0.08 Pain (walking) 0.53, Unplanned arthritis-related medical consultation 0.53
No of defaulters	intention-to-treat analysis Intervention group 16 (35.6%) Control group 26 (52%) Drop-outs of participants and controls comparable: p=0.13 to 0.84

Zhao et al. (2005) Curative effect of acupuncture combined with rehabilitation guidance on knee osteoarthritis  
*Chinese Journal of Clinical Rehabilitation.* 9(31), pp.149-151.

Data Extraction Form – Study Design and Intervention Characteristics

Study design and participant characteristics

Author(s)	Zhao, L-q, Huang, Y-x. & Teng, W-r.
Location of study	Shanghai, PRC
Study design	RCT
Study aim	Primary aim – To explore the effectiveness of acupuncture combined with rehabilitation and guidance on daily activities on OAK
Gender	59.5% female
Population	Chinese speaking participants seeking treatment in a Traditional Chinese Medicine (TCM) clinic in a hospital in Shanghai. <u>Inclusion:</u> 1) >6 month of diagnosis as OAK; 2) aged ≥50; 3) significant arthritis in preceding one month; 4) voluntary participation; functional category: I-III <u>Exclusion:</u> 1) injection of steroid/arthroscopy; 2) severe chronic disease
Age range of participants	Mean age (range) 60 (+/-7-8), female 59.1% in intervention group and 60% in control group

Intervention features

Intervention types	Educational (Brady, 2012)
Intervention focus	Targeted behaviour – not mentioned
Mode of delivery	Not mentioned, probably individual
Intervention components	Rehabilitation guidance given by TCM doctor detailing: 1) Explanation of disease, explaining harm of using knees excessively, avoiding prolong physical activities (PA) like standing, walking stair climbing, and squatting 2) Do PA appropriately on LL alternatively, 3X/day for 10-15 minutes stretching and strengthening for knee, strengthening for hip – in non-weight-bearing position 3) Advice on weight reduction if obesity
Intervention tailored	Only education and advice given, on top of acupuncture treatment
Control group	Acupuncture given, same as intervention group, on 6 points First 2 weeks – 3x/week; third and fourth week – 2x/wk
Theory/model of behaviour used for intervention development	no
Behaviour change	Not mentioned

technique used	
Primary outcome measure	Lysholm knee scoring scale – evaluating knee motor function, covering: 1) limping [5-0]; 2) demands for support[5-0]; 2) locking [15-0]; 4 instability [25-0]; 6) swelling [10-0]; 7) stair activity [10-0]; 8) squat [5-0] No details of quality-reliability or validity mentioned
Secondary outcome measure	no
Duration of intervention and assessment/follow-up points	10 sessions of 30 minutes in four weeks of acupuncture Education guidance not mentioned Assessment time-points: T1-baseline, T2-post 4-week

#### Intervention results

Sample size	Total intake of 42 participants: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>Baseline</u></th> <th style="text-align: center;"><u>5-week</u></th> </tr> </thead> <tbody> <tr> <td>Combined group</td> <td style="text-align: center;">22</td> <td style="text-align: center;">22(100%)</td> </tr> <tr> <td>Acupuncture group</td> <td style="text-align: center;">20</td> <td style="text-align: center;">20(100%)</td> </tr> </tbody> </table>		<u>Baseline</u>	<u>5-week</u>	Combined group	22	22(100%)	Acupuncture group	20	20(100%)
	<u>Baseline</u>	<u>5-week</u>								
Combined group	22	22(100%)								
Acupuncture group	20	20(100%)								
Findings	Lysholm knee scoring scale: Intra group pre-post mean difference for both groups: $t=2.07\sim 7.23, p<0.05\sim 0.01$ Between group mean difference significantly larger mean difference found on combined group $t=2.32\sim 4.96, p<0.05$									
Number of intervention contacts	10									
No of defaulters	intention-to-treat analysis no default									

Yip et al. (2004) A quasi-experimental study on improving arthritis self-management for residents of an aged people's home in Hong Kong. *Psychology, Health & Medicine*. 9(2), pp.235-246.

Data Extraction Form – Study Design and Intervention Characteristics  
 Study design and participant characteristics

Author(s)	Yip, Y.B., Sit, J.W.H, Wong, D.Y.S.,
Location of study	Hong Kong
Study design	Quasi-experimental study: first call-intervention group; second and third call-control group
Study aim	To evaluate the effectiveness of an adopted Arthritis Self-Management Program (ASMP) intervention in enhancing arthritis self-efficacy, reducing arthritis pain and improving functional and emotional status
Gender	Overall 92.9% female; IG 91.3% female; CG 94.7% female
Population	Chinese speaking participants aged 60 or over living in an aged home, capable of completing questionnaire verbally, and self-reporting osteoarthritis over wrist, back, hip or knee (confirmed by medical history in aged home) Exclusion: Bed-bound, wheelchair-bound or loss of balance in standing Currently receiving PT (hydrotherapy, strengthening exercise) or acupuncture Overall KOA more than 66.7%; IG 52.2%; CG 78.9%
Age range of participants	Mean age – 86.7; IG 81.99 (95%CI 79.6-85.5); CG 85.15 (83.7-87.9)

Intervention features

Intervention types	Behavioural change + structured physical activities (Brady, 2012)
Intervention focus	Targeted behaviour – physical activity
Mode of delivery	Class of 10-15 participants
Intervention components	Led by RN who was trained in how to lead small group and self-management Details of self-management component (standard ASMP): - action planning - coping strategies – how to cope with & manage common OA consequences, e.g. arthritic pain, fatigue, daily activities limitations and stress 1) SM principles; 2) medical aspects and pain mgt; 3) joint protection; 4) PA & ex 5) available treatment; 6) managing stress; 7) nutrition & 8) communication skills and community resources Details of exercise component-TaiChi, flexibility ex & walking ex at the last three session, time duration not mentioned:
Intervention tailored	Not mentioned clearly except action planning

Control group	Routine orthopaedic treatment of out-patient care and analgesics
Theory/model of behaviour used for intervention development	Yes, Bandura's concept of self-efficacy and behaviour change
Behaviour change technique used	SM basic principle Fully structured protocol, use of action plan
Primary outcome measure	Arthritis Self-efficacy (ASE) scale - pain (5-50) and other symptoms (6-60) with higher score indicating greater perceived ability to control various aspects of arthritis Depression scale CES-D Arthritis pain intensity & functional status-pain & fatigue Modified health assessment questionnaire Frequency & duration of leisure-time light ex Knee range and muscle strength of quadriceps & hamstrings (0-5) (Taken in structured face-to-face interview) A panel of seven experts in MSK field to check: Content validity 0.89 Inter-rater reliability 0.84 test and re-test reliability 0.9 to 0.95
Secondary outcome measure	Small group interview
Duration of intervention and assessment/follow-up points	Six weekly 2-hour ASMP class, Taichi taught in last 3 sessions Assessment time-points: T1-baseline, T2-post 1-week FU, T3-post 16-week FU

#### Intervention results

Sample size	Total intake of 42 participants: Intervention group 23 and control group 19 T3 completed IG 21 (91.3%); CG 16(84.2%),
Findings	At post-treatment 16 week Overall PSES of IG improved (p=0.03) mean change for IG pain higher (p=0.05) Hamstrings strength improved (p=0.02) Quadriceps strength improved (p=0.03) IG not showing more practice in exercise
No of defaulters	intention-to-treat analysis Intervention group 21 (91.3%) Control group 16 (84.2%)

**Appendix B**  
**Appendix B**

Author year	Random sequence generation	Allocation concealment	Blinding of participants & personnel	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other sources of bias
Wu 2011 Kao 2012	Cluster randomisation – out of 12 districts, 2 chosen into intervention group and 2 into control group by ballot No significant difference between groups in terms of outcome measures at baseline <b>Unclear risk</b>	All participants in 2 districts were allocated to intervention group while those from the other 2 into control group <b>High risk</b>	Lack of blinding of participants to the intervention <b>High risk</b>	Questionnaires were completed during face-to-face interview by the researches <b>High risk</b>	Attrition 20.8% IG 15% CG 27.2% Final analysis 79.2% Missing data management not reported <b>Unclear risk</b>	All prespecified outcomes reported <b>Low risk</b>	<b>Low risk</b>
Yip 2008	Assignment to groups following a random number table, Recruitment and consent before group allocation, No significant difference of baseline characteristics of IG & CG <b>Low risk</b>	Not mentioned <b>Unclear risk</b>	Lack of blinding of participants to the intervention <b>High risk</b>	Assessors were not involved in delivering the intervention, but nothing mentioned whether they were aware of intervention <b>Low risk</b>	Retention 77.9% at primary end-point Attrition 44.2% at 1 yr IG 22.2%; CG 22% Final analysis 55.8% Missing data management discussed <b>Low risk</b>	Practice of light exercise weekly was reported at previous article but not at 1 year <b>Unclear risk</b>	<b>Low risk</b>
Yip 2004	Participants from first call were allocated to IG while those from second and third groups to CG. IG was significantly younger and suffered 2.5 years longer of OA. <b>High risk</b>	No true randomisation – participants allocated into groups with known assignment <b>High risk</b>	Lack of blinding of participants <b>High risk</b>	Face-to-face interview and joint assessment, blinding on outcome assessor not mentioned <b>High risk</b>	Attrition 11.9% IG 8.7% CG 15.8% Final analysis 88.1% Missing data management not reported <b>Unclear risk</b>	All prespecified outcomes reported <b>Low risk</b>	<b>Low risk</b>
Zhao 2005	Consecutive number for assignment with no details of randomization No significant difference of baseline characteristics of IG & CG <b>Low risk</b>	Done by nurses No further details <b>Unclear risk</b>	Lack of blinding of participants <b>High risk</b>	Assessor was not aware of experimental design. The person analysing data was blinded <b>Low risk</b>	No default Final analysis 100% <b>Low risk</b>	All prespecified outcomes reported <b>Low risk</b>	<b>Low risk</b>

**Risk of Bias in included studies**

Key: CG Control group; IG Intervention group; OA osteoarthritis

## Appendix C

### CRITICAL APPRAISAL SKILLS PROGRAMME (CASP) RANDOMISED CONTROLLED TRIAL Checklist 31.5.2013

Wu et al. (2011) Effects of an osteoarthritis self-management programme.  
*Journal of Advanced Nursing*. 67(7), pp.1491-1501.

Critical Appraisal Questions	Yes	Can't tell	No
<b>(A) Are the results of the trial valid?</b>			
<b>Screening questions</b> 1. Did the trial address a clearly focused issue? Consider: An issue can be "focused" in terms of <ul style="list-style-type: none"> <li>The population studied</li> <li>The intervention given</li> <li>The comparator given</li> <li>The outcomes considered</li> </ul>	√		
2. Was the assignment of patients to treatments randomised? Consider: <ul style="list-style-type: none"> <li>How was this carried out, some methods may produce broken allocation concealment</li> <li>Was the allocation concealed from researchers?</li> </ul>		√	
Is it worth continuing?			
<b>Detailed questions</b> 3. Were patients, health workers and study personnel blinded? Consider: <ul style="list-style-type: none"> <li>Health workers could be: clinicians, nurses, etc</li> <li>Study personnel – especially outcome assessors</li> </ul>			√
4. Were the groups similar at the start of the trial? Consider: Look at <ul style="list-style-type: none"> <li>Other factors that might affect the outcome such as age, sex, social class, these may be called baseline characteristics</li> </ul>			√
5. Aside from the experimental intervention, were the groups treated equally?			√
6. Were all of the patients who entered the trial properly accounted for at its conclusion? Consider: <ul style="list-style-type: none"> <li>Was the trial stopped early?</li> <li>Were patients analysed in the groups to which they were randomised?</li> </ul>	√		
<b>(B) What are the results?</b>			



<p>7. How large was the treatment effect?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• What outcomes were measured?</li> <li>• Is the primary outcome clearly specified?</li> <li>• What results were found for each outcome?</li> <li>• Is there evidence of selective reporting of outcomes?</li> </ul>	<p>Mean difference (SD), p-value of CG:  Primary outcomes  ASE-pain 2.25(8.90), p&lt;0.001  ASE-OS 2.05(13.34), p=0.049  Pain belief 0.65(4.76), p=0.033  Number of medical consultations - 0.64(1.97), p=0.010  Pain days -1.59(2.15), p=0.160  Disability days -0.70(1.68), p=0.712  Effect size</p>			
Critical Appraisal Questions		Yes	Can't tell	No
<p>8. How precise was the estimate of the treatment effect?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• What are the confidence limits?</li> <li>• Were they statistically significant?</li> </ul>	<p>No confidence limits were shown. P -values of ASE-pain and OS were shown to be statistically significant.</p>			
(C) What will the results help locally?				
<p>9. Can the results be applied in your context? (or to the local population?)</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Do you have reason to believe that your population of interest is different to that in the trial?</li> <li>• If so, in what way?</li> </ul>	√			<p>Community elderly may have less severe knee problem than those who seek medical care or referred for medical service. So the results may not be generalizable to those seen in physiotherapy clinic. However, it may show that pain beliefs and confidence in coping can be enhanced cognitively through self-management.</p>
<p>10. Were all clinically important outcomes considered?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Is there other information you would like to have seen?</li> <li>• Was the need for this trial clearly described?</li> </ul>			√	<p>Disability or functional performance not measured objectively.</p>
<p>11. Are the benefits worth the harms and costs?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Even if this is not addressed by the trial, what do you think?</li> </ul>	√			

Kao et al. (2012) The effectiveness of a self-management program on quality of life for knee osteoarthritis (OA) patients.  
*Archives of Gerontology and Geriatrics*. 54, pp.317-324.

Critical Appraisal Questions	Yes	Can't tell	No
<b>(A) Are the results of the trial valid?</b>			
<u>Screening questions</u>	√		
1. Did the trial address a clearly focused issue? Consider: An issue can be "focused" in terms of <ul style="list-style-type: none"> <li>The population studied</li> <li>The intervention given</li> <li>The comparator given</li> <li>The outcomes considered</li> </ul>			
2. Was the assignment of patients to treatments randomised? Consider: <ul style="list-style-type: none"> <li>How was this carried out, some methods may produce broken allocation concealment</li> <li>Was the allocation concealed from researchers?</li> </ul>		√	
Ballot for identifying cluster district with no concealment to clients in group allocation.			
<b>Is it worth continuing?</b>			
<u>Detailed questions</u>			√
3. Were patients, health workers and study personnel blinded? Consider: <ul style="list-style-type: none"> <li>Health workers could be: clinicians, nurses, etc</li> <li>Study personnel – especially outcome assessors</li> </ul>	Data collection was done in face-to-face interview by researchers. It was not mentioned whether they were blinded of the group the patients being assigned.		
4. Were the groups similar at the start of the trial? Consider: Look at <ul style="list-style-type: none"> <li>Other factors that might affect the outcome such as age, sex, social class, these may be called baseline characteristics</li> </ul>			√
No significant difference in nearly all sociodemographic characteristics except the control group had higher health food intake (p=0.002) and more pain days (p=0.006).			
6. Aside from the experimental intervention, were the groups treated equally?			√
There was no other treatment to the control group.			
6. Were all of the patients who entered the trial properly accounted for at its conclusion? Consider: <ul style="list-style-type: none"> <li>Was the trial stopped early?</li> <li>Were patients analysed in the groups to which they were randomised?</li> </ul>	√		
Intention-to-treat analysis was adopted.			
<b>(B) What are the results?</b>			
11. How large was the treatment effect? Consider: <ul style="list-style-type: none"> <li>What outcomes were measured?</li> <li>Is the primary outcome clearly specified?</li> <li>What results were found for each outcome?</li> <li>Is there evidence of selective reporting of outcomes?</li> </ul>	Only General Health subscale showed between group difference at post-intervention and follow-up – E.S.=0.339 Mental component scale at follow-up – E.S.=0.30 No change in secondary outcome of disability		

Critical Appraisal Questions	Yes	Can't tell	No
<p>12. How precise was the estimate of the treatment effect?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• What are the confidence limits?</li> <li>• Were they statistically significant?</li> </ul>	<p>No confidence limits were shown. P=0.011/p=0.013</p>		
<b>(C) What will the results help locally?</b>			
<p>13. Can the results be applied in your context? (or to the local population?)</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Do you have reason to believe that your population of interest is different to that in the trial?</li> <li>• If so, in what way?</li> </ul>	√		
<p>14. Were all clinically important outcomes considered?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Is there other information you would like to have seen?</li> <li>• Was the need for this trial clearly described?</li> </ul>			√
<p>11. Are the benefits worth the harms and costs?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Even if this is not addressed by the trial, what do you think?</li> </ul>	√		

Yip et al. (2008) A 1-year follow-up of an experimental study of a self-management arthritis programme with an added exercise component of clients with osteoarthritis of the knee. *Psychology, Health & Medicine*. 13(4), pp.402-414.

Critical Appraisal Questions	Yes	Can't tell	No
<b><i>(A) Are the results of the trial valid?</i></b>			
<b>Screening questions</b>			
1. Did the trial address a clearly focused issue? Consider: An issue can be "focused" in terms of <ul style="list-style-type: none"> <li>The population studied</li> <li>The intervention given</li> <li>The comparator given</li> <li>The outcomes considered</li> </ul>	√		
2. Was the assignment of patients to treatments randomised? Consider: <ul style="list-style-type: none"> <li>How was this carried out, some methods may produce broken allocation concealment</li> <li>Was the allocation concealed from researchers?</li> </ul>		√	
Assignment done by using a random number table but the allocation concealment was not mentioned. There's risk of selection bias.			
<b>Is it worth continuing?</b>			
<b>Detailed questions</b>		√	
3. Were patients, health workers and study personnel blinded? Consider: <ul style="list-style-type: none"> <li>Health workers could be: clinicians, nurses, etc</li> <li>Study personnel – especially outcome assessors</li> </ul>	RN & PT did data collection and they were not involved in delivery intervention but it was not mentioned whether they were blind to group allocated.		
4. Were the groups similar at the start of the trial? Consider: Look at <ul style="list-style-type: none"> <li>Other factors that might affect the outcome such as age, sex, social class, these may be called baseline characteristics</li> </ul>			√
Intervention group had higher current pain (p=0.002) and more unplanned medical consultation at baseline (p=0.04).			
7. Aside from the experimental intervention, were the groups treated equally?			√
There was no other treatment to the control group.			
6. Were all of the patients who entered the trial properly accounted for at its conclusion? Consider: <ul style="list-style-type: none"> <li>Was the trial stopped early?</li> <li>Were patients analysed in the groups to which they were randomised?</li> </ul>	√		
Intention-to-treat analysis was adopted.			
<b>(B) What are the results?</b>			

<p>15. How large was the treatment effect?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• What outcomes were measured?</li> <li>• Is the primary outcome clearly specified?</li> <li>• What results were found for each outcome?</li> <li>• Is there evidence of selective reporting of outcomes?</li> </ul>	<p>Effect size:</p> <p>ASE-pain 0.58</p> <p>ASE-other symptoms 0.64</p> <p>Pain (current) 0.89</p> <p>Pain (at night) 0.74</p> <p>Pain (walking) 0.53</p> <p>Pain (sit→stand) 0.28</p> <p>Fatigue 0.25</p> <p>Self-rated health 0.49</p> <p>Daily activities limitation 0.08</p> <p>Unplanned medical consultation 0.53</p>		
<b>Critical Appraisal Questions</b>	<b>Yes</b>	<b>Can't tell</b>	<b>No</b>
<p>16. How precise was the estimate of the treatment effect?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• What are the confidence limits?</li> <li>• Were they statistically significant?</li> </ul>	<p>No confidence limits were shown.</p>		
<b>(C) What will the results help locally?</b>			
<p>17. Can the results be applied in your context? (or to the local population?)</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Do you have reason to believe that your population of interest is different to that in the trial?</li> <li>• If so, in what way?</li> </ul>	√		
<p>18. Were all clinically important outcomes considered?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Is there other information you would like to have seen?</li> <li>• Was the need for this trial clearly described?</li> </ul>			√
<p>11. Are the benefits worth the harms and costs?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Even if this is not addressed by the trial, what do you think?</li> </ul>	√		

Zhao et al. (2005) Curative effect of acupuncture combined with rehabilitation guidance on knee osteoarthritis  
*Chinese Journal of Clinical Rehabilitation*. 9(31), pp.149-151.

Critical Appraisal Questions	Yes	Can't tell	No
<b>(A) Are the results of the trial valid?</b>			
<b>Screening questions</b>			
1. Did the trial address a clearly focused issue? Consider: An issue can be "focused" in terms of <ul style="list-style-type: none"> <li>The population studied</li> <li>The intervention given</li> <li>The comparator given</li> <li>The outcomes considered</li> </ul>	√		
2. Was the assignment of patients to treatments randomised? Consider: <ul style="list-style-type: none"> <li>How was this carried out, some methods may produce broken allocation concealment</li> <li>Was the allocation concealed from researchers?</li> </ul>		√	
Consecutive number in group assignment Concealment unknown			
<b>Is it worth continuing?</b>			
<b>Detailed questions</b>			
3. Were patients, health workers and study personnel blinded? Consider: <ul style="list-style-type: none"> <li>Health workers could be: clinicians, nurses, etc</li> <li>Study personnel – especially outcome assessors</li> </ul>	√		
Assessor was blinded of the experimental design The person analysing data was blinded			
4. Were the groups similar at the start of the trial? Consider: Look at <ul style="list-style-type: none"> <li>Other factors that might affect the outcome such as age, sex, social class, these may be called baseline characteristics</li> </ul>	√		
Baseline characteristics of age, sex and Lysholm knee scoring scale was reported to be similar (p>0.05)			
8. Aside from the experimental intervention, were the groups treated equally?	√		
The control group had acupuncture but no education/advice given.			
6. Were all of the patients who entered the trial properly accounted for at its conclusion? Consider: <ul style="list-style-type: none"> <li>Was the trial stopped early?</li> <li>Were patients analysed in the groups to which they were randomised?</li> </ul>	√		
Intention-to-treat analysis was adopted. No attrition			
<b>(B) What are the results?</b>			
19. How large was the treatment effect? Consider: <ul style="list-style-type: none"> <li>What outcomes were measured?</li> <li>Is the primary outcome clearly specified?</li> <li>What results were found for each outcome?</li> <li>Is there evidence of selective reporting of outcomes?</li> </ul>	Lysholm knee scoring scale: Intra group pre-post mean difference for both groups: t=2.07~7.23, p<0.05~0.01 Between group mean difference significantly larger mean difference found on combined group t=2.32~4.96, p<0.05		

Critical Appraisal Questions	Yes	Can't tell	No
<p>20. How precise was the estimate of the treatment effect?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• What are the confidence limits?</li> <li>• Were they statistically significant?</li> </ul>	<p>No confidence limits were shown. P&lt;0.05</p>		
<b>(C) What will the results help locally?</b>			
<p>21. Can the results be applied in your context? (or to the local population?)</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Do you have reason to believe that your population of interest is different to that in the trial?</li> <li>• If so, in what way?</li> </ul>	√		
<p>22. Were all clinically important outcomes considered?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Is there other information you would like to have seen?</li> <li>• Was the need for this trial clearly described?</li> </ul>	<p>Participants were OAK patients seeking treatment in a traditional Chinese Medicine clinic. Patients could be similar in local scene</p> <p style="text-align: right;">√</p> <p>Lysholm is a composite score covering: Symptom – pain, locking, instability Sign – swelling Functions – limping, support, stairs, squatting Functional performance not measured objectively. Only short-term effect evaluated No exercise adherence considered</p>		
<p>11. Are the benefits worth the harms and costs?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Even if this is not addressed by the trial, what do you think?</li> </ul>	√		

Yip et al. (2004) A quasi-experimental study on improving arthritis self-management for residents of an aged people's home in Hong Kong.  
 Psychology, Health & Medicine. 9(2), pp.235-246.

Critical Appraisal Questions	Yes	Can't tell	No
<b>(A) Are the results of the trial valid?</b>			
<b>Screening questions</b>			
<b>1. Did the trial address a clearly focused issue?</b> Consider: An issue can be "focused" in terms of <ul style="list-style-type: none"> <li>The population studied-people in aged home with OA</li> <li>The intervention given-ASMP with enhancement of ex</li> <li>The comparator given-routine ortho treatment &amp; FU +analgesics</li> <li>The outcomes considered-ASES, emotion, pain, health Ax+ex uptake</li> </ul>	√		
<b>2. Was the assignment of patients to treatments randomised?</b> Consider: <ul style="list-style-type: none"> <li>How was this carried out, some methods may produce broken allocation concealment</li> <li>Was the allocation concealed from researchers?</li> </ul>			√
Participants from the first call were all assigned to intervention group while those from second and third calls to control group. There's risk of selection bias.			
<b>Is it worth continuing?</b>			
<b>Detailed questions</b>			
<b>3. Were patients, health workers and study personnel blinded?</b> Consider: <ul style="list-style-type: none"> <li>Health workers could be: clinicians, nurses, etc</li> <li>Study personnel - especially outcome assessors</li> </ul>		√	
Health workers and clients were not blinded. It's not mentioned on who were the assessors.			
<b>4. Were the groups similar at the start of the trial?</b> Consider: Look at <ul style="list-style-type: none"> <li>Other factors that might affect the outcome such as age, sex, social class, these may be called baseline characteristics</li> </ul>		√	
No difference between gps wrt arthritis background & demographic characteristics except age (p=0.03) and duration of arthritis history (p=0.02).			
<b>9. Aside from the experimental intervention, were the groups treated equally?</b>			√
There was no other treatment to the control group except the usual orthopaedic FU.			
<b>6. Were all of the patients who entered the trial properly accounted for at its conclusion?</b> Consider: <ul style="list-style-type: none"> <li>Was the trial stopped early?</li> <li>Were patients analysed in the groups to which they were randomised?</li> </ul>	√		
Intention-to-treat analysis was adopted.			
<b>(B) What are the results?</b>			

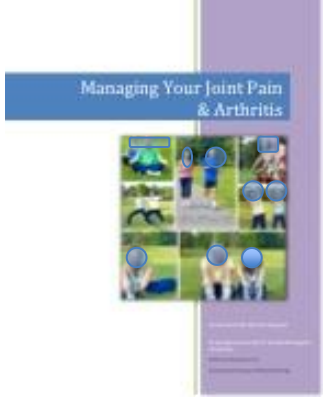

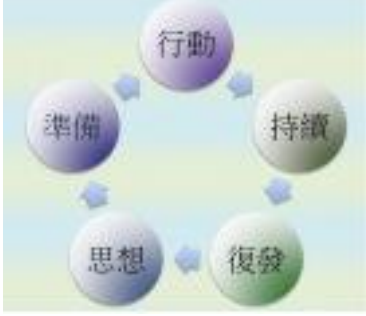



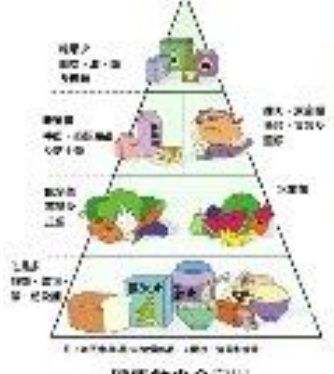






<p>7. How large was the treatment effect?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• What outcomes were measured?</li> <li>• Is the primary outcome clearly specified?</li> <li>• What results were found for each outcome?</li> <li>• Is there evidence of selective reporting of outcomes?</li> </ul>	<p>At post-treatment 16 week Overall PSES of IG improved (p=0.03) mean change for IG pain higher (p=0.05)</p> <p>Hamstrings strength improved (p=0.02) Quadriceps strength improved (p=0.05)</p> <p>Arthritis fatigue, daily activity limitation and knee range all showing no change IG not showing more practice in leisure time light exercise duration</p>		
<b>Critical Appraisal Questions</b>	<b>Yes</b>	<b>Can't tell</b>	<b>No</b>
<p>8. How precise was the estimate of the treatment effect?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• What are the confidence limits?</li> <li>• Were they statistically significant?</li> </ul>	<p>No confidence limits were shown.</p>		
<b>(C) What will the results help locally?</b>			
<p>9. Can the results be applied in your context? (or to the local population?)</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Do you have reason to believe that your population of interest is different to that in the trial?</li> <li>• If so, in what way?</li> </ul>			√
<p>10. Were all clinically important outcomes considered?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Is there other information you would like to have seen?</li> <li>• Was the need for this trial clearly described?</li> </ul>	<p>They are the frail old elders living in aged home. Their severity of knee problem and functioning level could be worse.</p> <p>Only a general health status assessment investigated. No specific knee functions investigated as more than 2/3 were knee osteoarthritis.</p>		
<p>11. Are the benefits worth the harms and costs?</p> <p>Consider:</p> <ul style="list-style-type: none"> <li>• Even if this is not addressed by the trial, what do you think?</li> </ul>	√		

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## Appendix D

### Comparison of different illustrations included in the information booklet for ESCAPE-knee pain programme in the UK and HK

Illustration in the UK version	Illustrations in HK version	Reasons for change
The cover page		
	Image redacted for copyright reasons	Some pictures not on westerners were chosen for the Chinese version.
The change cycle -stages		
		It was prepared in this way simply because the candidate could only make the best resemblance.
Benefits of exercise		
		Baseball was not a common sport in HK. The other cartoon was obtained from the government website promoting leisure activities, a family function! Used with permission of the Centre of Health Protection, the department of Health, the Government of HKSAR
Food pyramid		
		The food pyramid was obtained from the HK government website for promoting healthy diet. Used with permission of the Centre of Health Protection, the department of Health, the Government of HKSAR

Ice and heat		
	Image redacted for copyright reasons	This was changed simply because of the availability of the images.
Anxiety, mood and joint pain		
	Image redacted for copyright reasons	This was changed simply because of the availability of the images.
Relaxation techniques		
	Image redacted for copyright reasons	This was changed simply because of the availability of the images.
Drug management		
	Image redacted for copyright reasons	This was changed simply because of the availability of the images.

Images in UK version used with permission from Professor Nicola Walsh

Eatwell plate used with permission of the Open Government licence for Crown copyright

## **Appendix E1**

### **Participant Information Sheet for physiotherapists in booklet study**

#### **1. Research topic**

An integrated programme of exercise, self-management and active coping strategies for patients with knee osteoarthritis – a proof-of-Concept study for a Hong Kong Chinese speaking population

#### **2. Invitation**

You are being invited to take part in a research study. Before you decide whether to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information. Ask us if there is anything that is unclear, or if you would like more information.

#### **3. What is the purpose of this study?**

The purpose of the study is to investigate the feasibility of translating a proved effective ESCAPE-knee pain programme for patients suffering from knee osteoarthritis (KOA) and to see if this programme is acceptable to patients. We have translated a booklet “Manage Your Joint Pain & Arthritis” into Chinese to support education on self-management for this programme.

#### **4. Why have I been chosen?**

You have been chosen because you have been identified as a physiotherapist who has been involved in delivering intervention to patients with KOA.

#### **5. Do I have to take part?**

No, taking part is voluntary. If you decide not to take part, you do not have to give a reason. If you do decide to take part we will ask you to sign a consent form, and give you a copy of this information sheet and the consent form to keep.

#### **6. What if I wish to withdraw at a later stage?**

You are free to withdraw at any time, and with no explanation, up until the point of analysis of any data. If you do withdraw up to this point, any data you have provided will be removed from the study.

#### **7. What will I be asked to do if I take part?**

You will be given the Chinese translated version of the information booklet to read. You will also be asked your opinion to complete a questionnaire. Any comments you have about the booklet will remain entirely anonymous.

#### **8. What are the possible benefits of taking part?**

The information we get from this study will help us to decide whether the

translated booklet could support education of self-management in managing knee pain. The findings will hopefully contribute to improving the healthcare of patients with joint pain. We would anticipate that the findings of this study will be published in medical journals.

### **9. What if something goes wrong?**

We are simply asking your opinions about the booklet by completing a questionnaire. We do not anticipate any problems associated with taking part in this study.

### **11. Will information about me be kept confidential?**

Yes. Any information you provide will be reported in a generalized summary, but will be entirely anonymised.

All information that is collected about you during the course of the research will be kept strictly confidential. Your personal details will be kept in a secure location and will only be accessed by the study investigators. Any information collected from you will only be used for the purpose of this study, and any published results will be strictly anonymous.

Under the laws of Hong Kong [in particular the Personal data (privacy) Ordinance, Cap 486], you enjoy the rights for the protection of the confidentiality of your personal data. For any query, you should consult the Privacy Commissioner for Privacy Data or his office (tel no. 28272827) as to the proper monitoring or supervision of your personal data protection be assured. By consenting to take part in this study, you authorize:

- 1) the principal investigator and her research team and the ethics committee responsible for overseeing the study to access, to use, and to retain your personal data for the purposes described in this informing process;
- 2) the relevant government agencies (e.g. the Hong Kong Department of Health) to access to your personal data for the purposes of checking and verifying the integrity of study data and assessing compliance with the study requirements.

### **12. What will happen to the results of the research study?**

The findings obtained from this research study will be written up as part of a Professional Doctorate thesis and may be used in conference presentations or published in a journal. It is anticipated that the results from this study will inform the development of physiotherapy intervention programme for patients with KOA in HK, integrating physical and psychological treatment. It forms part of the second of the five phases of a professional doctorate project on this topic.

### **13. Who is organising and funding the research?**

This study is part of a professional doctorate research project registered with the University of the West of England, Bristol (UWE) and based at Physiotherapy

Department, Prince of Wales Hospital. Ms Jamie Sau-ying LAU, the senior physiotherapist of Prince of Wales Hospital is the Principal Investigator of this study. No grant or extra funding has been received for this study.

**14. Who has reviewed the study?**

This study has been reviewed by the Joint Chinese University of Hong Kong-New Territories East Cluster Research Ethics Committee and the Faculty Research Ethics Committee of University of the West of England.

**15. What do I do now?**

Thank you for considering taking part in this research. If you require any further information regarding this study, please contact, during office hour:

**Jamie Lau** (Professional doctorate student) **on 3505 3154**

You can ask any questions you have and let her know your final decision.

*Thank you for your time and consideration*

## Appendix E2

### Consent Form for Physiotherapist in Booklet study

<b>Consent Form</b>
---------------------

Title: An integrated programme of exercise, self-management and active coping strategies for patients with knee osteoarthritis – a proof-of-Concept study for a Hong Kong Chinese speaking population

Principal Investigator: Jamie Sau-ying LAU

	<b>Please read this information carefully</b>	<b>Please initial in box</b>
<b>1</b>	I confirm that I have read and understand the information sheet (dated 17 July, 2018, version 1) for the above study and have had the opportunity to ask questions.	
<b>2</b>	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.	
<b>3</b>	I understand and give permission to NTEC-CUHK Cluster REC/IRB (telephone: 3505 3935) as one of the authorized parties to access my information related to the study for ethics review purpose.	
<b>4</b>	I agree to take part in the above study.	
<b>5</b>	I agree that the findings from this study will be used for publication purposes but will be anonymised and not attributable to me.	

.....  
Name of Participant                      Date    Signature

.....  
Name of researcher taking consent      Date    Signature

Copies to: Participating therapist, Researcher's file

## Appendix E3

### Evaluation form on relevance & comprehension for physiotherapist

**Dear colleagues,**

You are cordially invited to read the Chinese version of the information booklet guiding self-management skills for patients with knee osteoarthritis. After that please complete the following questionnaire by circling at the appropriate point on the lines to express your viewpoint on relevance and understandability for each question as below:

relevance: "totally not relevant" = least relevant to "totally relevant" as most relevant

understandability: "difficult to understand" = least easy to understand to "easy to understand" = easiest to understand

On completion, please return this questionnaire to Jamie Lau.

Please put a circle on the line as appropriate for each question below.

1.1 The topics listed on the "**Content**" page is

-----					
totally not relevant	quite not relevant	slightly not relevant	slightly relevant	quite relevant	totally relevant
-----					
difficult to understand	quite difficult to understand	a bit difficult to understand	Slightly easy to understand	quite easy to understand	easy to understand

1.2 The content in the "**Aim**" and "**Change cycle**" is:

-----					
totally not relevant	quite not relevant	slightly not relevant	slightly relevant	quite relevant	totally relevant
-----					
difficult to understand	quite difficult to understand	a bit difficult to understand	Slightly easy to understand	quite easy to understand	easy to understand

1.3 The content in "**Joint pain**" and "**Exercise benefits**" is:

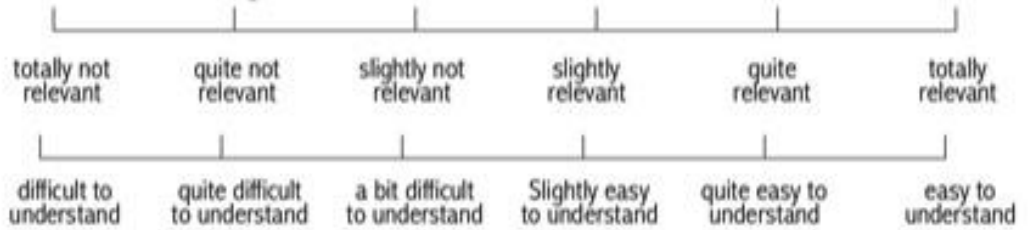
-----					
totally not relevant	quite not relevant	slightly not relevant	slightly relevant	quite relevant	totally relevant
-----					
difficult to understand	quite difficult to understand	a bit difficult to understand	Slightly easy to understand	quite easy to understand	easy to understand

1.4 The content in "**Goal setting**" and "**Action plan**" is:

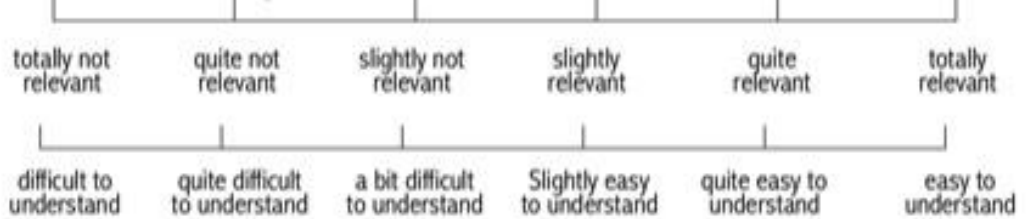
-----					
totally not relevant	quite not relevant	slightly not relevant	slightly relevant	quite relevant	totally relevant
-----					
difficult to understand	quite difficult to understand	a bit difficult to understand	Slightly easy to understand	quite easy to understand	easy to understand



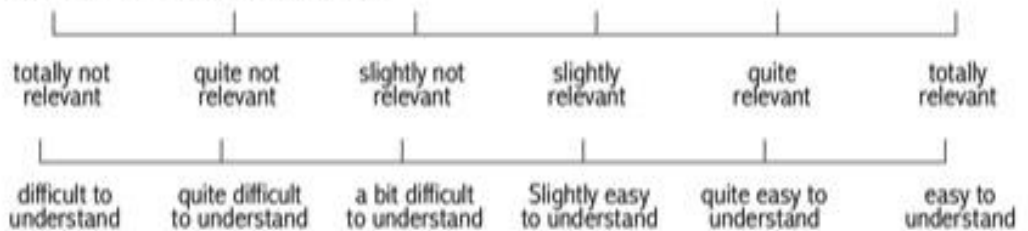
1.1 The content in "Pacing" is:



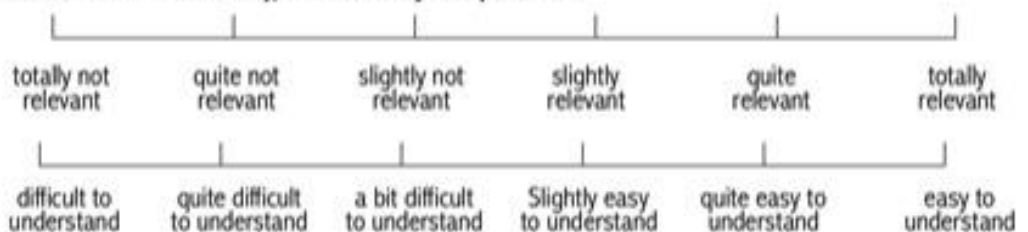
1.2 The content in "Healthy diet" is:



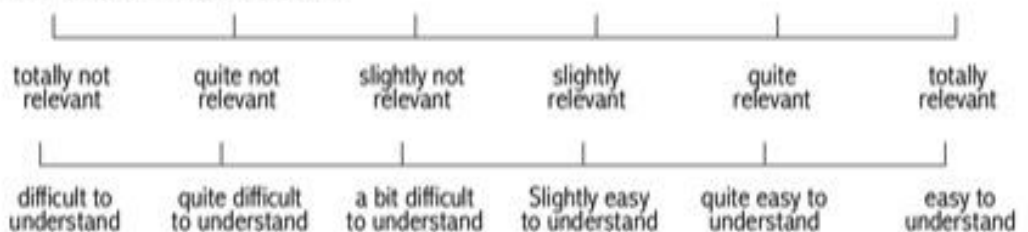
1.3 The content in "Ice and heat" is:



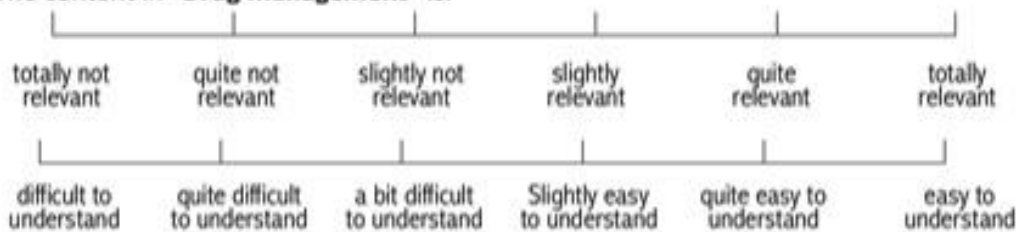
1.4 The content in "Anxiety, mood and joint pain" is:



1.5 The content in "relaxation" is:



1.6 The content in "Drug management" is:



- 1.1 The content in **“Managing flare-ups”** and **“Long-term exercise”** is:
- |                         |                               |                               |                             |                          |                    |
|-------------------------|-------------------------------|-------------------------------|-----------------------------|--------------------------|--------------------|
| totally not relevant    | quite not relevant            | slightly not relevant         | slightly relevant           | quite relevant           | totally relevant   |
| difficult to understand | quite difficult to understand | a bit difficult to understand | Slightly easy to understand | quite easy to understand | easy to understand |
- 1.2 The **printing presentation and design** of the information booklet is:
- |                         |                               |                               |                             |                          |                    |
|-------------------------|-------------------------------|-------------------------------|-----------------------------|--------------------------|--------------------|
| totally not relevant    | quite not relevant            | slightly not relevant         | slightly relevant           | quite relevant           | totally relevant   |
| difficult to understand | quite difficult to understand | a bit difficult to understand | Slightly easy to understand | quite easy to understand | easy to understand |
- 1.3 The **goal to achieve learning self-management skills and exercise** from the information booklet is:
- |                         |                               |                               |                             |                          |                    |
|-------------------------|-------------------------------|-------------------------------|-----------------------------|--------------------------|--------------------|
| totally not relevant    | quite not relevant            | slightly not relevant         | slightly relevant           | quite relevant           | totally relevant   |
| difficult to understand | quite difficult to understand | a bit difficult to understand | Slightly easy to understand | quite easy to understand | easy to understand |
- 1.4 Experience in treating musculoskeletal conditions: (optional)
- Less than 1 year
  - From 1 to below 3 years
  - From 3 to below 5 years
  - From 5 to below 10 years
  - More than 10 years

This is the end.  
Thanks a lot!

## Appendix F1

### Patient information sheet for patients in booklet study

#### **1. Research topic**

##### ***Managing Knee Joint Pain***

#### **2. Invitation**

You are invited to take part in this study which forms part of a doctorate at the University of West of England, Bristol, United Kingdom. Before you agree, it is important that you understand why we are doing this research, and what it will involve. Take your time reading the following information carefully, and discuss it with others if you wish. Please contact us if there is anything that is unclear or if you would like more information. Please consider carefully whether or not you wish to take part. Thank you for taking the time to read this information.

#### **3. What is the purpose of this study?**

We have translated a booklet “Manage Your Joint Pain & Arthritis” for education on self-management for knee pain. We would like to ask for your advice. We hope this will help us plan and improve the quality of care people with joint pain receive in the future.

#### **4. Why have I been chosen?**

You have been contacted, as you received treatment in our out-patient clinic. We would like to see whether this booklet is relevant and comprehensible to people with knee pain.

#### **5. Do I have to take part?**

No, it is up to you to decide whether or not to take part in the study. Even if you decide to take part you can still change your mind at any time and withdraw from the study without affecting the care you receive now or in the future.

#### **6. What will happen to me if I take part?**

If you agree to take part in the study, you will be offered an appointment to attend a group discussion of about 4-6 people at the clinic in Prince of Wales Hospital, once only, for up to 60 minutes. There will be no charge for this attendance.

At the beginning, we shall introduce the booklet, followed by discussion for every section. Then you will be asked your opinion by

completing a questionnaire. Any comments you have about the booklet will remain entirely anonymous.

### ***7. What are the possible benefits of taking part?***

The information we collect from this study will help us to decide whether the translated booklet and discussion could be made any better management for knee pain. We hope that the findings will contribute to improving the healthcare of patients with joint pain in the future. We would anticipate that the findings of this study will be published in medical journals.

### ***8. What if something goes wrong?***

We are simply asking you questions about the booklet and completing a questionnaire. You can contribute as little or as much as you want to the group discussion, or choose not to answer some questions if you prefer. We do not anticipate any problems associated with taking part in this study.

### ***9. Will information about me be kept confidential?***

With your permission we will record the group discussion and type it up. We will not use any information that identifies you or other members of the group in the typed up version.

All information you share will be kept strictly confidential but will be looked at by other members of the research team. Any personal information you provide (e.g. name, contact details) will be kept separately from the group discussion information in a secure location and will only be accessed by the study investigators.

Any information collected from you will only be used for the purpose of this study. We will include information gained at this group discussion in a final study report and for publication in academic journals. We may use direct quotes from the group discussion; these will be anonymised and will not be able to be traced back to any individual person.

Under the laws of Hong Kong [in particular the Personal data (privacy) Ordinance, Cap 486], you have rights for the protection of the confidentiality of your personal data. For any query, you should consult the Privacy Commissioner for Privacy Data or his office (tel no. 28272827). By consenting to take part in this study, you authorize:

- 1) the principal investigator and her research team and the

ethics committee responsible for overseeing the study to access, use, and retain your personal data for the purposes described in this informing process;

2) the relevant government agencies (e.g. the Hong Kong Department of Health) to access to your personal data for the purposes of checking and verifying the integrity of study data and assessing compliance with the study requirements.

**10. What will happen to the results of the research study?**

We hope that the results of this study will be published in a healthcare journal and at conferences. We will also send you a summary of the results at the end of the study, if you so wish.

**11. Who is organising and funding the research?**

Ms Jamie Sau-ying LAU, the senior physiotherapist of Prince of Wales Hospital is the Principal Investigator of this study. No grant or extra funding has been received for this study.

**12. Who has reviewed the study?**

This study has been reviewed by the Joint Chinese University of Hong Kong-New Territories East Cluster Research Ethics Committee and the Faculty Research Ethics Committee of University of the West of England.

**13. Contact for further information**

If you require any further information regarding this study, please contact, during office hour:

**Jamie Lau on 3505 3154**

If you wish to participate in this study, you will be asked to sign a consent form and given a copy of this information sheet and a signed copy of the consent form to keep. If you decide that you do not want to take part in the study, it will have no effect on any treatment which you will receive.

*Thank you for your time and consideration*

## Appendix F2

### Consent form for patients in booklet study

#### Consent Form

Title: Managing Knee Joint Pain

Principal Investigator: Jamie Sau-ying LAU

	<b>Please read this information carefully</b>	<b>Please initial in box</b>
<b>1</b>	I confirm that I have read and understand the information sheet (dated 17 July, 2018, version1) for the above study and have had the opportunity to ask questions.	
<b>2</b>	I understand that there will be no payment to me for participating in this research study.	
<b>3</b>	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and without my medical care or legal rights being affected.	
<b>4</b>	I agree that the group discussion can be audio-taped.	
<b>5</b>	I give permission for the use of direct quotes in research papers, but understand they will be anonymized.	
<b>6</b>	I understand and give permission to NTEC-CUHK Cluster REC/IRB (telephone: 3505 3935) as one of the authorized parties to access my information related to the study for ethics review purpose.	
<b>7</b>	I agree to take part in the above study.	

.....  
**Name of Participant**

**Date**

**Signature**

.....  
**Name of researcher taking consent**

**Date**

**Signature**

#### Copies to:

Patient, Researcher's file, Hospital record

## Appendix F3

### Evaluation form on relevance & comprehension for patients

#### Dear participant,

You are cordially invited to read the Chinese version "**Managing knee pain**" information booklet guiding self-management skills for patients with knee osteoarthritis. After that please complete the following questionnaire by circling at the appropriate point on the lines to express your viewpoint on relevance and understandability for each question as below:

relevance: "totally not relevant" = least relevant to "totally relevant" as most relevant

understandability: "difficult to understand" = "least easy to understand" to "easy to understand" = "easiest to understand"

Please put a circle on the line as appropriate for each question below.

1.1 The topics listed on the "**Content**" page is

-----					
totally not relevant	quite not relevant	slightly not relevant	slightly relevant	quite relevant	totally relevant
-----					
difficult to understand	quite difficult to understand	a bit difficult to understand	Slightly easy to understand	quite easy to understand	easy to understand

1.2 The content in the "**Aim**" and "**Change cycle**" is:

-----					
totally not relevant	quite not relevant	slightly not relevant	slightly relevant	quite relevant	totally relevant
-----					
difficult to understand	quite difficult to understand	a bit difficult to understand	Slightly easy to understand	quite easy to understand	easy to understand

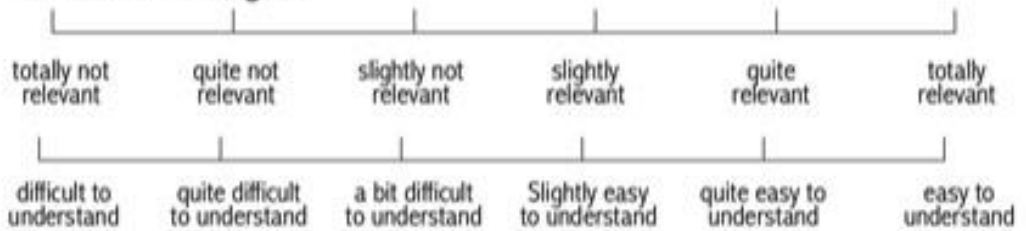
1.3 The content in "**Joint pain**" and "**Exercise benefits**" is:

-----					
totally not relevant	quite not relevant	slightly not relevant	slightly relevant	quite relevant	totally relevant
-----					
difficult to understand	quite difficult to understand	a bit difficult to understand	Slightly easy to understand	quite easy to understand	easy to understand

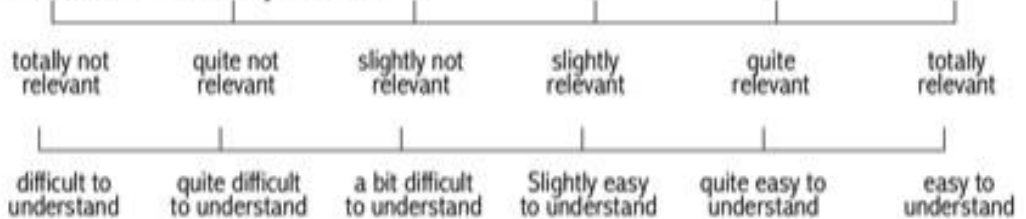
1.4 The content in "**Goal setting**" and "**Action plan**" is:

-----					
totally not relevant	quite not relevant	slightly not relevant	slightly relevant	quite relevant	totally relevant
-----					
difficult to understand	quite difficult to understand	a bit difficult to understand	Slightly easy to understand	quite easy to understand	easy to understand

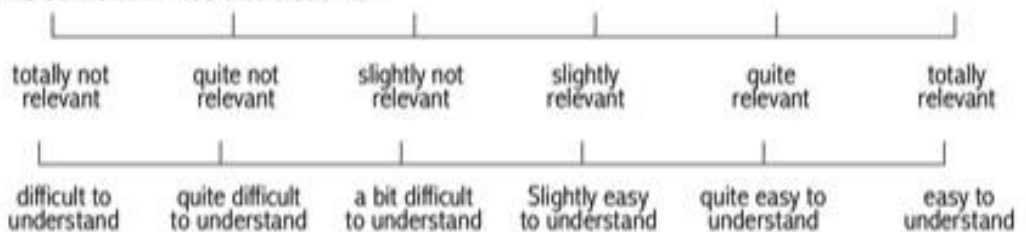
1.1 The content in "Pacing" is:



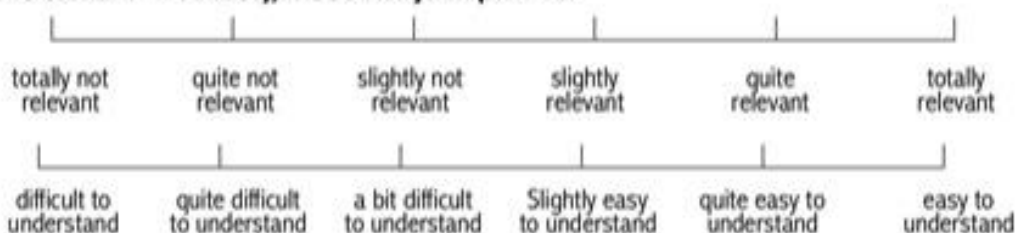
1.2 The content in "Healthy diet" is:



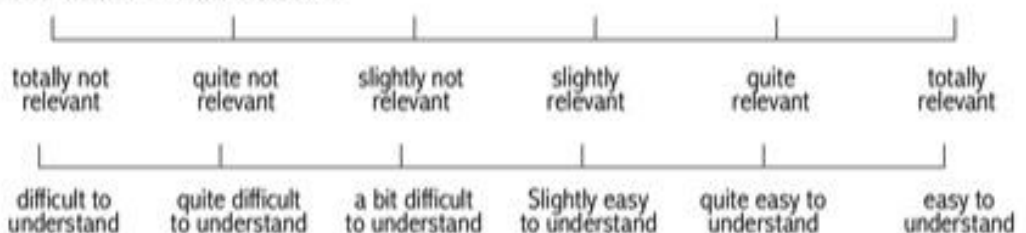
1.3 The content in "Ice and heat" is:



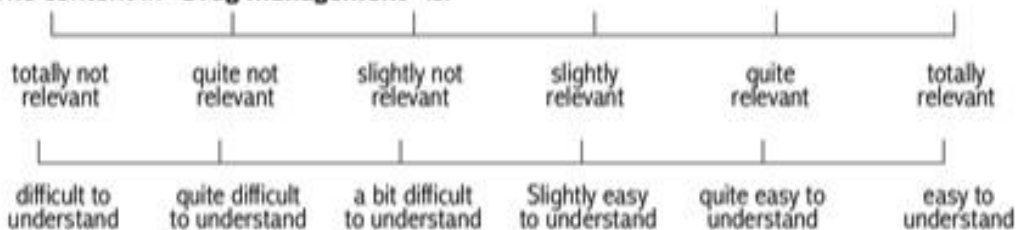
1.4 The content in "Anxiety, mood and joint pain" is:



1.5 The content in "relaxation" is:



1.6 The content in "Drug management" is:





1.1 The content in **"Managing flare-ups"** and **"Long-term exercise"** is:

totally not relevant	quite not relevant	slightly not relevant	slightly relevant	quite relevant	totally relevant
difficult to understand	quite difficult to understand	a bit difficult to understand	Slightly easy to understand	quite easy to understand	easy to understand

1.2 The **printing presentation and design** of the information booklet is:

totally not relevant	quite not relevant	slightly not relevant	slightly relevant	quite relevant	totally relevant
difficult to understand	quite difficult to understand	a bit difficult to understand	Slightly easy to understand	quite easy to understand	easy to understand

1.3 The **goal to achieve learning self-management skills and exercise** from the information booklet is:

totally not relevant	quite not relevant	slightly not relevant	slightly relevant	quite relevant	totally relevant
difficult to understand	quite difficult to understand	a bit difficult to understand	Slightly easy to understand	quite easy to understand	easy to understand

Please provide your personal information below:

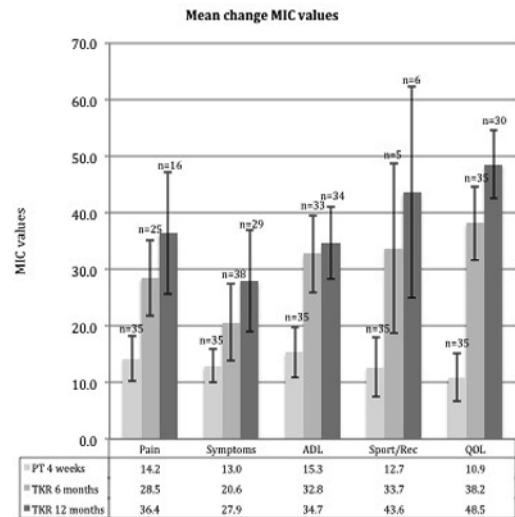
- 1.4 History of your knee pain:
- Less than 1 month
  - From 1 to 3 months
  - From more than 3 months to 6 months
  - From more than 6 months to 12 years
  - More than 1 years

This is the end.  
Thanks a lot!

## Appendix G

### Minimal important change of KOOS after physiotherapy treatment

Image redacted for copyright reasons



The ROC MIC values were based on a limited number of unchanged patients (13 and 3-12 for PT and TKR, respectively), indicating results being unreliable.

**Conclusions:** For the KOOS, Mean Change MIC values in patients with knee OA varied with intervention and increased with length of follow-up, indicating MIC being context dependent. To adequately determine the MIC in different study contexts, adequate anchor questions should supplement administration of the KOOS score in future studies.

Reprinted from Osteoarthritis and Cartilage, Vol 22, Ingelsrud LH, Terwee CB, Goncalves RS and Roos EM, Minimal important change for the knee injury and osteoarthritis outcome score (KOOS) in patients with knee osteoarthritis, pages S179-S180, copyright year 2018, with permission from Elsevier.

## **Appendix H1**

### **Participant information sheet for physiotherapist training**

#### **1. Research topic**

An integrated programme of exercise, self-management and active coping strategies for patients with knee osteoarthritis – a proof-of-Concept study for a Hong Kong Chinese speaking population

#### **2. Invitation**

You are being invited to take part in a research study. Before you decide whether to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information. Ask us if there is anything that is unclear, or if you would like more information.

#### **3. What is the purpose of this study?**

The purpose of the study is to investigate the feasibility of translating a proved effective ESCAPE-knee pain programme for patients suffering from knee osteoarthritis (KOA) and to see if this programme is acceptable to patients.

It is hoped that through a training programme, therapists can learn to deliver this manualised programme integrating exercise with self-management and active coping strategies for KOA patients.

#### **4. Why have I been chosen?**

You have been chosen because you have been identified as a physiotherapist who has been involved in delivering intervention to patients with KOA.

#### **5. Do I have to take part?**

No, taking part is voluntary. If you decide not to take part, you do not have to give a reason. If you do decide to take part we will ask you to sign a consent form, and give you a copy of this information sheet and the consent form to keep.

#### **6. What if I wish to withdraw at a later stage?**

You are free to withdraw at any time, and with no explanation, up until the point of analysis of any data. If you do withdraw up to this point, any data you have provided will be removed from the study.

#### **7. What will I be asked to do if I take part?**

You will be asked to take part in an eight-hour training programme spread over four weeks in Prince of Wales Hospital. This will cover on updated evidence-based management of KOA, the content of the ESCAPE-knee pain and knowledge and skills of motivational interviewing for enhancing behavioural change.

You will also be asked to complete questionnaires before and after the training programme regarding ways of managing patients with knee pain. They will be

used to guide the training programme.

### **8. The exercise class:**

You will be responsible to deliver a course of the ESCAPE-knee pain programme to a group of 10 patients. There will be ten exercise sessions over a five-week period which will be held in the physiotherapy clinic at Prince of Wales Hospital. Each session will last for approximately 1 1/4 hours. During each session, you will provide some education and discussion on self-management and pain coping strategies to the patient group, followed by supervision on exercise. At the end of the five weeks, you will encourage your patients to continue to exercise at home or at organised classes in their community.

Before and after the exercise programme, the principal investigator will perform assessment on all the patients attending your exercise programme.

### **9. What are the possible benefits of taking part?**

The information we get from this study will help us to decide whether this new integrated exercise programme with self-management is more effective in managing knee pain. The findings will hopefully contribute to improving the healthcare of patients with joint pain. We would anticipate that the findings of this study will be published in medical journals.

### **10. What if something goes wrong?**

In supporting the administration of the integrated programme, there will be briefing and discussion after every session between you and principal investigator. Reviews of any concerns raised during the exercise classes, clarification and preparation for the following session will be made.

### **11. Will my taking part in this study be kept confidential?**

Yes. Any information you provide before and after the training programme will be reported in a generalized summary, but will be entirely anonymised.

All information that is collected about you during the course of the research will be kept strictly confidential. Your personal details will be kept in a secure location and will only be accessed by the study investigators. Any information collected from you will only be used for the purpose of this study, and any published results will be strictly anonymous.

Under the laws of Hong Kong [in particular the Personal data (privacy) Ordinance, Cap 486], you enjoy the rights for the protection of the confidentiality of your personal data. For any query, you should consult the Privacy Commissioner for Privacy Data or his office (tel no. 28272827) as to the proper monitoring or supervision of your personal data protection be assured. By consenting to take part in this study, you authorize:

- 1) the principal investigator and her research team and the ethics committee responsible for overseeing the study to access, to use, and to retain your personal data for the purposes described in this informing

process;

2) the relevant government agencies (e.g. the Hong Kong Department of Health) to access to your personal data for the purposes of checking and verifying the integrity of study data and assessing compliance with the study requirements.

### ***12. What will happen to the results of the research study?***

The findings obtained from this research study will be written up as part of a Professional Doctorate thesis and may be used in conference presentations or published in a journal. It is anticipated that the results from this study will inform the development of physiotherapy intervention programme for patients with KOA in HK, integrating physical and psychological treatment. It forms part of the last three of the five phases of a professional doctorate project on this topic.

### ***13. Who is organising and funding the research?***

This study is part of a professional doctorate research project registered with the University of the West of England, Bristol (UWE) and based at Physiotherapy Department, Prince of Wales Hospital. Ms Jamie Sau-ying LAU, the senior physiotherapist of Prince of Wales Hospital is the Principal Investigator of this study. No grant or extra funding has been received for this study.

### ***14. Who has reviewed the study?***

This study has been reviewed by the Joint Chinese University of Hong Kong-New Territories East Cluster Research Ethics Committee and the Faculty Research Ethics Committee of University of the West of England.

### ***15. What do I do now?***

Thank you for considering taking part in this research. If you require any further information regarding this study, please contact, during office hour:

**Jamie Lau** (Professional doctorate student) **on 2632 3154**

You can ask any questions you have and let her know your final decision.

*Thank you for your time and consideration*

## Appendix H2

### Participant consent form for physiotherapist training

Title: An integrated programme of exercise, self-management and active coping strategies for patients with knee osteoarthritis – a proof-of-Concept study for a Hong Kong Chinese speaking population

Principal Investigator: Jamie Sau-ying LAU

	<b>Please read this information carefully</b>	<b>Please initial in box</b>
<b>1</b>	I confirm that I have read and understand the information sheet (dated 31 October, 2016, version 6) for the above study and have had the opportunity to ask questions.	
<b>2</b>	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.	
<b>3</b>	I understand and give permission to NTEC-CUHK Cluster REC/IRB (telephone: 2632 3935) as one of the authorized parties to access the treatment records I document for patients related to the study for ethics review purpose.	
<b>4</b>	I agree to take part in the above study.	
<b>5</b>	I agree that the findings from this study will be used for publication purposes but will be anonymised and not attributable to me.	

.....  
**Name of Participant                      Date                      Signature**

.....  
**Name of researcher taking consent      Date                      Signature**

**Copies to:**  
Participating therapist, Researcher's file

## Appendix I1

### Pre-training survey form for physiotherapists

**Dear colleagues,**

In order to identify the training needs for managing patients with knee osteoarthritis (KOA), here are some questions we would like you to respond to.

On completion, please return this questionnaire to Jamie Lau.

#### **Section One**

The questions below relate to your previous experience

1.1 For how many years have you worked with musculoskeletal cases:

- Less than 1 year
- From 1 to below 3 years
- From 3 to below 5 years
- From 5 to below 10 years
- More than 10 years

1.2 Have you done any cognitive behavioural therapy training (CBT)?

- No
- Yes; For how many days? \_\_\_\_\_ days

1.3 Have you done any motivational interviewing training?

- No
- Yes; For how many days? \_\_\_\_\_ days

1.4 What are your expectations of the ESCAPE-knee pain training?

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---

## Section Two

We would like your views on the following statements. Think about patients with KOA. *(Please tick one box for each question.)*

		Strongly disagree	Some what disagree	Neither agree nor disagree	Some what agree	Stron gly agree
2.1	Knee pain is due to “wear and tear” within the joint and the problem will probably worsen over the long term.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2	Participation in physical activity and exercise, in the presence of OA, may cause damage within the affected joint.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.3	A patient suffering from moderate pain should refrain from physical exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4	Depression is associated with more OA symptoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5	Patients with KOA should be deterred from practicing weight-bearing activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.6	Treatment may have been successful even if the pain fluctuates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.7	Strengthening exercises for knee will need to cover quadriceps and hamstrings only.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.8	Increasing overall general physical activity levels during everyday life is important.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.9	If knee pain increases in severity, I immediately withhold exercise activity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.10	Apart from reducing pain, improving physical and psychological functioning is important for KOA management.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



		Strongly disagree	Some what disagree	Neither agree nor disagree	Some what agree	Strongly agree
2.11	Exercise intensity should be altered if there is increased pain the following day.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.12	The greater the intensity of exercise training, the higher the treatment effect will be.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.13	Beneficial effects of exercise last only as long as the patients with OA continues to participate in exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.14	A person's confidence in their ability to carry out exercise increases the likelihood of continuing in the long term	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.15	Learning to cope with stress promotes wellbeing in knee pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.16	Goal setting and action planning engage patients actively.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

This is the end.

Thanks a lot!

## Appendix I2

### Post-training survey form for physiotherapists

#### Dear colleagues,

Thanks for completing the ESCAPE-knee pain training programme.

We would now be grateful for any feedback you have regarding the training.

On completion of this questionnaire, please return to Jamie Lau.

#### Section One

The questions below relate to your experiences of the programme.

1.1 How did you find the *usefulness* of the ESCAPE-knee pain training programme in PWH?

1.1.1	Updated evidence of knee osteoarthritis (KOA) management	
1.1.2	ESCAPE-knee pain format and programme	
1.1.3	Motivational interviewing	

1.2 How did you find the *pace* of the ESCAPE-knee pain training?

	Too quick	acceptable	Too slow
1.2.1 Updated evidence of KOA management Comment: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2.2 ESCAPE-knee pain format and programme Comment: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2.3 Motivational interviewing Comment: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.3 How did you find the clinical examples discussed?

\_\_\_\_\_

\_\_\_\_\_

1.4 How did you find the feedback given?

\_\_\_\_\_

\_\_\_\_\_

1.5 Were your expectations of the ESCAPE-knee pain training met?

---



---

1.6 Do you think you might be able to utilize ESCAPE-knee pain (integrating exercise with self-management) into your general clinical work (apart from this proof-of-concept study)?

---



---

**Section Two**

We would like your views on the following statements. Think about patients with KOA. *(Please tick one box for each question.)*

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
2.1 Knee pain is due to “wear and tear” within the joint and the problem will probably worsen over the long term.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2 Participation in physical activity and exercise, in the presence of OA, may cause damage within the affected joint.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.3 A patient suffering from moderate pain should refrain from physical exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4 Depression is associated with more OA symptoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5 Patients with KOA should be deterred from practicing weight-bearing activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.6 Treatment may have been successful even if the pain fluctuates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
2.7 Strengthening exercises for knee will need to cover quadriceps and hamstrings only.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.8 Increasing overall general physical activity levels during everyday life is important.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.9 If knee pain increases in severity, I immediately withhold exercise activity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.10 Apart from reducing pain, improving physical and psychological functioning is important for KOA management.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.11 Exercise intensity should be altered if there is increased pain the following day.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.12 The greater the intensity of exercise training, the higher the treatment effect will be.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.13 Beneficial effects of exercise last only as long as the patients with OA continues to participate in exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.14 A person's confidence in their ability to carry out exercise increases the likelihood of continuing in the long term.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.15 Learning to cope with stress promotes wellbeing in knee pain condition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.16 Goal setting and action planning engage patients actively.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you for completing this questionnaire !

## Appendix J

### Reference for updated evidence on KOA management

The six areas and 16 questions with the references are laid out below.

#### I) Misconception on KOA disease

- *Q1) Knee pain is due to ‘wear and tear’ within the joint and the problem will probably worsen over the long term.*
- Attitudes and beliefs about exercise are associated with individual perceptions about their knee problems. It is a commonly held belief that knee pain is due to “wear and tear: within the joint and that the problem will most probably worsen over the long term.” (Bennell, Dobson & Hinman, 2014, p.105) At initial stage of OA, loss of articular cartilage occurs at the articular surface, and spreads through the cartilage matrix down to the subchondral bone (Vincent & Watt, 2010). Aging of the musculoskeletal system increases the susceptibility for developing OA. It is, however, catalysed by the presence of some risk factors (Anderson & Loeser, 2010). Although OA is age-related, it is not an inevitable consequence of aging (Anderson et al, 2010). It is a dynamic reactive pattern of a joint related to increasing age, female sex, obesity, previous injury or surgery, genetic predisposition, biomechanical load and occupational or physical work demands (Busija, et al, 2010).
- *Q2) Participation in physical activity and exercise, in the presence of OA, may cause damage within the affected joint.*
- “Another common misconception is that participation in PA and exercise, in the presence of OA, may cause damage within the affected joint.” (Bennell, Dobson & Hinman, 2014, p.105). High level of PA only were found to be associated with incidence of OA (Lau, et al 2000) (table H.1). Lower limb muscle strength is associated with greater cartilage loss (Ding et al, 2008). Increased muscle strength, as a result of training, reportedly has a protective effect on cartilage degeneration over a 30-month period (Amin et al, 2009). Additionally, participants in a clinical trial receiving lower limb strength training experienced reduced disease progression compared to a control group who undertook general mobility exercises (Mikesky et al, 2006).

Table H.1 showing the association of physical activities and occupational exposures with the risk of osteoarthritis of knee osteoarthritis in Hong Kong Chinese, January 1998 to December 1998 (Lau, et al 2000)

	Men		Women	
Running	0.6	0.3 to 1.4	1.4	0.7 to 2.8
Football	1.3	0.6 to 2.8		
Squatting (≥1 hour/day)	1.2	0.7 to 2.0	1.1	0.8 to 1.5
Kneeling (≥1 hour/day)	1.4	0.7 to 3.0	0.9	0.6 to 1.3
Walking (≥2 hours/day)	2.2	1.4 to 3.5	1.4	1.1 to 1.8
Climbing stairs (≥15 flights/day)	4.1	2.1 to 8.2	6.1	3.5 to 10.8
Lifting ≥10kg (≥10 times/week)	5.8	3.1 to 10.8	3.0	2.2 to 4.1

## II) Psychosocial factors

- *Q4) Depression is associated with more OA symptoms*
- “Psychological impairment such as depression and anxiety are common” in KOA patients (Bennell, Dobson & Hinman, 2014, p.94). Inactive elder with KOA were shown to have higher depression scores compared with healthy active elder (Shams, Hadi and Sahaf, 2016).
- *Q10) Apart from reducing pain, improving physical and psychological functioning is important for KOA management.*
- Core treatment should be offered to all KOA patients include strengthening ex, education and weight loss if overweight (NICE 2014, McAlinden, et al, 2014). Apart from pain, the level of pain-related fear, anxiety, depression (Heuts, et al 2004; Scopaz, et al, 2009) and pain catastrophizing explained for psychological disability, physical disability and walk speed (Somers, et al, 2009). Physical activity has the strongest effects on self-efficacy. Improvement in strength, cardiovascular status and functioning are linked to overall well-being improvement (Netz, et al, 2005).

## III) Types of exercise

- *Q3) A patient suffering from moderate pain should refrain from physical exercise*
- A core treatment is advisable for all people with osteoarthritis to exercise, irrespective of age, comorbidity, pain severity or disability (NICE, 2014). High-quality evidence indicates land-based therapeutic exercise provide short-term benefits and that is sustained for at least two to six months post-treatment (Fransen et al, 2015). The exercise should include local muscle strengthening and general aerobic fitness. Similar effects for pain in patients with severe KOA (SMD 0.60 [95% CI 0.38, 0.82]) and those with mild/moderate KOA (SMD 0.66 [95% CI 0.34, 0.99]) (Juhl et al, 2014).
- *Q5) Patients with KOA should be deterred from practising weight-bearing activities.*
- A recent systematic review showed muscle strengthening exercise with or without weight-bearing and aerobic exercises are effective for pain relief (Tanaka et al. 2013). Additionally an experimental study showed similar improvement for weight-bearing and non-weight bearing training in muscle strength and physical function (Jan et al, 2009) in people with KOA.
- *Q7) Strengthening exercises for knee will need to cover quadriceps and hamstrings only.*
- “It is preferable to use a program that strengthens major lower limb muscles.” Examples of strengthening exercises for knee/hip OA and calf muscles were shown. (Bennell, Dobson & Hinman 2014, p.95, 111-114). The studies reported in the systematic review undertaken by Tanaka et al, (2013) supported strengthening for hip, knee and calf muscles. Exercise programmes focusing on quadriceps strength only were more beneficial in reducing pain than programmes aimed at improving general lower limb strength (SMD 0.85 [95% CI 0.55,1.14]) vs. 0.39 [95% CI 0.27, 0.52]) (p=0.005). Programmes focusing on quadriceps strength only were more

effective at reducing disability (SMD 0.87 [95% CI 0.45, 1.29]) vs. 0.36 [95% CI 0.18, 0.52]) (p=0.029) (Juhl, et al 2014).

- Q8) Increasing overall general physical activity levels during everyday life is important.
- Aerobic exercise, such as walking or cycling, is beneficial for improving pain and physical function. Combined with dietary restriction, aerobic exercise can assist weight loss in patients with overweight/obesity. Aerobic exercise have shown to have positive effects on psychological impairment such as depressive symptoms (Bennell, Dobson & Hinman 2014).

#### **IV) Exercise dosage**

- Q9) If knee pain increases in severity, I immediately withhold exercise activity
- A scale for monitoring pain during training can be followed. Patients with KOA were told to allow pain up to 5 on a 0 to 10 scale during and after the training session. Pain should subside to “pain as usual” the day after training. If pain does not subside, the level of training is to be reduced (Ageberg et al, 2013). A proof of concept study on a rescue training programme in parallel to a standard programme was undertaken to participants with KOA in case of excessive pre-session pain. Basically weight bearing activities were excluded while cycling and core stability exercise were continued (Bartholdy et al, 2014).
- Q11) Exercise intensity should be altered if there is increased pain the following day.
- Signs and symptoms like severe pain or swelling during or after exercise, over night or even the following day indicate that exercise program may be too intensive and that dosage may need to be altered (Bennell, Dobson & Hinman, 2014, p.100).
- Q12) The greater the intensity of exercise training, the higher the treatment effect will be.
- A positive dose-response effect was obtained in a recent SR and MA findings showing the effect of aerobic exercise on pain relief increased with an increased number of supervised sessions (slope 0.02 [95% CI 0.002, 0.043]). When supervised exercise performed at least 3 times a week compared with less (SMD 0.68 vs. 0.41; p=0.017), no impact of intensity, duration of individual sessions was found (Juhl, et al 2014). One study compared low intensity vs high intensity strengthening exercise programmes. Both significantly improved in pain, function, walking and muscle strength while high-resistance strength training effect appeared to be larger than those with low-resistance for people with mild to moderate KOA (Jan et al 2008). Zacharias et al (2014) showed that a more intense training mode (70% resistance maximum and repetition <12 /set) resulted in larger and more sustained effect on function.

## V) Self-management

- Q6) Treatment may have been successful even if the pain fluctuates.
- While rest and passive treatment are suitable for managing acute pain, chronic pain management calls for activity and exercise. Although pain may never go away and affect certain functions, patients can gain control over their pain and improve overall functional levels (Vasudevan 2015, p.5).
- Q15) Learning to cope with stress promotes wellbeing in knee pain.
- Prevalence of depressive symptoms is high (Sale, Gignac & Hawker, 2008). In ESCAPE-knee pain programme (Hurley et al, 2007a) and Pain Coping Skill Training programme (Bryant et al, 2014), relaxation for stress management was practised.
- Q16) Engage patients actively for goal setting and action planning.
- Optimal health outcomes will be enhanced by implementation of individually tailored goal-directed exercise programmes, mutuality in goal setting and an appropriate action plan (Marks, 2012).

## VI Exercise adherence

- Q13) Beneficial effects of exercise last only as long as the patients with OA continue to participate in exercise.
- An experimental study of treatment effect for OA hip and knee showed effect on pain for ex in the past week was small to moderate (MD -11.5 [95% CI -19.7, -3.3]) at 24 week post-intervention. At 36 weeks no difference was found between the groups (van Baar et al, 2001). Beneficial effects of ex decline over time and finally disappear.
- Q14) A person's confidence in their ability to carry out exercise increases the likelihood of continuing in the long-term.
- Adherence requires behaviour change (Hay-smith 2016). Social Cognitive Theory (SCT) (Bandura 1997) was commonly used to guide developing a behaviour. To act, a person requires self-efficacy for the behaviour (Bandura 1997). Treatment effect of physical activity was found to be mediated by self-efficacy and self-regulation (Anderson, et al 2010).



# Appendix K1

## Evidence update for knee osteoarthritis

**Evidence-based practice updates  
for knee osteoarthritis**

-----  
Jamie Lau

### Definition of knee osteoarthritis

- Knee osteoarthritis is a common chronic condition related to pain and disability (Peat 2001, Vos et al 2012).  
Ranked **11<sup>th</sup> highest** contributors to **global disability** and **38<sup>th</sup> highest** in **years lost to disability** (Cross et al 2014)
- Definition: (classified by) American College of Rheumatology
  - clinical syndrome in older adults who present with knee pain, morning stiffness and joint crepitus (Hochberg 1995, Altman 1986)
- Presenting physical impairment:
  - Joint stiffness, muscle weakness, altered proprioception, reduced balance and gait abnormalities (Bennell, Dobson & Hinman 2014)
- Consequences:
  - Pain, reduced function in daily activities,
  - Complex biopsychosocial issue of pain, related to a person's expectation & self-efficacy, associated with changes in mood, sleep and coping abilities (NICE guideline 2014)

### Criteria for knee osteoarthritis American College of Rheumatology, 2001

- Knee pain and at least 3 of the following 6 criteria:
  - 50 years of age or older, NICE Guidelines (2014): ≥ 45 years old
  - Stiffness lasting
  - Crepitus,
  - Bony tenderness
  - Bony enlargement
  - No warmth to the touch
- X-ray examination following Kellgren-Lawrence grading system

### Case definition – radiographic changes Kellgren-Lawrence grading system

Grade	X-ray features	
0	Normal joint	
1	Small osteophyte of doubtful significance	
2	Definite osteophyte	} KL grades ≥2 diagnosed as OA
3	Osteophyte and joint space narrowing	
4	Severe joint space narrowing	

Kellgren JH & Lawrence JS (1957) Radiological assessment of osteo-arthrosis. Ann Rheuma Dis 16:494-502

### Question 1

**Neck, shoulder, back, knee**

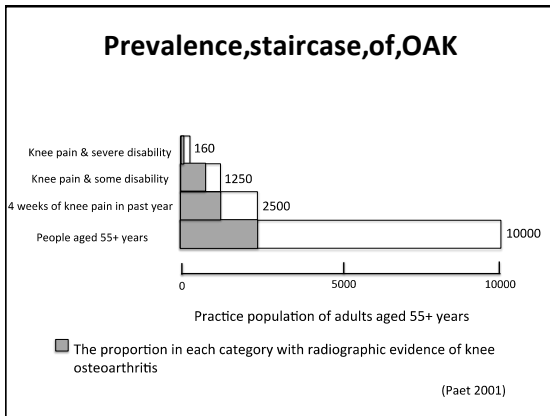
Please put the above diseases in descending order being seen by our physiotherapists in PWH.

1	2	3	4

### Prevalence of OAK

- Prevalence: - related to
  - gender, age range – increase with age
  - case definition – symptoms (prevalence lower) or radiographic changes (Anderson 1999, Paet 2001, Zhang 2001)
  - (poor link between changes visible on x-ray & symptoms of OA)

Country	General (%)	Older age (%)		Authors
		Men	Women	
UK	13-28			(Paet 2001)
US	18.1 (men) 23.5 (women)	85-90	23.7 30	(Anderson 1999)
Beijing	5.6 (men) 15 (women)	≥70	9.8 17.2	(Zhang 2001)
Shanxi (China)	13.8 (12.4 men, 15.3 women)	At 70	35 41	(Zhang 2013)
HK	7 (men) 13 (women)	≥70	12 40	(Woo 1994)

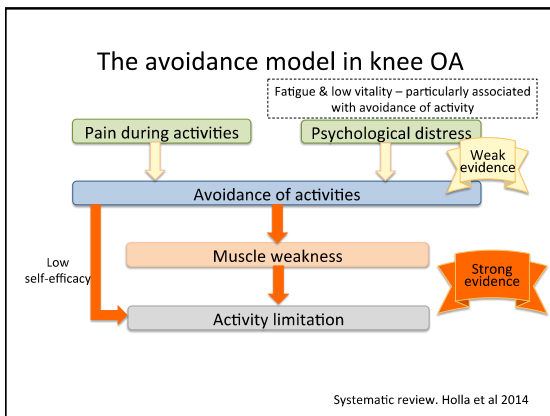


Adapted by permission from BMJ Publishing Group Limited. [Annals of the Rheumatic Diseases, Knee pain and osteoarthritis in older adults: a review of community burden and current use of primary health care, Peat G, McCahey R and Croft P, volume 60, pages 91-97, copyright year 2018]

### Pathogenesis

*Wear, & tear, of, jt., that, will, worsen, with, / me,*

- Contrary to popular belief, OA is **not caused by ageing** and does not necessarily deteriorate (NICE guideline 2014)
- It is **not an inevitable consequence of ageing** (Anderson et al 2010)
- The disease process in OA reflects a **dynamic reactive pattern** of a joint related to age, gender, **obesity**, previous injury or surgery, genetic predisposition, **biomechanical load and occupational or physical work demands** (Busija et al 2010, Creamer & Hochberg 1997)
- **Reduced muscle strength**, (Hurley 1999) and **obesity** are identified as **potentially modifiable risk factors** in the development and progression of OA (Hunter 2011, Busija et al 2010)



Adapted by permission from Springer Nature Customer Service Centre GmbH: Springer Nature, Journal of Behavioral Medicine, The avoidance model in knee and hip osteoarthritis: a systematic review of the evidence. Holla JFM, Sanchez-Ramirez DC, van der Leeden M, et al. copyright year 2018

### Question 2

Being a physiotherapist, what can you offer to help patients with knee osteoarthritis?

### NICE Guidelines 2014

- Holistic approach to OA assessment & management:
  - Advice to all
    - Access to appropriate information
    - Activity & ex
    - Interventions to achieve weight loss if overweight
- Education & self-management
  - Accurate information
    - to enhance understanding of the condition and its management, and to counter misconceptions
  - Self-management strategies to ensure positive **behaviour changes**, e.g. ex, wt. loss, use of suitable footwear & pacing

### Common misconception

- Knee pain is due to **"wear and tear"** within the joint and that the problem will most probably worsen over the long term.
- Participation in physical activity and ex, in the presence of OA, may cause **damage** within the affected joint.
- More severe OA (X-ray damage) is less likely to benefit from ex. (Bennell, Dobson & Hinman 2014)

Core treatment advisable for all people with OA to ex, irrespective of:

- age
- pain severity
- comorbidity
- disability

(NICE 2014)

### Common misconception

- Knee pain is due to “wear and tear” within the joint and that the problem will most probably worsen over the long term.
- Participation in physical activity and ex, in the presence of OA, may cause **damage** within the affected joint.
- More severe OA (X-ray damage) is less likely to benefit from ex.

To maximize patient adherence to exercise in OA:  
 - patient education  
 - confidence in ability to carry out exercise (self-efficacy)

Bennell, Dobson & Hinman 2014

### OA research Society International (OARSI guidelines) for non-surgical management of OAK

#### Core, treatments,

Appropriate for all individuals

- Land-based exercise
- Water-based exercise
- Weight management
- Self-management and education
- Strength training

(McAlindon 2014)

Reprinted from Osteoarthritis and Cartilage, Vol 22, McAlindon TE, Bannuru RR, Sullivan NK et al, OARSI guideline for the non-surgical management of knee osteoarthritis, pages 363-388, copyright year 2018, with permission from Elsevier

### Systematic review of guidelines for physical management of OA

- 17 guidelines reviewed and synthesized
- Interventions strongly recommended:

Exercise,	Electrical(based,therapy,	
Combined	TENS	Manual therapy with supervised ex
Aerobic	Equipment,,	
Strengthening	Knee bracing	Diet and weight
Aquatic/hydroth	Appropriate footwear	Self-manageme
Land-based	Wedged insoles	
Yoga		

(Larmer et al 2014)

### Question 3

Brief outline an exercise programme for a patient with knee osteoarthritis?

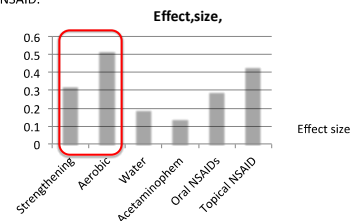
### Exercise management

#### - Effects of exercise

- Quadriceps weakness common amongst KOA
  - Possibly associated with disuse atrophy, considered **part of the active disease process** (Hurley 1999)
  - Associated with **greater cartilage loss** (Ding et al 2008)
- Training to increased strength
  - **Protective effect on cartilage degeneration over 30-month** (Amin et al 2008)
  - Participants experienced **reduced disease progression** vs general mobility ex (Mikesky et al 2006)
- Mixed programme of **aerobic, strengthening & proprioception ex**, with **task-specific functional training** (Beckwee et al 2013, Jansen 2011)

### What type of exercise?

- A range of exercise types offer clinical benefits from **small to moderate**
- Effect size comparable to reported estimates for simple analgesics and oral NSAID.



Bennell, Dobson & Hinman 2014

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## Effectiveness of exercise

- 44 RCTs land-based therapeutic exercise

	Short-term SMD (95%)	2-6 month
Pain (high quality evidence)	-0.49 (-0.39 to -0.59)	Effect sustained
Physical function (moderate quality evidence)	-0.52 (-0.39 to -0.64)	Benefit not apparent
Quality of life (sig. but small benefits)	0.28 (0.15 to 0.40)	

(Fransen 2015)

## Recommendations about the type of exercise

- Similar reductions in pain & improvements in function can be gained with various types of ex
- For LL OA, an ex. programme to improve **muscle strength, aerobic capacity** and **flexibility** is recommended.
- Strengthening ex. for knee should include major LL muscles e.g. **quad, hip abd & ext, hamstrings & gastrocnemius**.
- In addition to benefits for pain & function, aerobic ex. such as **walking** can assist in weight loss/prevention of weight gain & improving mood & anxiety.
- **Aquatic** ex may be beneficial for those who are overweight/obese or those with more severe disease.
- **Tai Chi** may be a useful ex option for some patients with LL OA.
- **Balance** ex should be included if assessment reveals balance impairment or if the patient has a history of falls.
- Increasing overall general **physical activity** levels during everyday life is important in addition to structured exercise.

Bennell, Dobson & Hinman 2014

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## Physical activities important in OA

- **Lower physical activity** level
- **Higher body weight**
- OA patients at higher risk of death compared with the general population
  - History of diabetes, cancer and walking disability are major risk factors
- Management should focus on effective treatment of **cardiovascular risk factors** and comorbidities, as well as on **increasing physical activity**

Nuesch 2011

## What types of exercise?

Neuromuscular ex in weight bearing vs Quadriceps strengthening in non-weight bearing

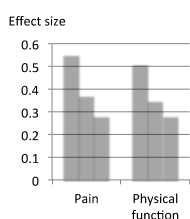
Modest improvement in pain with both programmes  
Not significantly different between the two

Post-hoc analysis

Subgroups	NMEx	Quad strength.
Varus thrust	Pain relief +	
Obese w. no varus thrust		Pain relief +
Non-obese w. no varus thrust	Pain relief +	Pain relief +

(Bennell 2014)

## Different modes of exercise therapy



Individual  
Class-based  
Home-based

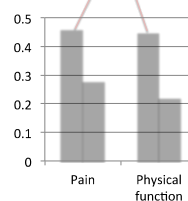
- Can be done in combination
- Outcomes better when **supervised by appropriate qualified HP**
- Cost-effective programs: **class-based + home-based**
- “minimalist” approach (recipe-based, general-purpose approach to ex prescription less likely to achieve meaningful benefit)

Bennell, Dobson & Hinman 2014

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## What exercise dosage should be prescribed?

12 directly supervised sessions show moderate mean effect size



12 or more supervised sessions  
less than 12 sessions

WHO guidelines:

- Moderate intensity **aerobic 150 min/week**
- Additional health benefits **300 min/week**
- Pain management if needed **medication 20 min** prior ex **ice packs x 15-20 min** after

Bennell, Dobson & Hinman 2014

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**Training parameters –the American Geriatric Society**

Ex#type#	intensity#	volume#	frequency#
<b>Flexibility:</b>			
Static stretching initially	Stretch to subjective sensation of resistance	1 stretch/muscle group; hold 5-15s	Once daily
Longer-term goal	Stretch to full range	3-5 stretches/muscle gp; Hold 20-30s	3-5/week
<b>Strengthening:</b>			
Isometric	Low-mod: 40-60% MVC	1-10 submax contractions/ muscle gp; hold 1-6s	Daily
Isotonic	Low: 40% 1RM Mod: 40-60% 1RM High: >60% 1RM	10-15 reps 8-10 reps 6-8 reps	2-3/week
<b>Endurance:#</b>			
Aerobic	Low-mod: 40-60%VO2max/ HRmax RPE: 12-14=60-65% VO2max	Accumulation of 20-30 min/day	2-5/week

(American Geriatric Society Panel on Ex and OA 2001)

Used with permission of the American Geriatrics Society Panel on Exercise and Osteoarthritis 2001. Exercise prescription for older adults with osteoarthritis pain: consensus practice recommendations. Journal of the American Geriatrics Society, Publisher John Wiley and Sons

### When to alter dosage intensity?

**Indicators:**

- Severe or intense pain during ex.
- Pain that does not subside to usual levels within a few hours after ex
- Increased night pain following ex
- Swelling or increased swelling in the hours following ex. ro the next morning
- Increased pain the following day

Bennell, Dobson & Hinman 2014

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### Why is exercise not being prescribed by clinicians for patients with OA?

- UK-based survey of 2000 PT:
  - PT remained **uncertain of the benefits of ex** for people with OA
- French study of both patient and practitioner:
  - GP **unsure about which ex were best**, including the type and dosage
- Clinician's overall knowledge of the benefits of ex for people fo OA, their own personal attitudes & beliefs can impact on ex prescription
  - SR - **29%** of GP believed that **rest** was optimum mgt approach & ex should not be used for certain patients with chronic knee pain (Cottrell et al 2010)
  - US study – Among people for whom ex was indicated, only **44%** were **prescribed individual or supervised ex** (Ganz et al 2006)
  - French study – **<15%** GP would **prescribe ex** for OAK as a first-line therapeutic approach.
- Some practitioners take a **"fatalist"** view, with a tendency toward trivialization, where OA in general and OAK specifically were perceived as a natural degradation of the body with age.

### Why don't patients adhere to ex recommendations?

- There's a **dose-response relationship** demonstrated between **adherence and exercise effects** in a large 18-month trial (n=439) (Ettinger et al 1997)
- Increasing adherence improved
  - Pain
  - Walking ability
  - Disability
- Beneficial effects of ex last only as long as the patient with OA continues to participate in ex (Bennell 2011)

Bennell, Dobson & Hinman 2014

### Why don't patients adhere to ex recommendations?

- **Attitudes and beliefs** of older people with OA about the **role of ex for managing their condition** are particularly important in influencing adherence
  - Uncertainty regarding: role of ex, around issues of ex purpose, safety and effectiveness in managing knee pain (Holden 2012)
  - Factors such as laziness, forgetfulness, boredom, and lack of enjoyment hindering

Bennell, Dobson & Hinman 2014

### How can patient adherence to ex be improved?

Identify barriers and facilitators:

The#individual#	Influencing#factors#
<ul style="list-style-type: none"> <li>• Personality</li> <li>• Self-image</li> <li>• Health attitude</li> <li>• Exercise attitude</li> <li>• Motivation by enjoyment</li> <li>• Motivation by results</li> <li>• Exercise history</li> <li>• Disease knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> <li>• Stiffness and fatigue</li> <li>• Type of exercise</li> <li>• Perceived benefits of ex</li> <li>• quality of sleep</li> <li>• Family support</li> <li>• PT's professional care</li> <li>• Physician's encouragement</li> <li>• Training partner (if needed)</li> <li>• Socioeconomic status</li> <li>• Personal hygiene</li> <li>• Weather conditions</li> <li>• Availability of ex classes</li> <li>• Transportation</li> </ul>

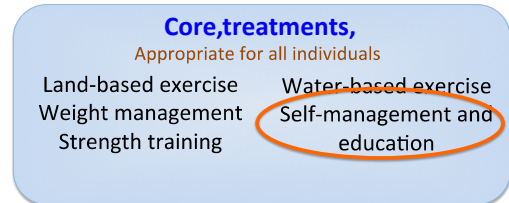
Bennell, Dobson & Hinman 2014

### How can patient adherence to ex be improved?

- **Individualising** ex recommendations to the **unique problems, clinical presentation, goals and preferences** are of utmost importance to ensure that the ex program meets the needs of the patient.
- Availability of appropriate ex **equipment and facilities** for promoting long term adherence
- Closely **monitor pain levels** in the early stages of starting a new ex program
- Education regarding the **role of ex** comes from medical practitioners and from health professionals prescribing ex.

Bennell, Dobson & Hinman 2014

### OA research Society International (OARSI guidelines) for non-surgical management of OAK



(McAlindon 2014)

Reprinted from Osteoarthritis and Cartilage, Vol 22, McAlindon TE, Bannuru RR, Sullivan NK et al, OARSI guideline for the non-surgical management of knee osteoarthritis, pages 363-388, copyright year 2018, with permission from Elsevier

### Question 4

How much do you know about self-management?

### Rationale for Self-management, OA research Society International guidelines for non-surgical management of OAK

(McAlindon 2014 Nelson 2014)

#### Self-mgt & education

- Types of ex.
  - not improving adherence
- SME:
  - ex adherence significant but conflicting result with clinical outcomes
  - important,
- Supervised ex/refreshersession/take-home-video improved ex. adherence & clinical outcomes

Jordan (Cochrane review) 2010

### What is self-management for arthritis?

- Objectives:
  - To empower a person to reduce their pain & improve physical and psychological functioning
- Components (Newman, Steed & Mulligan 2004)
  - **Arthritis Self-Management Programme for OA** (Lorig & Holman 2003)
    - Set specific & realistic actions,
    - Problem-solving skills
    - Pain coping strategies
    - Involving lay leaders as role model
  - Systematic review (Button et al 2015)
    - Training self-management skills
    - Information delivery
    - Goal setting

### Types of Self-management

- Education component
  - Knowledge of the conditions, goal setting, decision making, problems solving, self-monitoring
- Skill-building & behaviour-change interventions
  - Structured physical activity & weight-control programs
  - Dose-response effects
  - More effective when ≥12 supervised contact
  - Link people to community resources
- Supportive provider interactions
  - Motivational interviewing – a form of behavioural counselling about behaviour change
  - MI-consistent behaviour: asking permission before giving advice, praising small changes, emphasising control

(Brady 2012)

### Effectiveness of behavioural ex intervention

Group mediated cognitive behavioural ex 36 contact hrs across 9 months **vs** Traditional centre-based ex therapy 3x per week for 12 weeks

	Group (mediated, interven/ on,	Centre (based, exercise, therapy,
Physical activities at 12 mo (accelerometry)	83 min (sig.)	33 min
Mobility at 12 mo	Favourable results	

Group-mediated cognitive behavioural intervention designed to promote systematic development of **self-regulatory skills** & **facilitate motivation** to develop and implement behavioural skills to **maintain long-term independent ex & PA participation**.

(Focht 2014)

### Systematic literature review - Ex + SM in Chinese populations

- **8 databases** were searched up to February 2016, with no time limit
  - Cochrane Library, MEDLINE, CINAHL, Science Direct, EMBASE, PsylNFO, Pubmed Central and SportDiscus
- **Search words** included knee osteoarthritis, treatment or management, exercise, physical fitness, self-management
- 5 studies on **4 RCTs** were identified.
- Quality assessment by Cochrane Collaborations' tool for risk of bias.

### ESCAPE-knee pain (EX + SME – supervised by physio) (Hurley 2012)

	6(wk,	6(month,	30(month,
WOMAC-function mean	SD	NS	NS
Proportion improved ≥15% (MCD)	<0.001	p=0.018	p=0.019
Number needed to treat	3.7	7.3	6.7

Cognitive change amongst the participants:


- Their initial poor understanding and negative, fatalistic beliefs about the management and prognosis of this condition turned to **positive experiences**
- **greater knowledge** on their conditions and treatment options
- They had **less fear** of exercise and appreciated how exercise could **reduce symptoms**

### ESCAPE-knee pain programme - HK (10 sessions in 5 weeks, @75 minutes)

**Self (management, informa/ on,**

- Change cycle
- Joint pain
- Benefits of exercise
- Goal setting & action plan
- Pacing
- Healthy diet
- Ice & heat
- Anxiety, mood & joint pain
- Relaxation technique
- Drug management
- Managing flare-ups
- Long-term exercise

**Exercise, training,**



**Exercise progression up to individual capability**

### Therapist training – pre survey

Areas,	Ques/ ons,	Item, score,	Area, score,
1 Misconception	"Wear & tear" of jts worsen in long-term PA damage OA jt	1.6 3.2	2.4
2 Psychosocial	Depression Psychological functioning	3 3.8	3.4
3 Types of Ex	Mod pain not for physical ex Wt bearing ex not for OAK Strengthening ex – Quad & Hamstrings General PA important	3.6 3 4 2.8	3.35
4 Ex dosage	Withhold ex if knee pain increases Alter ex intensity if increased pain the next day Greater ex intensity for greater treatment effect	2.6 3 1.4	2.33
5 Self-Mgt	Treatment successful even if pain fluctuates To cope with stress promotes well being Goal setting + action plan engage patients	2.4 3.6 3.8	3.27
6 Ex adherence	Ex benefits last as long as ex continued Confidence in one's ability to ex more likely for long-term ex	2.8 3.6	3.2

### Key messages for OAK management

- **Obesity & muscle weakness** – modifiable risk factors for OAK
- **Fear avoidance** strongly related > activity limitation
- **Exercise and self-m** **Aerobic-strength-functional types varying doses** core treatment
- **Dose-response relations** for ex. training
- Effect of supervised exercise equivalent to NSAID
- **Behavioural** change for long-term ex. participation and maintainence
- **Integrated ex and self-management programme:** positive experience, greater knowledge in knee coping skills, less fear of ex, improved pain & function

## Appendix K2

### Training on Motivational Interviewing

#### Introduction on Motivational interviewing

#### Why MI

- People don't like being told what to do
- Correcting deficits not pleasant, or effective
- Difficult to insert change – conflict in conversation
- Hard problems respond better to a softer style

#### Why MI

- People don't like being told what to do
- Correcting deficits not pleasant, of effective
- Difficult to insert change – conflict in conversation
- Hard problems respond better to a softer style
- MI crosses boundaries
- People like to motivate themselves, with your support

#### MI today

People are generally better persuaded by the reasons which they have themselves discovered, than by those which have come into the mind of others.”

Blaise Pascal, *Pensées*, (1670)

#### What is MI?

- MI is a guiding style of verbal interaction with patients. (Percival 2017)
- It emerged in the 1980 within the setting of alcohol addiction treatment. (Rollnick S, Miller W)
- It was noted that encouraging patients to think and talk about their own reasons to change minimised their resistance and increased their motivation.

#### Ambivalence about change

Having both sides of argument  
normal and necessary step in the process of change

- To work with patient's ambivalence rather than viewing it as a problem
- To act as a guide:
  - Clarify their strengths
  - Listen to their concerns
  - Boost their confidence in their ability to change
  - Collaborate with them to plan for change



## The evidence base of MI

- >200 RCTs
- SR (2005): significant & clinical relevant effect in studies looked at.
  - Better than traditional advice-giving
- SR: modest advantage of MI over comparison intervention, including traditional advice-giving (Halloran et al 2014; Lundahl et al 2013)
  - Effective in **adherence**(to medical advice, like
    - **weight** management
    - reducing **sedentary** behaviours,
    - increasing levels of **physical activities** in chronic illness

## Have a trial!

- Work in pair: one speaker and one helper
- 3-minute conversation, then change over
- Speaker:
  - Something you want and need to change, have been thinking about changing but you haven't changed yet
  - "Something I feel ambivalent about is..."

## Have a trial!

3 minutes

### Helper:

Your task is to try as hard as you can to **convince** and **persuade** the Speaker to change

- Tell him why he has to change
- Tell him how he can change
- Emphasise how important it is to change
- persuade to change

If you encounter resistance, **repeat the above**

## Righting reflex

- Common in traditional advice-giving
- To identify someone's problem and immediately try to fix it, involving a directing style
- Try to convince, with rational reasons to change, providing all correct information
- Paradoxically, it often has the opposite effect:
  - When people are ambivalent about change, they often have heard the logical arguments in favour of change many times. Using righting reflex, they become **resistant and defensive**.

## Taste of MI

### Speaker:

- Same topic
- i.e. something you're ambivalent about, for change

### Listener:

- Listen carefully with the goal of understanding the dilemma
- Give no advice

## Taste of MI

### Listener:

3 minutes

- Ask these open questions and listen:
  - What make you want to change ?
  - If it is successful, what would you think you may do ?
  - If you use a scale of 10, how important is it to you to change ?
  - FU: why is it not zero ?
- Give a short summary/reflection of the speaker's motivations for change
- Then ask: "What do you think you may do ?" and just listen with interest

## Recognising change talk is the key

- The patient voices the **reasons for change**, such as when they talk about **how** and **why** they might change
- In the field of substance misuse, patients who use more change talk appear to have better outcomes with regards to their addiction.

## Ambivalence about change normal and necessary step in the process of change

"My knee hurts when I get up to walk."

"I want to walk for longer distance."

"It's the wear & tear when I get older."

"I need to make some change. I'm putting on weight."

"I need to sit down after doing things for a little while."

"I'm exhausted when I try to do some cleaning or cooking at home".

Sustain talk

Change talk

Your style makes a difference...

## Four key processes of MI

Planning ('How to change?')

Evoking ('Why change?')

Focussing ('What to change?')

Engaging ('Shall we work together?')

## Key communication skills

- Asking open questions
- Affirming
- Reflective listening
- Summarising
- Informing & advising

## Engaging

- A process of establishing a constructive working relationship with a patient
- Means **connecting** with the patient and ensuring that they **feel understood**.
- The process of engaging is effectively **continuous**
- Skills needed for engaging important **throughout** the whole consultation, & in any follow up consultations

## Case study focusing on engaging

- Woon Yee is a 65 year old woman who has come to see physiotherapist for her doctor's referral on **leg pain**. She has had leg pain on both of sides for 5-6 years. Now it goes up to her buttocks and low back. She also has pain on her shoulder and arms too. Because of the pain, she **seldom** does exercise. She has spent over \$10000 on private treatment. Her **BMI was 31**.
- She comes today for her first consultation. However she can't see any therapist even **waiting for an hour**. She is angry as all patients finish leaving her alone and it's near to lunch time.

## The consultation

- Woon Yee was **angry** when therapist Jerry approached her and told her that he was treating another difficult patient.
- It was initially **not quite tuned in** to bring up the idea of seeing her knee pain at this episode and give her exercise for managing her knee pain.
- By engaging, Jerry wanted to help her **feel(understood)** so that she could calm down, and Jerry hoped that then she might agree to speak about strengthening programme and her weight.

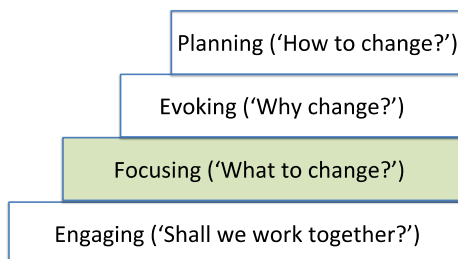
## Key communication skills in MI – Reflective listening

- Listening – a two-step process
  - **hearing** what a person is saying, then
  - conveying to them that you **understand** this
- Reflective listening
  - Giving a **summary** of what someone has told you in your own words in the form of a **statement** not a question
- Reflection
  - often given as short summaries, guess, or hypotheses
  - Allow to **capture(the essence)** of what the patient is saying, meaning or feeling
  - Allow patient to correct if you have wrongly understood
  - Particularly useful if a patient is upset or angry and should help them to **calm(down)and(feel(understood)**.

## Levels of reflections

- **Simple reflections**
  - Add little or nothing to what the person has said
  - Repeat or slight rephrase
- **Complex reflections**
  - Make a **guess** about meaning that has not been directly stated
  - **Paraphrase, metaphor**, reflection of **feeling, continuing** the paragraph, etc

## Four key processes of MI



## Focusing

- A process of establishing (**with the patient's agreement**) the direction for the conversation about change.
- Common mistake is to **jump too quickly** onto a change topic without establishing that the patient agrees.
- The aim is to involve the **patient** in **deciding a direction for change** that makes the most sense both to them and to you.
- To express your own view when describing **possible options for change**.

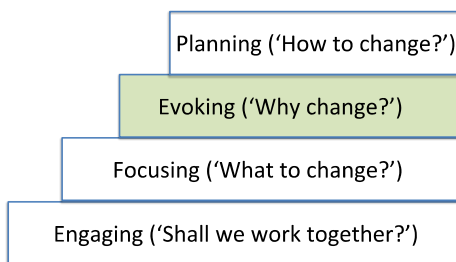
### Examples of focusing

- 治療師 • 同你檢查完，你想唔想知道我找到你嘅問題呀？ (ask permission before giving information and advice)
- 病人 • 想啊！
- 治療師 • 你的關節有點僵硬，肌肉比較軟弱，所以行路，或其他一些活動有困難。
- 病人 • 咁點算呀？ (when patient ask, give advice)
- 治療師 • 都有D方法嘅，你可以考慮，但係你唔一定要跟，都係你自己選擇嘅。有D運動，有病人做過之後，痛少啲，有力啲，行得起步啲，你可以考慮學做。聽咗咁多有什麼想法？ (Give choice)
- 病人 • 好呀，你教我做吧。

### Key communication skills in MI - open questions

- Open questions encourage people to reflect & elaborate.
- Open questions can be used to
  - build and strengthen a collaborative relationship
  - Find out more about the patient's perspective & ideas about change
  - Evoke the patient's own motivations for change

### Four key processes of MI



### Key communication skills in MI – informing and advising

- You can offer information and advice within MI where appropriate, e.g.
  - When the patient asks for it
  - More spontaneously when there is good engagement
- Ask permission before providing
- It is best to provide as much choice as possible and to emphasise the patient's autonomy. This freedom of choice minimises resistance and allows patients to come to their own conclusions about the relevance & importance of the information. It is often useful to make it clear that the patient is free to use or disregard any information you give.

### Elicit – Permission – Provide – Elicit

“對於處理\_\_\_\_\_，你已經知道咗什麼？(Elicit)

“你介唔介意如果我可以同你講下其他人係點樣改善\_\_\_\_\_？(Ask for permission)

“就算我同你講都好，你都一定知道什麼對你嚟講最有用。” (Emphasise autonomy)

Respectfully provide your information to the person

“我哋傾過嘅方法你點睇？” (Elicit) (Provide choices)

#### Role play

- Therapist thinks of an advice/information to give
- Tell Patient his/her role, i.e. the disease & problem
- Suppose the patient has spoken for some time and it is time to do the EPE at this junction

### MI process – evoking

- To elicit the patient's own motivation for a particular change
- Aims
  - encourage the patient talk about why(&how)they might change (change talk)
  - Strengthen personal motivation for & commitment to a specific goal.
  - Encourage patient to become an active participant in the change process
- Evoking is central to MI, the stage at which it becomes most obviously different from traditional advice-giving

## MI process evoking

- 1 Recognise, evoke and respond to change talk
- Work towards commitment
- Respond to sustain talk and discord

## Preparatory change talk

Desire 渴望 想、希望、喜歡  
 Ability 能力 能夠、有能力  
 Reason 理由 如果...就會  
 Need 需要 要、必須要、一定要

## Mobilising change talk

Commitment 承諾 會、將會、打算  
 Action 行動 準備、願意、考慮  
 Taking steps 採取 已經、試了  
 Steps 步驟

Listening to change talk

Applause

Praise

## Some ways to evoke change talk

- Asking evoking questions
  - (more guiding than no GvG)
- Using the importance ruler
  - Why is it not so important?
  - If it were, what do you think will happen?
- Looking back/looking forward
  - Who do people describe you as before you got this?
  - What about 5 years later?
- Exploring goals & values
  - What do you value most? (understand barriers, help to reframe)

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Practice

## Responding to change talk

- Elaborating**
  - Asking for elaboration, more detail, in what ways, an example, etc.
- Affirming**
  - Commenting positively on the person's statement
- Reflecting**
  - Simple, complex, rephrasing the paragraph, etc.
- Summarising**
  - Collecting quotes of change talk

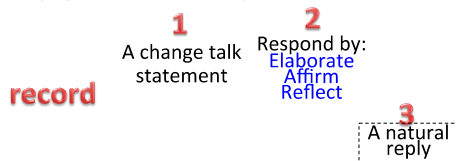
## Key communication skills in MI affirming

- Affirming involves recognizing & commenting on the patient's strengths and abilities, both in general and specifically in relation to the change they would like to make.
- MI relies on the patient's strengths and efforts in order to bring about change.
- An aim of affirming is to strengthen their confidence in their ability to do this.

## Key communication skills in MI summarising

- Summarising collects & reflects
- The summary should be used to highlight positive goals for change, to pull together change talk used by patients.
- To give summary towards the end of a consultation or segment of it
  - To clarify understanding
  - To allow patient to add anything that you've missed.
- Use the patient's own language and highlight positive things they've said about change when summarising.
- Summaries allow you to bring topic to a close, to take control and change direction.

## Easy go as 1-2-3 - practice



Responding to Change talk - Easy go 1-2-3

	1		2			3
	Change talk statement	Change talk (+/-)	elaborate	affirm	reflect	Change talk reply (+/-)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

## Key communication in MI – identify change talk

<p>"My knee hurts when I get up to walk."</p> <p>"It's the wear &amp; tear when I get older."</p> <p>"I need to sit down after doing things for a little while."</p>	<p>"I want to walk for longer distance."</p> <p>"I need to make some change. I'm putting on weight."</p> <p>"I'm exhausted when I try to do some cleaning or cooking at home".</p>
<b>Sustain talk</b>	<b>Change talk</b>

## Resistance toward change

### Sustain(talk(

about change

"My knee is painful. I don't want to walk."

"I have to take a seat in the middle of the mall."

"I have no time because I need to care for my husband who has illness."

"I can't control the amount I eat."

### Discoid((

about your relationship

- Observable behaviour
- Interpersonal
- Predictive of non-change

#### Signals

- Defending
- Arguing
- Challenging, discounting, hostility
- interrupting

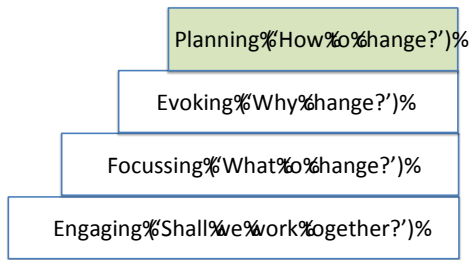
## Before responding to sustain talk

- Adjust our expectation:
  - Because it is normal part of ambivalence, don't expect an absence of sustain talk or be unnecessarily alarmed by it.
  - During the course of MI, change talk to sustain talk ratio may gradually increase from 1:1 to 2or3:1.
- Avoid fishing for it
  - The more people verbalize and explore sustain talk, the more they talk themselves out of changing.

## Sustain Talk

- Speech that favours the status quo
- Not ignore, but listen to, respect, often reflect, and include in the larger picture
- Change talk often comes intertwined with sustain talk
- Snatching change talk from the jaws of ambivalence

## Four key processes of MI



## Recognising readiness

- Increased talk
- Questions about change
- Resolve
- Envisioning
- Taking steps
- Diminished talk
- Decreased discussion about the problem

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## MI process of planning

- Encourage client to make decisions, but also to reinforce their motives for making them integral to the process of planning
- Shall we see together what we can try?
- The confidence scaling questions: How confident do you think you can go for your plan?

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Ethics approval from Clinical Research Ethics Committee



香港中文大學醫學院  
Faculty Of Medicine  
The Chinese University Of Hong Kong



醫院管理局  
新界東醫院聯網  
Hospital Authority  
New Territories East Cluster



Joint Chinese University of Hong Kong-New Territories East Cluster  
Clinical Research Ethics Committee

香港中文大學-新界東醫院聯網 臨床研究倫理 聯席委員會

8/F, Lui Che Woo Clinical Sciences Building, Prince of Wales Hospital, Shatin, HK  
Tel : (852) 2632 3935 / 2144 5926 Fax : (852) 2646 6653 Website : <http://www.crec.cuhk.edu.hk>

*The Joint CUHK-NTEC CREC is an independent committee established by CUHK/NTEC and authorized to perform ethics and scientific review and oversight of clinical studies within the jurisdiction of CUHK/NTEC in accordance with its standard operating procedure and the principles of the Declaration of Helsinki and ICH Good Clinical Practice.*

26 SEP '16

CREC Ref. No.: 2016.403

To: Ms. Jamie Sau Ying LAU  
Physiotherapy Department  
Prince of Wales Hospital

This notice is issued by the Joint CUHK-NTEC CREC with respect to the application/submission by you, being the principal investigator of the following study at your study site:

- **Study Protocol Title:** An integrated Programme of exercise, self-management and active coping strategies for patients with knee osteoarthritis – a Proof-of-Concept study for a Hong Kong Chinese speaking population.
- **Investigator(s):** Jamie Sau Ying LAU and Angelina Kit Chi YEUNG

In accordance with our standard operating procedure, we have duly performed ethics and scientific review of your application/submission as detailed below:

- **Nature of Your Application/Submission:**  Initial application  Amendments/changes  Others:  Renewal
- **Mode of Review:**  Full review  Expedited review
- **Date of Initial/Renewal Approval:** 15 September 2016
- **Document(s) Reviewed:** See Schedule 1
- **Reviewer(s) :** See Schedule 2

After due review by our reviewer(s), we hereby write to inform you of our decision on your application /submission as follows:

- **Decision:**  Application/Submission approved  Application/Submission approved with condition(s) (see condition(s) below)  Application/Submission approved with remark(s) (see remark(s) below)  Application/Submission approved with condition(s) and remark(s) (see condition(s) and remark(s) below)
- **Regular Progress Report(s) Required:** Every 12 months from the date of initial/renewal approval and during the period of the study if required





香港中文大學醫學院  
Faculty Of Medicine  
The Chinese University Of Hong Kong



醫院管理局  
新界東醫院聯網  
Hospital Authority  
New Territories East Cluster



**Joint Chinese University of Hong Kong-New Territories East Cluster  
Clinical Research Ethics Committee**

香港中文大學-新界東醫院聯網 臨床研究倫理 聯席委員會

8/F, Lui Che Woo Clinical Sciences Building, Prince of Wales Hospital, Shatin, HK  
Tel : (852) 2632 3935 / 2144 5926 Fax : (852) 2646 6653 Website : <http://www.crec.cuhk.edu.hk>

26 SEP '16

You, being the principal investigator of the study at your study site, are reminded to comply with our requirements and to maintain communication with us during the period of the study by undertaking the principal investigator's responsibilities including (but not limited to):

- if the study is an industry-sponsored clinical study, submitting to us a copy of the fully executed indemnity agreement satisfying the Hospital Authority's requirement prior to commencement of the study (if it has not been submitted yet);
- observing and complying with all applicable requirements under our standard operating procedure ("IRB/REC SOP"), the Declaration of Helsinki and the ICH GCP (if applicable);
- submitting regular progress report(s) at the required intervals (as specified above) in accordance with the requirements in the IRB/REC SOP;
- not implementing any amendment/change to any approved study document/material without our written approval, except where necessary to eliminate any immediate hazard to the subjects or if an amendment/change is only of an administrative or logistical nature;
- notifying us of any new information that may adversely affect the rights, safety or well-being of the subjects or the proper conduct of the study;
- reporting any deviation from the study protocol or compliance incident that has occurred during the study and may adversely affect the rights, safety or well-being of any subject in accordance with the requirements in the IRB/REC SOP;
- submitting safety reports on all SAEs observed at your study site or SUSARs reported from outside your study site in accordance with the requirements in the IRB/REC SOP; and
- submitting a final report in accordance with the requirements in the IRB/REC SOP upon completion or termination of the study at your study site.

In addition to the above, you are also reminded to observe and comply with other applicable regulatory and management requirements including (but not limited to):

- if required by Hong Kong laws or regulations, obtaining a certificate for clinical trial through the Hong Kong Department of Health and complying with the associated requirements;
- obtaining the necessary consent from the management of your institution/department in accordance with the requirements of your institution/department;
- if required by local laws or regulations at conducting site out of IRB/REC's jurisdiction, obtaining an approval and complying with associated requirements;
- not representing to any third party or in any way likely to mislead any third party forming the view that the approval from the IRB/REC has any extraterritorial effect; and
- with due diligence ensuring your teams, staff, agents or whosoever connected with you to comply with the preceding requirements.

Yours sincerely,

Envy Lee (Secretary)  
for and on behalf of  
The Joint CUHK-NTEC CREC

EL/Li

## Appendix L2

### Ethics approval from Faculty Research Ethics Committee



Faculty of Health & Applied  
Sciences  
Glenside Campus  
Blackberry Hill  
Stapleton  
Bristol BS16 1DD

Tel: 0117 328 1170

UWE REC REF No: HAS.16.10.031

25<sup>th</sup> October 2016

Sau-ying Jamie LAU

Flat 4B, 19 Fa Po Street

Village Gardens

Yau Yat Chuen

Kowloon Tong

Kowloon

Hong Kong SAR

Dear Sau-ying

**Application title: An integrated programme of exercise, self-management and active coping strategies for patients with knee osteoarthritis – a Proof-of-Concept study for a Hong Kong Chinese speaking population.**

Your ethics application was considered by the Faculty Research Ethics Committee and, based on the information provided, has been given ethical approval to proceed with the following conditions:

1. It is clear that this complex multi stage project has been clearly thought through in terms of ethics. In light of the information provided on the risk assessment about the potential for participants to become upset I would recommend that some support is added to the focus group information sheet. It could be any appropriate support service that could assist participants with any continued knee joint pain and managing conditions that include ongoing pain.
2. To consider adding a point to the patient consent form for the POC study that provides the information about treatment fees given in the information letter.
3. Please note (although not an ethical issue) that the university require that the UWE logo is included on all participant information sheets and consent forms.
4. You must not proceed with your research until you have responded to these conditions and have received full unconditional approval from the committee.

You must notify the committee in advance if you wish to make any significant amendments to the original application using the amendment form at <http://www1.uwe.ac.uk/research/researchethics/applyingforapproval.aspx>.

Please note that any information sheets and consent forms should have the UWE logo. Further guidance is available on the web:

<http://www1.uwe.ac.uk/aboutus/departmentsandservices/professionalservices/marketingandcommunications/resources.aspx>

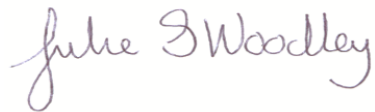
The following standard conditions also apply to all research given ethical approval by a UWE Research Ethics Committee:

1. You must notify the relevant UWE Research Ethics Committee in advance if you wish to make significant amendments to the original application: these include any changes to the study protocol which have an ethical dimension. Please note that any changes approved by an external research ethics committee must also be communicated to the relevant UWE committee.
2. You must notify the University Research Ethics Committee if you terminate your research before completion;
3. You must notify the University Research Ethics Committee if there are any serious events or developments in the research that have an ethical dimension.

Please note: The UREC is required to monitor and audit the ethical conduct of research involving human participants, data and tissue conducted by academic staff, students and researchers. Your project may be selected for audit from the research projects submitted to and approved by the UREC and its committees.

We wish you well with your research.

Yours sincerely



Dr Julie Woodley  
Chair  
Faculty Research Ethics Committee  
c.c. Prof Nicola Walsh

Submission for ethics approval - Integrated exercise & self-management programme for knee OA - proof-of-concept study for HK

Leigh Taylor <Leigh.Taylor@uwe.ac.uk> 代表 Research Ethics <researchethics@uwe.ac.uk>  
RE: 3/11/2016, 10:55

Dear Jamie

Many thanks for confirming this.

Kind regards

Leigh

Leigh Taylor (Mrs)  
Team Leader (Committee Services)  
Research Administration  
Research, Business & Innovation  
University of the West of England, Bristol

Leigh.Taylor@uwe.ac.uk  
Tel: 0117 328 1170

<http://fb.uwe.ac.uk/resadmin.asp>

Sau Lee  
RE: 3/11/2016, 9:14

Dear Mrs Taylor,

I'm very delighted to know about the news.

The website for the Community Rehabilitation Network is printed on a booklet which will be given to all patients participating in the project.

I shall add my supervisor's name and his phone number who is overseeing me doing the project at my workplace to the information sheet.

Best regards,  
Jamie



群 | 群聊 | 群设置 | 群成员 | ...

Leigh Taylor <Leigh.Taylor@uwe.ac.uk> 代表 Research Ethics <researchethics@uwe.ac.uk>  
RE: 4/11/2016, 21:02  
Sau Lee: Website link (draft) - 100% 9

群 | 群聊 | 群设置 | 群成员 | ...

Hi Jamie

Thank you for your email in response to your conditions. The Committee have given you full approval subject to the following conditions:

A website, email address, or other contact details are added for the Community Rehabilitation Network.

The supervisor contact details also be added to all the information sheets (under Who is organising and funding the research?) so that the participants know who is overseeing the project.

Kind regards

Leigh

Leigh Taylor (Mrs)  
Team Leader (Committee Services)  
Research Administration  
Research, Business & Innovation  
University of the West of England, Bristol

Leigh.Taylor@uwe.ac.uk  
Tel: 0117 328 1170

<http://fb.uwe.ac.uk/resadmin.asp>

## **Appendix M1**

### **Patient information sheet for POC study**

#### **1. Research topic**

##### ***Managing Knee Joint Pain***

#### **2. Invitation**

You are invited to take part in this study which forms part of a doctorate at the University of West of England, Bristol, United Kingdom. Before you agree, it is important that you understand why we are doing this research, and what it will involve. Take your time reading the following information carefully, and discuss it with others if you wish. Please contact us if there is anything that is unclear or if you would like more information. Please consider carefully whether or not you wish to take part. Thank you for taking the time to read this information.

#### **3. What is the purpose of this study?**

Joint pain is common, and can cause problems with day-to-day activities. The ways in which it is managed could be improved if we had a better understanding of the most effective forms of treatment. Our research will test a new programme developed in the UK, to see whether it is suitable for a Hong Kong Chinese speaking population.

#### **4. Why have I been chosen?**

You have been contacted, as you have been referred to the physiotherapy clinic for your knee pain. We are working closely with the clinic and hope to recruit 20 people over the next 3 months.

#### **5. Do I have to take part?**

No, it is up to you to decide whether or not to take part in the study. If you do decide to take part you will be asked to sign a consent form confirming that you are happy to be a part of the study. You are still free to see your doctor during this time and attend any other medical appointments that are arranged for you. You will also be able to continue taking any medications. Even if you decide to take part you can still change your mind at any time and withdraw from the study. Withdrawing or deciding not to take part will not affect the standard or type of care you receive now or in the future.

#### **6. What will happen to me if I take part?**

If you agree to take part in the study, you will then be offered a convenient appointment time to attend the physiotherapy department at Prince of Wales Hospital. Here you will be examined by a physiotherapist who will take a medical history and ask questions about your joint problems and any medication you take.

You will also be asked to complete several questionnaires regarding your pain, function and feelings about the condition. We will also assess your walking. The assessment will take approximately 1 hour.

You will then be offered an appointment to attend the exercise class.

### **7. *The exercise class:***

You will take part in ten exercise sessions over a five-week period which will be held in the physiotherapy clinic at Prince of Wales Hospital. Each session will be run by a physiotherapist, with 10 people (men and women) in a group, and will last for approximately 1¼ hours. During this time you will perform a series of exercises to improve your muscle strength and function, and will also receive information on setting goals, planning exercise, relaxation techniques and managing your pain. At the end of the five weeks, you will be encouraged to continue to exercise at home or at organised classes in your community.

As with all of your physiotherapy treatment, you have to pay for the exercise classes, HK\$100 for the first session and HK\$60 for the subsequent sessions.

After completing the exercise programme, you will be invited to attend another assessment session at the physiotherapy clinic in Prince of Wales Hospital (at no cost to you).

After the assessment, there will be a separate group discussion to explore what you experienced and how you felt in the exercise class. Another invitation for participation will be sent to you for joining this group discussion at the end of the class, but you do not have to take part in that.

### **8. *What are the possible benefits of taking part?***

The information we get from this study will help us to decide whether the new exercise classes are more effective in managing your knee pain than current techniques. The findings will hopefully contribute to improving the healthcare of patients with joint pain like you. We would anticipate that the findings of this study will be published in medical journals.

### **9. *What if something goes wrong?***

In the exercise classes you will be expected to work to a level that you will feel a little warm and possibly slightly breathless, but the exercises are not exhausting. You may also experience some muscle tiredness after the sessions. Exercises rarely have harmful side-effects, but undertaking any activity that is new to you can sometimes cause discomfort, which disappears within a couple of days. There is a small risk that exercise may make your pain worse, and in cases such as this, the physiotherapist will stop your exercises.

If you are dissatisfied with the assessment or treatment that you receive by any member of staff (doctor, nurse, physiotherapist etc), you have the same rights as any patient to voice and register your complaints through the hospital complaints procedure.

### **10. *Will information about me be kept confidential?***

All information that is collected about you during the course of the research will be kept strictly confidential. Your personal details will be kept in a secure location and

will only be accessed by the study investigators. Any information collected from you will only be used for the purpose of this study, and any published results will be strictly anonymous.

Under the laws of Hong Kong [in particular the Personal data (privacy) Ordinance, Cap 486], you have rights for the protection of the confidentiality of your personal data. For any query, you should consult the Privacy Commissioner for Privacy Data or his office (tel no. 28272827). By consenting to take part in this study, you authorize:

- 1) the principal investigator and her research team and the ethics committee responsible for overseeing the study to access, use, and retain your personal data for the purposes described in this informing process;
- 2) the relevant government agencies (e.g. the Hong Kong Department of Health) to access to your personal data for the purposes of checking and verifying the integrity of study data and assessing compliance with the study requirements.

### ***11. What will happen to the results of the research study?***

We hope that the results of this study will be published in a healthcare journal and at conferences. Although we will say where the information was collected, there will be no mention by name of the participants, so you will remain entirely anonymous. We will also send you a summary of the results at the end of the study.

### ***12. Who is organising and funding the research?***

Ms Jamie Sau-ying LAU, the senior physiotherapist of Prince of Wales Hospital is the Principal Investigator of this study. No grant or extra funding has been received for this study.

### ***13. Who has reviewed the study?***

This study has been reviewed by the Joint Chinese University of Hong Kong-New Territories East Cluster Research Ethics Committee and the Faculty Research Ethics Committee of University of the West of England.

### ***14. Contact for further information***

If you require any further information regarding this study, please contact, during office hour: **Jamie Lau on 2632 3154**

If you wish to participate in this study, you will be asked to sign a consent form and given a copy of this information sheet and a signed copy of the consent form to keep. If you decide that you do not want to take part in the study, it will have no effect on any treatment which you will receive.

*Thank you for your time and consideration*

## Appendix M2

### Patient consent form for POC study

Title: Managing Knee Joint Pain

Principal Investigator: Jamie Sau-ying LAU

	<b>Please read this information carefully</b>	<b>Please initial in box</b>
<b>1</b>	I confirm that I have read and understand the information sheet (dated 31 October, 2016, version 5) for the above study and have had the opportunity to ask questions.	
<b>2</b>	I understand that there will be no payment to me for participating in this research study.	
<b>3</b>	I understand and agree to pay for my treatment as stated in the information sheet.	
<b>4</b>	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and without my medical care or legal rights being affected.	
<b>5</b>	I understand that sections of my medical notes may be looked at by responsible individuals from the Physiotherapy Department of Prince of Wales Hospital where it is relevant to my taking part in research. I give permission for these individuals to have access to my records.	
<b>6</b>	I understand and give permission to NTEC-CUHK Cluster REC/IRB (telephone: 2632 3935) as one of the authorized parties to access my records related to the study for ethics review purpose.	
<b>7</b>	I agree to take part in the above study.	
<b>8</b>	I agree that the findings from this study will be used for publication purposes but will be anonymised and not attributable to me.	

.....  
**Name of Participant**                      **Date**                      **Signature**

.....  
**Name of researcher taking**              **Date**                      **Signature**  
**consent**

**Copies to:**

Patient, Researcher's file, Hospital record



## Hip exercise



Open upper knee in side-lying



Pull elastic band sideways backward



Hip stretch

## Knee exercise



Stretch elastic band



Kick sand bag



Kick sand bag



Write alphabet



Bend & stretch knee



Stand on toes  
Double → single

## ESCAPE-knee Pain Programme

Reprinted from Best Practice & Research Clinical Rheumatology, Vol 28, Bennell KL, Dobson F & Hinman RS, Exercise in osteoarthritis: moving from prescription to adherence, pages 93-117, copyright year 2018, with permission from Elsevier

## General exercise

Image redacted for copyright reasons



Bouncer

Cycling



Step up & down



Wall squat



Stand-up



Press-up on wall



Hamstrings stretch

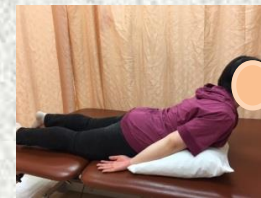
## Back exercise



Camel hump



Pelvic rotation



Head & chest up



Half or full leg up



Knees to chest

## ESCAPE-knee Pain Programme

Appendix N2 Knee exercise sheet!

Date										
Exercise session	1	2	3	4	5	6	7	8	9	10
<b>General exercises</b>										
Shuttle walking (min)										
Static bicycle (min)										
Bouncer (min)										
Step-ups (height, steps no. up & down)										
Sit to stand (seat height)										
Wall slides (back against wall)										
Wall press-ups (no. of times)										
Hamstrings stretch (no. of times)										
<b>Back exercises</b>										
Knee rolling (no. of times)										
Cat and Camel (no. of times)										
Back extensions (no. of times)										
Knee hug (no. of times)										
<b>Hip exercises</b>										
Clam (no. of times)										
Theraband hip out (no. of times)										
Theraband hip back (no. of times)										
Hip stretches (no. of times)										
<b>Knee exercises</b>										
Theraband knee straight (no. of times)										
Knee wedge & weight (lbs, no. of times)										
Leg alphabet in air (no. of times)										
Knee slides (no. of times)										



**Appendix N3 A patient exercise sheet in the ESCAPE-knee pain class**

Patient name: Yana

**Knee exercise sheet!**

Date										
Exercise session	1	2	3	4	5	6	7	8	9	10
<b>General exercises</b>										
Shuttle walking (min)		1	1	1	1	1	1	1	1	1
Static bicycle (min)	1	5	5	6	5	6	7	7	7	7
Bouncer (min)	1	3	3	6	6	6	6	6	7	7
Step-ups (height, steps no. up & down)	4"x10	4"x10	4"x10	6"x10	6"x10	6"x10	6"x10	6"x10	6"x10	8"x10
Sit to stand (seat height)(1 min)	18"x8	18"x21	18"x24	18"x30	16.5"x25	15"x26	15"x26	15"x26	14"x29	14"x29
Wall slides (back against wall) (knee flexion)	30°x5	50°x5	50°x5	45°x5	50°x15	50°x16	46°x16	50°x16	50°x18	70°x16
Wall press-ups (no. of times)	10	15	18	20	20	25	30	30	30	30
Hamstrings stretch (no. of times, holdx15sec)	1	1	1	1	1	1	1	1	1	1
<b>Back exercises</b>										
Knee rolling (no. of times)	5	10	10	15	15	10	15	15	10	15
Cat and Camel (no. of times)	5	10	10	15	15	15	17	17	18	20
Back extensions (no. of times)	5	10	10	15	15	15	17	17	18	20
Knee hug (no. of times, holdx15sec)	1	1	1	1	1	1	1	1	1	1
<b>Hip exercises</b>										
Clam (no. of times)	5	10	10	10	15	15	20	20	20	20
Theraband hip out (no. of times)(L,M,H resistance)	10 L	10 L	10 L	15 L	15 M	15 M	15 H	15 L	15 H	20 H
Theraband hip back(no. of times)(L,M,H)	10 L	10 L	10 L	15 L	15 M	15 M	15 H	15 L	15 H	15 H
Hip stretches (no. of times, holdx15sec)	1	1	1	1	1	1	1	1	1	1
<b>Knee exercises</b>										
Theraband knee straight (no. of times)(L,M,H)	10 L	10 L	15 L	15 M	15 M	15 M	15 M	15 M	15 M	15 M
Knee wedge & weight (lbs, no. of times)	3x5	3x10	3x10	4x10	3x10	5x12	5x16	5x16	5x16	5x20
Leg alphabet in air (write up 10 no.)	5	10	10	10	20	20	15	15	20	20
Knee slides (no. of times)	5	10	10	15	20	20	20	20	20	20

## Appendix O

### Patient satisfaction survey

Thank you for attending the ESCAPE-pain programme.

We would be very grateful if you could provide some feedback on the programme for us by answering the questions below and providing any comments you feel appropriate.

Question	Yes	No
Was the physiotherapist : 1. approachable  2. enthusiastic  3. knowledgeable  Comments:		
Did you receive enough information about the class prior to it starting?  If 'No' what info would you have liked to receive:		
Do you feel you benefited from the OA knee class?  Please comment on how you benefited or did not benefit		
Was the class appropriate for your level of fitness?  If 'No' please comment		
Did you find attending the ESCAPE programme twice a week difficult?  If 'YES' how often would you have liked to attend and for how many sessions?	Yes	No

<p>Did you find the information booklet useful?</p> <p>If yes: which part was the most beneficial?</p> <p>If no, what do you think could be improved?</p>		
<p>Were the exercises easy to follow?</p>		
<p>Is there anything different you would have liked to do in the class?</p> <p>Comments</p>		
<p>Will you be continuing your OA knee exercises in your own time?</p> <p>If 'YES' where? e.g. independently, group, gym</p>		
<p>Any other comments:</p>		

Thank you for your time!

## Appendix P

### Invitation card to potential participants for focus group

# An invitation to share your experience in the knee class



Image  
redacted for  
copyright  
reasons

Image  
redacted for  
copyright  
reasons

Any difficulty when you start to exercise?  
Any change in your body after finishing the class?  
How the discussion in class helped you to manage your joint  
pain?

We need your help to let us know what you think and feel.

If you can help, the information sheet has more details,  
or call Jamie Lau on 26323154

Date : 4 January , 2017 ( Wednesday )

Time : 3:30 to 5pm

Place : Room 11, physiotherapy clinic,  
Prince of Wales Hospital

Remark: This discussion group is one of the items in the  
research“Manage your knee pain”  
Once only and free of charge

## **Appendix Q1**

### **Full version of topic guide for focus group**

#### **Introduction and information about the study**

Good morning/afternoon. My name is Jamie Lau and this is my colleague Y, who will be taking notes during the session. I'm the researcher working on the project which is looking at pain management in patients with chronic knee pain. Firstly, I would like to thank you all very much for coming today and taking part in this research. The aim of today's session is to understand your thoughts on using exercise and self-management to manage your pain and how you found taking part in the exercise programme.

#### **Consent information**

A little bit about group discussion for those who may not know. This is going to be a relaxed discussion where people share their own views and experiences, but also hear from other people. You have all consented to the discussion being recorded but be assured that what you say will be kept confidential and anonymous and the tape will be destroyed at the end of this research. Your name will be replaced with an ID number so nobody will be able to identify you from what you have said today. I also ask you all to respect each other's views even if you don't agree with them and please do not discuss what you hear within the group to others outside the group.

Please feel free to join in the discussion at any time, the more you all have to say the better! Although I would appreciate it if only one person talks at a time. There are no right or wrong answers so please feel free to talk as honestly and openly as possible.

The discussion will last approximately up to 90 minutes. There is a lot I want to discuss, so at times I may move us along a bit.

Does that sound okay? Any questions before we start?

#### **Personal introductions**

Can you tell me a little bit about yourself?

#### **OA knee pain**



- Can you tell me a little bit about your knee pain?
- **Before the exercise class,**  
**What do you think was the cause for your knee pain?**

### **Perceptions of physiotherapy and the ESCAPE-pain programme**

- Have you had physiotherapy before for OA knee?
- What did you think about the ESCAPE-pain programme before you went?

### **ESCAPE-pain programme**

You have been on the rehabilitation programme. I'm interested in hearing about your experiences of attending the 5 week classes.

- **Did you attend all the sessions?**
  - **No:** why not?
  - **Yes:** what made you want to keep going?

Each session was divided into 2 parts. In the first part, the physiotherapist provided you with information on how to manage your joint pain.

- **What did you think of the first part of these sessions?** *How helpful/useful did you find the information that you were given?*
  - pacing activities
  - healthy diet
  - ice and heat
  - anxiety, mood and pain
  - relaxation technique
  - managing flare ups

*Improved understanding of your condition? Did/Has it changed your attitudes on joint pain and managing it?*

You were all given a booklet [show booklet].

- **Does everyone still have this?**
- **What did you think of the booklet?** *Helpful? Useful? Do you still use it, refer to it?*
- **Did anyone fill in the booklet?** *i.e. action plan pages – willing to share their goals? Were they achieved? How did it feel? Useful task? Are you still using action*

*plans to set goals or other aspects of the booklet?*

The second half of the sessions including exercising.

- **How active were you before the classes?** What difficulties did you use to have?
- **What did you think about the exercise part of the sessions?**
  - *How did you find the exercises? Have you noticed a change in your condition? Did you feel confident in doing the exercises?*
  - *Did you do any exercise in between sessions?*
    - *Yes: what type? Where? How did you find this?*
    - *No: why not?*
  - *Has it changed your attitude towards exercise?*

**If class not found to be beneficial: why not?** *Has your pain been changed because of the class? Was there something about the class that could have been done differently that would have helped?*

These type of exercise classes are designed for improving your physique and helping you build some knowledge and skills to manage your knee pain. It would be nice of you to think of it again.

- **Do you think the classes were well organized?** *What did you think of the physiotherapist who ran the sessions? What worked well? What could have been improved?*
- **Was the time frame adequate?** *Were 2 sessions a week for 5 weeks enough? Too long/short? Location?*
- **What did you think of the size of the class?** *Did you enjoy working in a group setting?*
- **Overall, what did you think of the classes?** *Were there any aspects of the class that you found most helpful/useful? Is there anything you would've wanted/like to have known more about? Were there any aspects of the class that you didn't enjoy?*

## Post ESCAPE-pain programme

- **Since attending the class, have you continued the exercise regime?** *In group settings or individually? Where? Has it helped you manage your joint pain better? Yes: in what way? No : Why not? How easy or difficult do you think it will be to continue? What might prevent you? What will help? Does anyone keep in touch with anyone from their exercise group?*
- **Other than exercise, are you using any other strategies to help manage your pain?** *Where did you learn of these strategies? i.e. from class?*
- **Do you think you will keep doing the things suggested?** *i.e. regular physical activity, weight control?*
- **How important do you think a programme like this is for patients with joint pain?** *Reasons? Would you recommend this to other patients with chronic knee pain?*

Is there anything else you would like to add? Is everybody happy with what's been discussed?

Would you be interested in receiving a summary of the findings from this research?

Thank you for your time and contributions to the group discussion. It is very much appreciated.

## Appendix Q2

### Short one-page topic guide for focus group

#### Objectives

- To investigate pain management for chronic KOA patients. This includes:
  - To understand your thoughts on using exercise & self-management to manage your pain;
  - To explore how you found taking part in the exercise programme

#### Informal introductions, drinks, facilities, consent, timer

#### Introduction to the session:

- Group discussion:
  - We are going to share our views and experiences, but also hear from other people
  - Your comment will be very valuable
- Confirm confidentiality
  - You've all consented that the discussion will be recorded. Please be assured that what you say will be kept confidential and anonymous. The tape will be destroyed at the end of this research.
  - You've already put a pseudonym in front of you so nobody will be able to identify you from what you have said today. Please say as much as you'd like but only one person talks at a time.
  - I also ask you all to respect each other's views even if you don't agree with them and please do not discuss what you hear within the group to others outside the group.
- Any questions before we start? It will last 1.5 hour. I may push a little bit as we have a lot to discuss.

#### Turn on recorder

#### Introductions [5 mins]

- Can you tell me a little bit about yourself? Please tell us a little bit about your knee pain.  
**Before the exercise class, what do you think was the cause for your knee pain?**

#### Knee class [3 mins] – attendance: **No:** why not? **Yes:** what made you keep going?

#### First half: information & discussion [15 mins]

- **What did you think of the first part of these sessions?** *How helpful/useful did you find the information that you were given? Improved understanding of your condition? Did/Has it changed your attitudes on joint pain and managing it?*
- **Booklet: Does everyone still have this? What did you think of the booklet?**
- **Did anyone fill in the booklet?** *i.e. action plan pages – willing to share their goals? Were they achieved? How did it feel? Useful task? Are you still using action plans to set goals or other aspects of the booklet?*

#### Second half: Exercising ? [15 mins]

- **How active were you before the classes?**
- **What did you think about the exercise part of the sessions?** Which exercise did you do more? Any progress? Any change in your condition? Did you feel confident in doing the exercises? Did you do any exercise in between sessions?
- **Do you think there is any factors to enhance this exercise class?**

---

### **Class organisation [5 mins]**

- Therapists, time frame (2x/week x 5wks): *frequency, class size, group setting*
- **Overall, what did you think of the classes?** *Were there any aspects of the class that you found most helpful/useful? Is there anything you would've wanted/like to have known more about?*

### **Post ESCAPE-pain programme [20 mins]** *What did you think that cause your knee pain? Can anything help?*

- **Since attending the class, have you continued the exercise regime?** *Where? Has it helped you manage your joint pain better? How easy or difficult do you think it will be to continue? What might prevent you? Does anyone keep in touch with anyone from their exercise group?*
- **Other than exercise, are you using any other strategies to help manage your pain?**
- **Do you think you will keep doing the things suggested?** *i.e. regular physical activity, weight control, pacing, relaxation?*
- **How important do you think a programme like this is for patients with joint pain?** *Reasons? Would you recommend this to other patients with chronic knee pain?*

### **Closing:**

Summary of what was said; anything missed/other comments? Thank for taking part.

## **Appendix R1**

### **Patient information sheet for focus group**

#### **1. Research topic**

##### ***Managing Knee Joint Pain***

#### **2. Invitation**

You are invited to take part in this study which forms part of a doctorate at the University of West of England, Bristol, United Kingdom. Before you agree, it is important that you understand why we are doing this research, and what it will involve. Take your time reading the following information carefully, and discuss it with others if you wish. Please contact us if there is anything that is unclear or if you would like more information. Please consider carefully whether or not you wish to take part. Thank you for taking the time to read this information.

#### **3. What is the purpose of this study?**

We are asking for your opinions on the content, delivery and impact of the exercise classes you attended. We hope this will help us plan and improve the quality of care people with joint pain receive in the future.

#### **4. Why have I been chosen?**

You have been contacted, as you attended the exercise and self-management classes for your knee pain in the clinic. We would like to see what you thought about those classes and whether they had any impact on your condition.

#### **5. Do I have to take part?**

No, it is up to you to decide whether or not to take part in the study. Even if you decide to take part you can still change your mind at any time and withdraw from the study without affecting the care you receive now or in the future.

#### **6. What will happen to me if I take part?**

If you agree to take part in the study, you will be offered an appointment to attend a group discussion of about 4-6 people at the clinic in Prince of Wales Hospital, once only, for up to 90 minutes. There will be no charge for this attendance.

You will be encouraged to share the experiences of care and your views of the exercise classes. You will also be asked your opinion of the practicalities of the classes and any impact on your pain, function and quality of life. Any comments you have about the exercise group will remain entirely anonymous.

#### **7. What are the possible benefits of taking part?**

The information we collect from this study will help us to decide whether the content and format of the exercise programme could be made any better. We hope that the findings will contribute to improving the healthcare of patients with joint pain in the future. We would anticipate that the findings of this study will be

published in medical journals.

### **8. What if something goes wrong?**

We are simply asking you questions about participating in the exercise classes. You can contribute as little or as much as you want to the group discussion, or choose not to answer some questions if you prefer. We do not anticipate any problems associated with taking part in this study. There are some community support services like Community Rehabilitation Network that offer some self-help groups for joint pain and weight management class if you need any assistance for your ongoing knee joint pain.

### **9. Will information about me be kept confidential?**

With your permission we will record the group discussion and type it up. We will not use any information that identifies you or other members of the group in the typed up version.

All information you share will be kept strictly confidential but will be looked at by other members of the research team. Any personal information you provide (e.g. name, contact details) will be kept separately from the group discussion information in a secure location and will only be accessed by the study investigators.

Any information collected from you will only be used for the purpose of this study. We will include information gained at this group discussion in a final study report and for publication in academic journals. We may use direct quotes from the group discussion; these will be anonymised and will not be able to be traced back to any individual person.

Under the laws of Hong Kong [in particular the Personal data (privacy) Ordinance, Cap 486], you have rights for the protection of the confidentiality of your personal data. For any query, you should consult the Privacy Commissioner for Privacy Data or his office (tel no. 28272827). By consenting to take part in this study, you authorize:

- 1) the principal investigator and her research team and the ethics committee responsible for overseeing the study to access, use, and retain your personal data for the purposes described in this informing process;
- 2) the relevant government agencies (e.g. the Hong Kong Department of Health) to access to your personal data for the purposes of checking and verifying the integrity of study data and assessing compliance with the study requirements.

### **10. What will happen to the results of the research study?**

We hope that the results of this study will be published in a healthcare journal and at conferences. We will also send you a summary of the results at the end of the study, if you so wish.

### **11. Who is organising and funding the research?**

Ms Jamie Sau-ying LAU, the senior physiotherapist of Prince of Wales Hospital is the Principal Investigator of this study. No grant or extra funding has been received for this study.

**12. Who has reviewed the study?**

This study has been reviewed by the Joint Chinese University of Hong Kong-New Territories East Cluster Research Ethics Committee and the Faculty Research Ethics Committee of University of the West of England.

**13. Contact for further information**

If you require any further information regarding this study, please contact, during office hour:

**Jamie Lau on 2632 3154**

If you wish to participate in this study, you will be asked to sign a consent form and given a copy of this information sheet and a signed copy of the consent form to keep. If you decide that you do not want to take part in the study, it will have no effect on any treatment which you will receive.

*Thank you for your time and consideration!*



## Appendix R2

### Consent form for focus group

Title: Managing Knee Joint Pain

Principal Investigator: Jamie Sau-ying LAU

	<b>Please read this information carefully</b>	<b>Please initial in box</b>
<b>1</b>	I confirm that I have read and understand the information sheet (dated 31 October, 2016, version5) for the above study and have had the opportunity to ask questions.	
<b>2</b>	I understand that there will be no payment to me for participating in this research study.	
<b>3</b>	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and without my medical care or legal rights being affected.	
<b>4</b>	I agree that the group discussion can be audio-taped.	
<b>5</b>	I give permission for the use of direct quotes in research papers, but understand they will be anonymized.	
<b>6</b>	I understand and give permission to NTEC-CUHK Cluster REC/IRB (telephone: 2632 3935) as one of the authorized parties to access my information related to the study for ethics review purpose.	
<b>7</b>	I agree to take part in the above study.	

.....  
**Name of Participant**                      **Date**                      **Signature**

.....  
**Name of researcher taking**              **Date**                      **Signature**  
**consent**

#### Copies to:

Patient, Researcher's file, Hospital record

## Appendix S1

### Independent coding of focus group data – JL (doctoral candidate)

#### Code summary (all names were pseudonyms)

##### Received passive treatment before but got worse

- 4 Received treatment (e.g. TCM) before, got worse this year (Jessy)
- 6 Medical treatment not helpful (May)
- 7 Received acupuncture & Chinese medicine but no improvement (Yana)
- 8 Received manipulation from a Chinese medicine bone-setter with no improvement (Phillip)
- 378 Not knowing what correct movement in the past (Lincoln)

##### Beliefs for knee pain

- 8 Knee pain got worse (Kassy)
- 10 Knee pain related to prolong standing and it got worse (Phoebe)
- 17 Body weight (Kassy)
- 18 Work related (Phoebe)
- 19 Body weight (Phillip)
- 21 Affected by work (May)
- 23 Prolong standing (May)
- 25 Lifting heavy loads, up and down stairs (May)
- 27 Gel in the joint being worn out (Jessy)
- 33 Body weight (CC)
- 35 Overloading the joint by hiking (Lincoln)

##### Impact of knee pain

- 14 Decreased function e.g. walking (Lincoln)
- 27 Walking got worse (Jessy)
- 219 Problem at the leg put her to quit the job (Phoebe)
- 271 Walked for a while, then had to sit down (Jessy)
- 272 Lean onto something if no seat available (Phoebe)
- 374 Didn't want to walk before due to soreness (Lincoln)

##### Inattendance

- 57 Absent for joining a tour (Kassy)

##### Reasons of attendance

- 53 Curious to learn more management and method (Lincoln)
- 54 Same (Phoebe)
- 55 Attended in order to learn (Lincoln)
- 56 Time is available (Phillip)
- 57 Learned a lot (Lincoln)
- 58 Presentation & discussion attractive (CC)
- 65 Some of the class content effective (Kassy)
- 66 Exercise useful (Phoebe)
- 67 Functional tolerance improved (stand & walk) (Kassy)

##### Discussion on self-management

- 71 Knew about oneself and learned about what could help (May)

- 73 Learned from vicious experience (CC)
- 75 Learned new knowledge e.g. food pyramid (Jessy)
- 77 Learned about mood, medication, pain management (ice), weight control (Jessy)
- 80 Learned more (Phillip)
- 87 The content relevant (CC)

*Supplement*

- 89 Guidance to clarify inappropriate concepts e.g. use of glucosamine (CC)
- 93 Not a must for taking glucosamine (CC)
- 110 Took supplement for preventive measure (Lincoln)
- 114 Placebo effect (May)
- 117 Need to take anyway if anything would happened (Lincoln)
- 120 Not effective (Kassy)
- 121 Effect not particular in prolong period (Lincoln)

*Medication*

- 126 Took analgesics at the beginning (Lincoln)
- 131 Stopped taking analgesics because not helpful (Phillip)
- 138 Applied ointment (Yana)
- 139 Most important to take pain killer (Kassy)
- 142 Ointment not effective (Kassy)

*Diet and exercise*

- 144 Recorded food intake & exercise amount (CC)
- 148 Recorded food intake & exercise amount (Phillip)
- 150 Recorded food intake & exercise amount (May)
- 152 Compared & paid more attention to achieve balance (CC)

*Diet control & exercise amount*

- 154 Exercise more but difficult to control diet (May)
- 443 Fond of eating (Jessy)
- 444 Better mood led to increased weight (May)
- 446 Less pain and better mood (Yana)
- 447 Festive holidays (May)
- 448 Ate more, dim sum tea (Yana)
- 449 Got fat easily in winter (Kassy)
- 450 Easy to get fat in holidays (Phoebe)
- 451 More foods in holidays (Yana)
- 453 Gathering with friends (Yana)
- 456 Happy (Yana)

*Action plan*

- 171 Achievable target & direction, action plan of squatting down (CC)
- 177 Action plan of squatting down, keep on exercising

*Reduce pain*

- 433 Not to overload, or forced to walk, take rest in between (Kssy)
- 435 Not to lose temper (Phoebe)
- 436 Use heat and ice pack (May)

*Level of being active before the class*

- 185 Active (Kassy)
- 189 Shopping, meeting friends (Kassy)
- 196 Doing exercise in playground, light activities (Kassy)

- 202 Daily light morning exercise in the park (Jessy)
- 206 Not active (Phillip)
- 212 Active in doing exercise (Yana)
- 214 Engaged in voluntary work (Yana)
- 218 Engaged at work fully, tired with no mood to do exercise, light exercise in weekends (Lincoln)
- 219 Worked everyday with a lot of standing & walking. Did exercise in weekends (Phoebe)
- 225 Exercise in fitness centre (CC)
- 254 The gentle exercise did before not accurate (Jessy)

### **Exercise section**

- 171 Learned exercise that helped knee pain, increase the level of difficulty each time she exercised (CC)
- 227 Felt not stressed, relaxing, proper training of exercise in class (May)

#### *Back pain & exercise*

- 231 You push yourself to move in exercise. Felt exercise to be good (Phoebe)
- 237 Back exercises strengthen the back to wean off corset (Phoebe)
- 239 Dependent on corset for support (Phoebe)
- 245 Confidence increased to remove corset (Phoebe)
- 247 Prolong standing at work caused back problem (Phoebe)
- 249 Back exercise started gradually (Phoebe)
- 252 Knee pain started to hurt in standing. Corset removed after doing exercise (Phoebe)

#### *Exercise practice after learning*

- 254 Followed the exercise learnt in class & practised back home daily, turned to be a goal (Jessy)
- 258 Did exercise at home (Yana)
- 259 Did exercise at park (Phillip)
- 264 Bouncer is good (Lincoln)
- 266 Did exercise at home, not daily (Lincoln)
- 269 Practised exercise at home (Jessy)
- 271 Performed stepping exercise park; Did as much as she could remember (Jessy)
- 483 Exercise sheet helped her to follow the exercise at home (Phoebe)
- 485 Guidance is important or someone to learn the exercise (CC)

#### *Useful*

- 362 Cycling exercise useful in mobilising knee (Yana)
- 363 Bouncer nice (Phillip)
- 364 Bouncer difficult (Yana)
- 365 Bouncer difficult & demanding (Phillip)

### **Effect after attending class – outcome**

- 67 Functional tolerance improvement (Standing & walking) (Kassy)
- 82 Walked for longer distance, stood for longer period, felt better (Kassy)
- 156 More painful if not moving the joint (May)
- 179 Managed squatting down to lower level; leg became stronger (May)
- 223 Leg problem improved after exercise; got a new part-time job (Phoebe)
- 225 Did more types of exercise learned in class, like stretching and cycling (CC)
- 254 Able to squat down & arise (Jessy)

- 261 Legs gotten stronger (Phillip)
- 271 Found it helpful, walked for longer distance
- 273 Motivated to do exercise at home & in the park; walked a lot more now (Jessy)
- 275 Performed stepping exercise in a park (Jessy)
- 277 Did cycling, swinging, kicking exercise in sports ground (Kassy)
- 278 Did cycling movement at home (May)
- 374 Now, I can walk for more than an hour (Lincoln)

### **Confidence in doing exercise**

- 283 Doing exercise since young (Yana)
- 286 Paid effort in doing exercise (Yana)
- 292 Eager to do exercise, but in time shortage; organised her work and managed to do more exercise that she had learnt (Jessy)
- 296 Want to help herself (Jessy)
- 318 As she did more, no steps were required...she set her own plan & sequence (Jessy)
- 367 Built up confidence again (Lincoln)
- 370 Leg became stronger yet important to adhere to exercise (Lincoln)
- 375 Perseverance and confidence is up to a person (May)
- 378 Knowing to do what exercise now (Lincoln)
- 379 Motivated to move more now, better to walk, walking better than sitting (Jessy)
- 381 Avoid the trap (Jessy)
- 497 To persevere to do exercise (Lincoln)

### **Barriers**

- 290 Busy in taking care of grandchildren (Jessy)
- 374 Lazy to keep on (Lincoln)
- 377 Conflicting (Jessy)
- 399 Going to work is a barrier to continue exercise (Lincoln)
- 493 Practice exercise a little when busy (Lincoln)
- 495 Had no time to do exercise (Jessy)
- 399 Going to work (Lincoln)
- 400 Having limitation in the use of time (taking care of grandchildren) (Jessy)
- 402 Taking care of grandchildren was time-consuming (Jessy)
- 413 Not coping with so many things to do, especially when getting degeneration (Jessy)
- 414 Not coping with what you intended to do (Kassy)

### **Therapists' role**

- 298 Gave guidance (CC)
- 299 Helpful (Jessy)
- 300 Helpful (Kassy)
- 302 Taught some knowledge updates (CC)
- 304 Taught some correct ways of exercise (Yana)
- 307 Taught a correct way of exercise (CC)
- 311 Gave response and guidance to some health-related problems (CC)
- 315 Fine & helpful (Kassy)

*Some confusion in the first few sessions*

- 316 Essential to teach the ways in performing all exercises in the first session (Lincoln)
- 491 Very important to teach exercise in the first session (Lincoln)
- 485 Guidance is important for someone to learn the exercise (CC)
- 487 Therapist taught the way and posture how to do the exercise in the first session (Lincoln)
- 318 Confused at the beginning (Jessy)
- 333 Guidance inadequate for exercise and organisation poor at the class (Jessy)
- 320 Joined the class late & felt chaotic, thought of quitting the programme (CC)
- 322 Confusing at the first session, not familiar with the exercise (May)
- 334 Therapist divided the participants into groups at the beginning, becoming confused afterwards (May)
- 336 Therapist divided the participants into groups at the beginning & allocated sequence of practice (May)
- 343 Therapists had made arrangement (May)
- 345 Right to make arrangement (Jessy)

**Class organisation**

*Frequency and time duration*

- 322 Time duration too short (May)
- 324 New challenge, better to have longer session (May)
- 326 Frequency & time duration fit for intensive training (CC)
- 328 Frequency & time duration alright, 1-2 hours for each session alright, to build up exercise intensity at home (Jessy)

*Group size & guidance*

- 330 10 persons suitable (Jessy)
- 331 10 persons OK (Phoebe)
- 332 10 persons OK (Yana)
- 333 Guidance inadequate at the beginning; participants had to manage time in exercise practice themselves (Jessy)

*Exercise room*

- 355 Exercise room & equipment OK (CC)
- 356 Good (May)
- 357 Good (Jessy)
- 358 Good (Yana)
- 359 Spacious (Phillip)
- 360 Spacious (Kassy)

**Continue exercise in the future**

- 385 Continue to exercise (Kassy)
- 391 Continue to join exercise in CRN (May)
- 392 Not possible to go to exercise class (Jessy)

## Appendix S2

### Independent coding of focus group – JP (one of the supervising team)

#### Codes in the focus group data

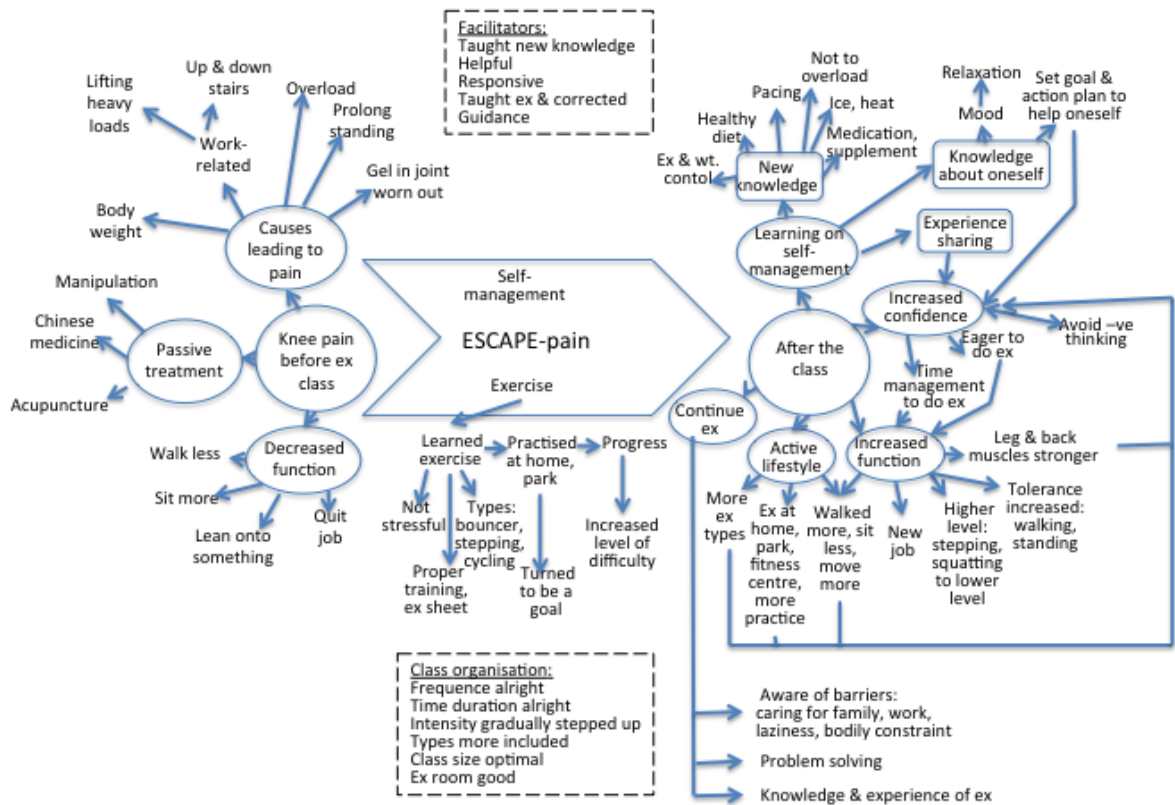
Personal context  
History of present condition  
Previous management  
Medical attitudes to OA  
Current treatment of pain medication not helpful  
Behaviours to manage pain prior to the course  
Beliefs about causes of OA  
Change of behaviour because of OA  
Attendance at the beginning  
Reasons for attending  
Views on content of ESCAPE-pain course  
Positive views on ESCAPE-pain programme  
Education sessions helpful, learnt how to help self  
Positive experience of social aspect of the course  
Increasing knowledge of how to manage OA  
Positive – improved knowledge  
Initially sceptical but has found improvements in Physical Activity (PA)  
Benefits of ESCAPE improvement in PA  
Physiotherapist added value, made information their own  
Physiotherapist changed health behaviour, new information  
Benefits of ESCAPE – reducing health costs  
Engagement with documentation  
Disengagement with documentation  
Increase of awareness of behaviours  
Change of behaviour – moved more  
Noticing lack of movement causes pain  
CC-goal to exercise  
CC-has previous experience, ESCAPE-pain reinforcing benefits of exercise  
ESCAPE-pain increased knowledge  
Level of PA  
Fitting PA into working life  
Still has uncertainty – cause of knee pain  
Benefit of ESCAPE-improvement in pain, found employment  
Benefit of ESCAPE-increased knowledge adaptation to current habits  
Benefit of ESCAPE-reduction of stress  
Increased knowledge of the difference between PA and exercise  
Benefit of ESCAPE-reduction of aids  
Benefit of ESCAPE-increased confidence, increased function, adherence to ex  
Adherence to ESCAPE exercise  
Benefits of ESCAPE - increased PA  
Benefits of ESCAPE – increased strength and PA  
Adherence to ESCAPE exercise  
Benefits of ESCAPE-increased PA  
Benefit of ESCAPE – increased confidence  
Reasons for non-adherence  
Improvements to programme – more freedom

Evaluation of programme – position, information giving  
Evaluation of programme – positive, correct advice  
Evaluation of programme – positive about therapists  
Evaluation of ESCAPE-negative, limited personalisation of exercise  
Evaluation of ESCAPE – negative, lack of direction  
Evaluation of ESCAPE – negative, limited time to exercise  
Evaluation of ESCAPE – negative, management of group when exercising  
Evaluation of ESCAPE – positive, room environment  
ESCAPE exercises-  
Benefit of ESCAPE – increased confidence  
Benefit of ESCAPE – increased strength and PA  
Benefits of ESCAPE – changed health beliefs  
Benefit of ESCAPE – increased knowledge  
Adherence to ongoing exercise  
Adherence to self-management  
Adherence to lifestyle changes  
Barriers to ongoing exercise  
Sharing non-escape endorsed information  
Sharing non-escape endorsed information  
Evaluation of ESCAPE – positive  
Recommendation of ESCAPE  
Use of ESCAPE – info at home



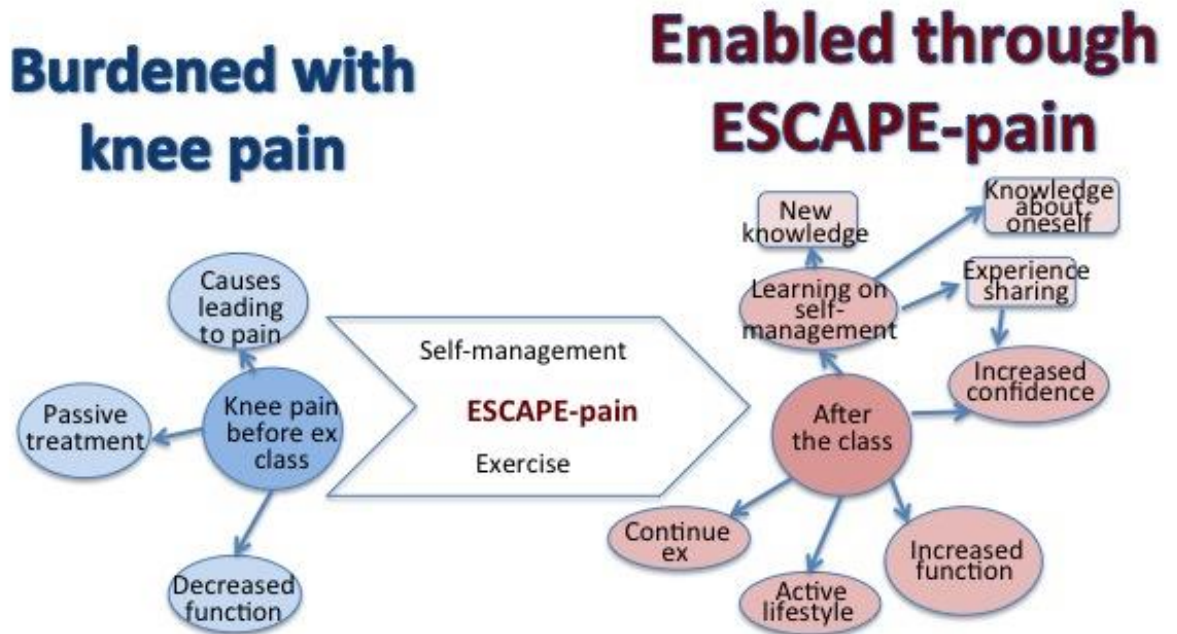
# Appendix T1

## Concept map – draft in detail



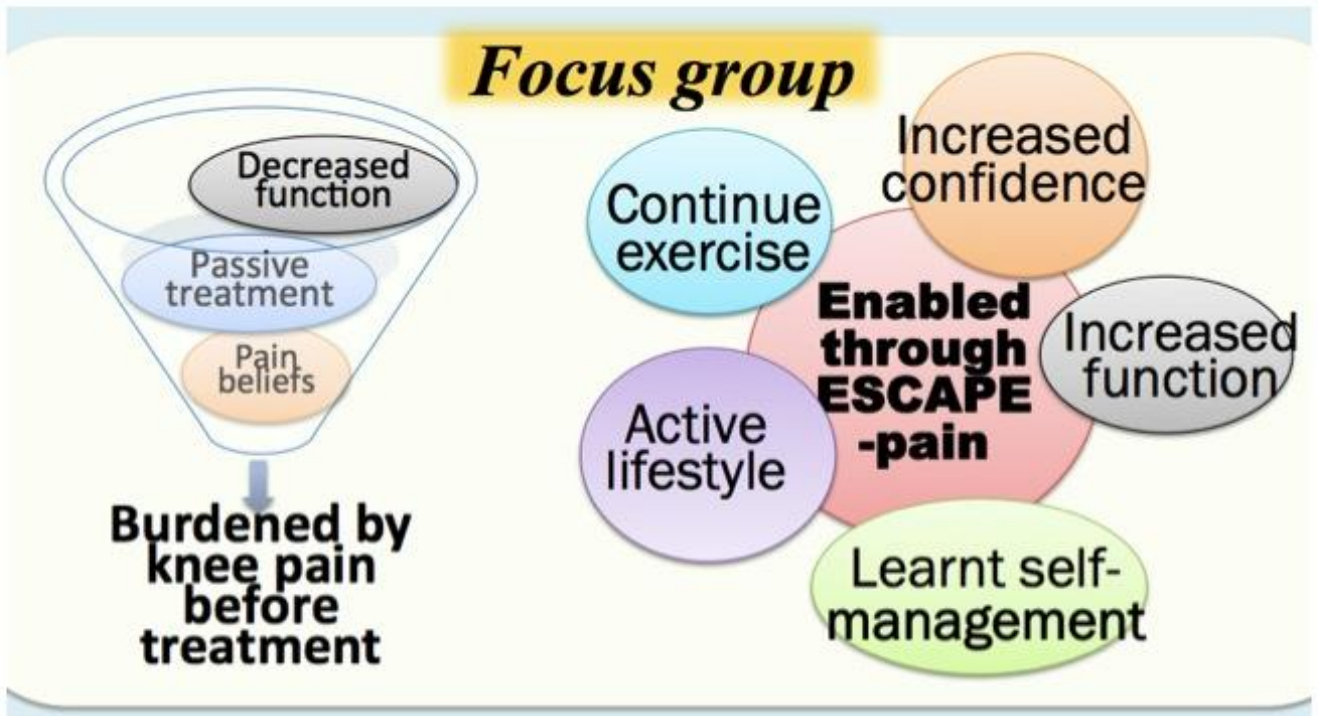
## Appendix T2

### Concept map simplified



Appendix T3

Concept map refined for presentation



## Appendix U

### Dissemination in local magazine

健康雜誌

傷健深情  威爾斯親王醫院高級物理治療師 劉秀英女士



## 無懼膝退化 動樂體心安

陳婆婆睡醒起來，或坐久後站起來的時候，膝蓋好像攔硬了，總要鬆動一會兒才可穩步地走，膝頭痛使她不能屈曲或下蹲，更害怕膝頭越來越退化。可是不動又如何，雙膝無力，只見身體慢慢長胖，舉步更艱難。

陳婆婆患有膝退化的病徵是常見，女性比男性為多，有超過一成年齡50以上的女士患有此病，而70以上的更增至四成。2010年環球疾病負擔報告顯示，膝和髖關節退化所引起的殘障，在環球的狀況居第十一位。

Used with permission of the Rehab Express Magazine (2017), issue 60, pp.68-69.

很多人有一種錯誤的想法：退化就是跟年老不可分割所帶來的結果。運動只會使關節更加磨損，一動不如一靜。其實關節退化並非如此，有分原發和繼發兩種，有些因素會使病情轉變，如年齡、性別、肥胖、傷患或手術、遺傳、負重和體力勞動，是一種動態的模式。近年發現，膝退化與心臟血管病和「新陳代謝症候群」（例如高血壓、肥胖和糖尿病）有關，甚至是催化使之發病。

處理膝退化，專家們建議所有患膝退化的病人得到「核心治療」：1) 強化肌力運動；2) 教育如何自己處理膝痛；和3) 在肥胖的情況下減磅，以運動形式強化下肢肌力，經證實可以減少痛楚和增加活動功能；有研究顯示增強肌力對軟骨分解起保衛作用，減低病情惡化；而透過運動達到鎮痛療效相等於服用止痛藥，卻又不受藥物所帶來的副作用纏擾。進行帶氧運動有助減磅，減少關節負荷，專家建議於20週內減去體重百分之五。不過運動的療效只會在持續做運動的時候獲得，當停止運動時，效益也隨之而逝，因此取得運動成功的秘訣在於堅持！

另一方面，學習自己如何處理長期膝痛（「自理療程」），經證實可以幫助病患者建立耐力，持續運動，讓他們更多了解這個病症和運動的益處，學習如何面對難題，洞悉膝痛和情緒波動的真面目，採取一些簡單鎮痛的方法，和曉得病情復發時如何處理。這些「自理療程」多數以小組進行，由導師帶領，組員都是同路人，大家互相支持，使信心有所建立，持續運動的耐力和抗逆境能力增強。

物理治療師是運動治療專家，在英國有一個「脫離膝痛」治療項目，綜合運動和「自理療程」，給膝痛病人，由物理治療師同時教導自理方法和運動，有顯著

療效，患者了解和經驗過運動所帶來的益處，經過兩年半還有不少參加者自己繼續運動。威爾斯親王醫院物理治療部最近把這個「脫離膝痛」項目引入香港，初步試驗取得成功，膝痛患者經過10堂小組研討和運動後，膝痛顯著減少，活動能力增加，步伐輕快些，情緒指數穩定，整體狀況得以改善，更推介此「脫離膝痛」項目給那些與他們有相同病患的人。儘管膝退化還在，他們的態度改變了，有信心，學會如何與這長期痛症相處，更願意自己繼續做運動。

「脫離膝痛」項目經過跨越文化的考驗，在本地都顯示有臨床成效，病人也滿意這個療程，表示會繼續運動，盼望給更多病人帶來益處。

### 膝部關節炎



### 常見徵狀

- 痛楚
- 腫脹
- 發熱
- 下肢肌力不足
- 活動困難
- 膝關節變形

### 運動治療

踭盤拉橡皮帶





## Appendix V

### Abstract submission to Hospital Authority Convention 2017

#### **An Integrated Programme of Exercise, Self-management and Active Coping Strategies for Patients with Knee Osteoarthritis – a Proof-of-Concept Study for a Hong Kong Chinese Speaking Population**

Jamie Lau(1), Angelina Yeung(1), Ivor Wong(1), Jen Pearson(2), Fiona Cramp(2), Nicola Walsh(2)

(1)Physiotherapy Department, Prince of Wales Hospital (2)Faculty of Health & Life Sciences, University of the West of England

#### Background:

Knee osteoarthritis (KOA) is associated with long-term pain and disability, and is ranked as 11<sup>th</sup> highest contributor to global disability. Practice guidelines recommend exercise, education for self-management, and weight loss if required. An integrated programme of exercise, self-management and active coping strategies (ESCAPE-knee pain) has proved effective and cost-effective in the UK for KOA patients, addressing both physical and psychological needs. This Proof-of-Concept (POC) study aimed to explore whether this programme could be delivered to a Hong Kong Chinese (HKC) speaking population.

#### Objectives:

To deliver the ESCAPE-knee pain programme to a small cohort of KOA patients in a physiotherapy clinic, and to explore their satisfaction.

#### Methods:

Ambulatory Chinese speaking KOA patients were recruited from the waiting list in the physiotherapy clinic, Prince of Wales Hospital. Exclusions were knee physiotherapy in the previous 12-months or joint replacement surgery. ESCAPE-knee pain, a 10-session group programme was delivered over 5 weeks by a physiotherapist. Each session consisted of 25-minutes discussion on self-management, followed by 50-minutes strengthening and aerobic exercise according to the individual patient's capability.

HKC outcome measures consisted of the Knee injury and Osteoarthritis Outcome Score (KOOS-HKC); Numeric Pain Rating (NPR); Patient Specific Functional Scale (PSFS); Chinese Self-efficacy for Exercise (SEE-C); Hospital Anxiety and Depression Scale (HADS) and Global Improvement Rating (GIR). Performance tests were 40-meter fast-speed walk test, 30-second chair-stand test and 12-step stair-climb test. Data were analysed descriptively.

#### Results:

21 patients (two groups) completed the programme, median age 62, 79% female, BMI 28.0. Median attendance was 9 sessions; two patients dropped out. One adverse event of a hypoglycaemic attack occurred. KOOS-HKC improved significantly on Pain 17.3, PS 10.1 and QoL 14.5 points. Individual functions (PSFS) improved 2.5, self-efficacy (SEE-C) 1, psychologically (HADS) 4.6, pain (NPR) 0.8 and overall (GIR) 5.2 points. The chair-stand, walk and step tests improved by 14.5% to 18.4%. The satisfaction demonstrated of exercise benefits, learned self-management and a willingness to continue exercising independently.

Clinical implications:

ESCAPE-knee pain was translatable, feasible and effective for KOA patients in HK. Patients were satisfied with the programme, and stated they would continue to exercise. A future large scale trial will test the clinical and cost-effectiveness of ESCAPE-pain (HK).



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## Exercise and self-management for patients with knee osteoarthritis – a Proof-of-Concept study for a Hong Kong Chinese speaking population

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### BACKGROUND

Osteoarthritis of knee (OAK) is associated with long-term pain and ranked as 11<sup>th</sup> highest in global disability (Cross et al 2014). Guidelines recommend exercise, self-management education, and weight loss if required. An integrated programme of exercise, self-management and active coping (ESCAPE-knee pain) has proved effective and cost-effective in the UK, addressing physical and psychological needs (Hurley et al 2007a, 2007b; Jessep et al 2009).

### AIM

This proof of concept study aimed to determine the feasibility of delivering the ESCAPE-pain programme in Hong Kong; and explore the acceptability of the intervention to a Chinese speaking population.

### METHODS



### INTERVENTION

A 5-week group programme, was facilitated by a physiotherapist in a physiotherapy out-patient department, including self-management education and exercise training.

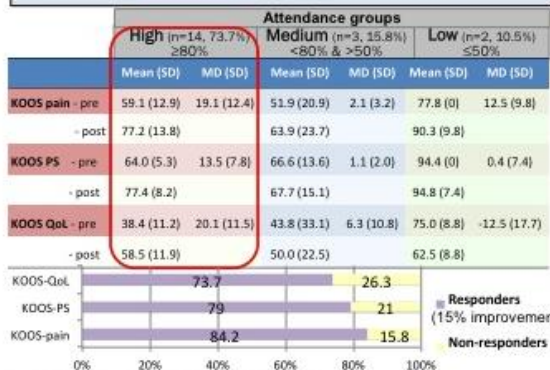


### PARTICIPANTS

21 patients (two groups) participated in the programme, median age 62, 79% female, BMI 28.0.

### RESULTS

Median attendance was nine sessions; two patients dropped out. The high attendance group showed the largest improvement on KOOS subscales. 80% of participants were responders (15% improvement in KOOS). 95% participants improved their individual function scores and psychological status, while 80% of patients improved their self-efficacy for exercise.



### QUALITATIVE FINDINGS

Eight participants took part in a focus group. Analysis suggested they were burdened by knee pain, but felt enabled following the programme. They found exercise frequency, intensity, types and time-period suitable, and self-management strategies useful. They experienced benefits of exercise and engaged in more active lifestyle. Their confidence to continue exercise in long-term increased.



### CONCLUSION

ESCAPE-knee pain was feasible for OAK patients in HK with good acceptability. Participants expressed an intent to continue exercising following the programme. A future large scale trial will test the clinical and cost-effectiveness of ESCAPE-pain in HK.

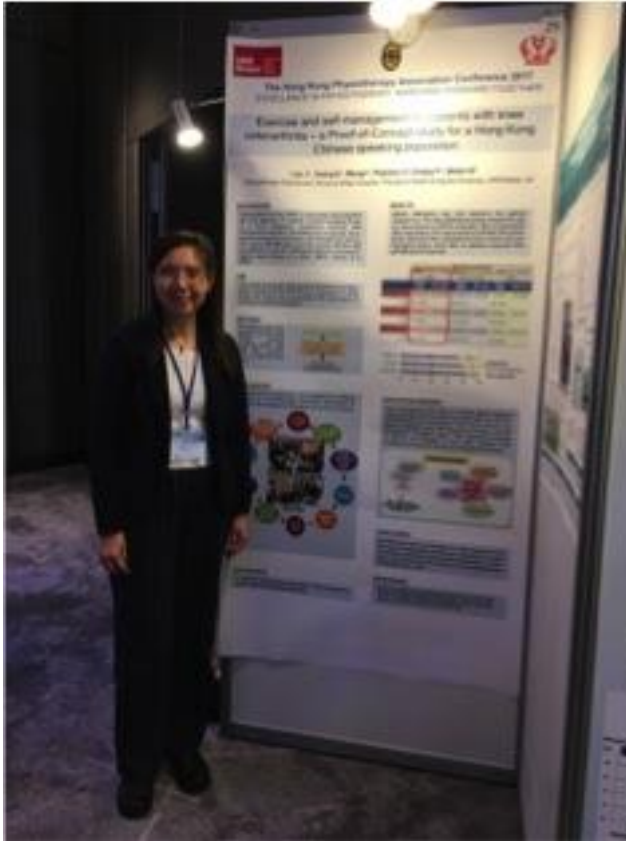
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## Appendix X

### Gold award winning in HKPA Annual Conference



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