

TITLE PAGE

Title: Continuity of care and general wellbeing of patients with comorbidities requiring joint replacement

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Structured abstract

Aim: This paper examines the continuity of care and general wellbeing of patients with comorbidities undergoing elective total hip or knee joint replacement.

Background: Advances in medical science and improved lifestyles have reduced mortality rates in most Western countries. As a result, there is an ageing population with a concomitant growth in the number of people who are living with multiple chronic illnesses, commonly referred to as comorbidities. These patients often require acute care services, creating a blend of acute and chronic illness needs. For example, joint replacement surgery is frequently performed to improve impaired mobility associated with osteoarthritis.

Method: A purposive sample of twenty participants with multiple comorbidities who required joint replacement surgery was recruited to obtain survey, interview and medical record audit data.

Findings: Comorbidity care was poorly co-ordinated prior to having surgery, during the acute care stay and following surgery and primarily entailed prescribed medicines. The main focus in acute care was patient throughput following joint replacement surgery according to a prescribed clinical pathway. General wellbeing was less than optimal: participants reported pain, fatigue, insomnia and alterations in urinary elimination as the chief sources of discomfort during the course of the study.

Conclusion: Continuity of care of comorbidities was lacking. Comorbidities affected patient general wellbeing and delayed recovery from surgery. Acute care, clinical pathways and the specialisation of medicine and nursing subordinated the general problem of patients with comorbidities. Systems designed to integrate and co-ordinate

chronic illness care had limited application in the acute care setting. A multidisciplinary, holistic approach is required. Recommendations for further research conclude this paper.

Keywords: Nursing, chronic illness, comorbidities, continuity of care, joint replacement

SUMMARY

What is already known about the topic

- Australia's health care system is based on a single model of health care designed to meet medical interests in curing disease.
- The prevalence of chronic illnesses and comorbidities is increasing.
- People with comorbidities have complex needs.
- Economic imperatives driving health care make it difficult to provide coordinated, integrated and comprehensive nursing care to people with comorbidities.

What this paper adds

- Personal experiences of people with comorbidities who required acute care services, specifically joint replacement surgery are detailed.
- This paper presents evidence that comorbidities contribute to symptom burden, in particular pain.
- Information about the complex needs of people with comorbidities having joint replacement surgery and the implications for nursing is presented.

Introduction

Many people of all ages and backgrounds in Western countries are living with chronic illnesses. Chronic illnesses are an escalating health care problem that has been described as the epidemic of the future (Lubkin *et al.* 2002). Chronic illness is 'a permanently altered health state, caused by a non-reversible pathological condition that leaves residual disability that cannot be corrected by a simple surgical procedure or cured by a short course of medical therapy' (Miller 1992, p. 4). Such conditions are incurable, enduring, often progressive, costly, and require long-term care and regular monitoring by health professionals (Strauss 1975, Miller 1992, Lubkin *et al.* 2002; Dunning, 2003). In addition, chronic illnesses are associated with deterioration, reduced competence, increased needs, physical and emotional pain, and increased dependence (Lubkin *et al.* 2002).

Unfortunately, people of all ages with one chronic illness often develop multiple chronic illnesses, which are commonly referred to as comorbidities (Verbrugge *et al.* 1989). Providing proactive continuity of care of comorbidities is very challenging for health professionals. Many people with comorbidities require repeated admissions to hospital for acute care that is superimposed on, and complicates, their chronic ill-health.

Background

Advances in medical science have reduced mortality rates in most Western countries including Australia. These advances have resulted in an ageing population and an increased prevalence of chronic illnesses. Patients with multiple chronic illnesses requiring acute care services are a significant group: almost 15% of Australian patients receiving public health care had five or more medical diagnoses (Australian Institute of

Health & Welfare 2004). Many initiatives are being launched in Western countries in an attempt to contain escalating health care costs. In particular, length of stay in acute care has been progressively shortened, which jeopardises the care of people with chronic illnesses (Picone *et al.* 1998).

The presence of comorbidities complicates care and negatively influence outcomes such as length of stay, surgical outcomes, functional status, quality of life and re-admission is common (Grau *et al.* 1986, Williams *et al.* 2002, Williams 2004). Acute care is a single disease model of care where specialised medical knowledge is used to repair the acute problem and eradicate the disease condition (Nolan *et al.* 1999). Patients are then expected to return to their previous autonomous life, free of disease. This is not the case for people with comorbidities.

Patients with comorbidities require ongoing care in the community and effective discharge planning that addresses all their health problems as well as the primary reason for admission (Armitage *et al.* 1998). However, neither the hospital or the community takes full responsibility for coordinating care, and services become fragmented, costs increase, and health issues are often missed (Papenhausen *et al.* 1998).

Various models of care have been developed in an effort to coordinate care across care areas such as case management (Schaldach 1997, Hovenga 1998), but disjointed care still occurs (Sparbel *et al.* 2000). In addition, disease management programs generally target individual chronic illnesses and typically embrace a medical model of self-management that focuses on the patient taking prescribed medicines (Koch *et al.* 2004, Kralik *et al.* 2004). Comorbidity management is compounded by an increasingly costly and complex health care system (Raddish 1999, Rothman *et al.* 2004, Gask 2005), under-

recording of comorbidities in patients' medical records (Humphries *et al.* 2000), and a lack of consensus about what continuity of care means (Sparbel *et al.* 2000).

The current Australian health care system is clearly influenced by the biomedical approach (Willis 1989) whose dominant philosophy is cure. While a focus of cure is appropriate for areas of specialisation, it is not always valid for most patients with chronic illnesses (McElmurry *et al.* 1998). It is evident that a comprehensive approach to patients with chronic illnesses is needed to achieve coordinated continuity of care (Ward 1990). Coordinated care implies holistic care and goes beyond the notion of cure to embrace well-being (Haworth *et al.* 2001).

Few researchers have examined the management of comorbidities in acute care and the community (Williams *et al.* 2002). Even fewer researchers have taken an holistic approach or considered the impact and combinations of psychiatric and physical illnesses (Saltman 2005). Williams (2004) found acute care settings did not facilitate the continuity or co-ordination of care of comorbidities. In particular, participants were discharged home with little improvement in their comorbidity-associated comfort. The current paper concerns patients with comorbidities requiring acute care services for the principal diagnosis of osteoarthritis.

Osteoarthritis is a common comorbidity often necessitating joint replacement surgery to improve mobility (McMurray *et al.* 2002, Australian Institute of Health & Welfare 2004, Hart 2004). Previous research investigating joint replacement and comorbidities has been limited by small sample sizes, patient populations from single institutions, inadequate control of variables, and contradictory results (McMurray *et al.* 2002, Jain *et al.* 2005). Although joint replacement surgery has been used to benchmark

excessive joint replacement surgery waiting lists in the public health system in Australia indicate there is an imbalance between supply and demand of health services (Russell *et al.* 2003, Australian Institute of Health & Welfare, 2004).

Aims

The aim of the study was to examine the continuity of care and general wellbeing of patients with the principal diagnosis of osteoarthritis and comorbidities who required elective total hip or knee joint replacement.

Study design

An exploratory descriptive design incorporating both quantitative and qualitative methods derived from patient perceptions and a medical record audit was undertaken. Patients were examined using a longitudinal approach from preadmission to eight weeks following discharge.

Participants

A purposive sample of twenty patients requiring a total knee or hip joint replacement were consecutively recruited from the orthopaedic preadmission clinics of a major public metropolitan university hospital in Victoria, Australia. Twenty individuals were considered adequate to substantiate the study design. The key inclusion criteria for participants were the presence of three or more comorbidities for a minimum of three years so that the comorbidities were more likely to be stable and integrated into the participants' patterns of daily living. Participants were aged between 40 and 75 years to reflect the aging Australian population and to include younger adults where the burden of

disease can significantly affect work and quality of life. Participants were oriented to time and place and English-speaking.

Data collection

Data collection for the study was undertaken at the four designated time points as outlined in Table 1.

Table 1: The data collection process.

Data collection time point	Type of data collected
The preadmission clinic	<ul style="list-style-type: none"> • Informed consent • Participant demographics • Participant comorbidities to measure CIRS-G • 1st RAND-36 survey, including additional questions relating to continuity of care • 1st symptom survey
On the day of discharge from the orthopaedic unit	<ul style="list-style-type: none"> • 2nd RAND-36 survey • Evidence of complications • Participant discharge medications
Four weeks post discharge from the orthopaedic unit	<ul style="list-style-type: none"> • 3rd RAND-36 survey
Eight weeks post discharge from the orthopaedic unit	<ul style="list-style-type: none"> • 4th RAND-36 survey, including additional questions relating to continuity of care • 2nd symptom survey • Health care utilisation survey • Semi-structured interview focusing on continuity of care of comorbidities • Clinical audit of medical records

Data were collected either face-to-face or via telephone to reduce the likelihood of missing data between July, 2004 and January, 2005.

Instruments

General wellbeing was measured using the RAND-36-Item Health Survey 1.0, a valid, generic profile measure of general wellbeing and quality of life that was widely used in chronic disease research (Hays *et al.* 2001; Sprangers *et al.* 2000). The RAND-36 comprises eight subscales that measure physical functioning, role limitations due to physical health, role limitations due to emotional problems, social functioning, emotional wellbeing, energy/fatigue, pain and general health perceptions (Hays *et al.* 2001). Cronbach's alpha coefficients for the RAND-36 are 0.78–0.93 (Ware *et al.* 1992).

Medical and psychiatric comorbidity burden was measured using the Cumulative Illness Rating Scale-Geriatric (CIRS-G) (de Groot *et al.* 2003, Miller *et al.* 1992), with intraclass correlation coefficients ranging from 0.78 to 0.89 (Hudon *et al.* 2005). In the current study, two researchers randomly scored five of the CIRS-G ratings to ascertain inter-rater reliability with 95% agreement. A symptom survey was developed based on past work (Williams 2004) and the Cornell Medical Index (CMI) Health Questionnaire designed to predict health status with a correlation coefficient of 0.83 (Brodman *et al.* 1986). Measures of health care use, which encompassed all direct and indirect health care-related encounters, was derived from studies that investigated Western patterns of health care use (Badley *et al.* 1999, Doran *et al.* 2001, Lapsley *et al.* 2001, Dempsey *et al.* 2003, Klarenbach *et al.* 2003, Williams 2004). Minor modifications were made to this tool following review by an expert panel in chronic illness management (Elliot 2004).

Interviews

Semi-structured interviews were designed to elicit information about how participants' comorbidities affected their daily lives and recovery from surgery. Interviews were conducted with people who received surgery first and recruitment continued until data saturation occurred. A total of fourteen interviews were conducted at the participants' choice of location.

Medical record audit

Medical records were scrutinised for information to assist in estimating the comorbidity burden score, documentation of care relating to comorbidities, and changes in the participants' condition that were likely to increase the complexity of the care required. A tool was devised to obtain consistency and comprehensiveness of information from each medical record.

Ethical considerations

Permission to conduct the study was obtained from the participating hospital and university ethics committees. Potential participants were identified by an independent person in the clinic and invited to participate prior to surgery. They were assured that participation or refusal to participate would not result in any discrimination, delay their surgery or reduce the level of care they received. Written informed consent was obtained from the participants prior to data collection. Participants were orientated to place, date and person at all data collection points.

Data analysis

Descriptive statistics were conducted on all quantitative data using SPSS version 12. Individual interviews were audio-taped and transcribed verbatim. Field notes taken during the interviews and collection of surveys were also transcribed verbatim. All

qualitative data including the medical record audit were entered into QSR NVivo® software to facilitate Ritchie and Spencer's (1994) atheoretical approach to data analysis. Five key steps were involved: familiarisation, identification of a thematic framework, indexing, charting, and finally, mapping and interpretation. Data analysis of transcripts was primarily undertaken by one researcher with a second researcher crosschecking the transcripts and thematic analysis.

Findings

The combination of quantitative and qualitative methods provided a detailed analysis of the needs of patients with comorbidities who required elective total joint replacement.

Demographic data

Twenty participants were consecutively recruited out of a possible 97 patients: age ranged from 49 to 75 years (mean = 67.05, SD 6.62). Thirteen were female. The number of comorbidities ranged from 4 to 13 (mean = 6.05, SD 2.11), and the average CIRS-G total score was 12.8. The average for a healthy control group with a mean age of 63.2 years is 8.2 (Miller *et al.* 1992).

The average length of stay in the orthopaedic unit was 5.6 days, range 4-7 days. Thirteen participants were born in Australia and seven in Europe. Nineteen participants had year eight or higher level of education, were retired, and had a partner or their adult children to care for them following surgery. The patient sample, including the overall burden of chronic illnesses is listed in Table 2.

Table 2: Patient sample including details of chronic conditions and comorbidity burden scores (n = 20).

Patient	Chronic illnesses	Age,	Sex,	Surgery,	CIRS score
1	Osteoarthritis, ischaemic heart disease (AMI X 2), hypertension, chronic back pain	73	M	(R) hip	8
2	Osteoarthritis, Type 1 diabetes, hypertension, osteoporosis, jejunioileal bypass (morbid obesity), gastric oesophageal reflux disease, depression	67	F	(R) hip	14
3	Osteoarthritis, hypothyroidism secondary to radioactive iodine treatment, hypertension, hyperlipidaemia, chest pain	72	F	(R) knee	7
4	Osteoarthritis, left ventricular hypertrophy, hypertension, hyperlipidaemia, chronic back pain, psoriasis	68	M	(R) hip	8
5	Osteoarthritis, Parkinson's disease, gout, asthma, kidney stones, long standing rash, gastric oesophageal reflux disease, lumbar degenerative disease	70	M	(R) hip	11
6	Osteoarthritis, Berry aneurysm, hypertension, hyperlipidaemia, migraine, psoriasis, sinusitis, depression	49	F	(L) knee	18
7	Osteoarthritis, osteoporosis, breast cancer, oesophageal cancer, orbital herpes, depression	70	F	(R) hip	15
8	Osteoarthritis, hypertension, hiatus hernia, mild varicose disease, Type 2 diabetes, hypothyroidism	75	F	(L) knee	14
9	Osteoarthritis, hypertension, congestive cardiac failure, gastric bariatric surgery (morbid obesity), chronic renal impairment, hypothyroidism, osteoporosis, chronic back pain, depression	73	F	(L) knee	19
10	Osteoarthritis, poliomyelitis, hypertension, bladder tumour, benign prostatic hyperplasia, asthma	62	M	(R) knee	14
11	Osteoarthritis, asthma, hypertension, congestive cardiac failure, chronic back pain, gout, glaucoma, benign prostatic hyperplasia	71	M	(R) hip	15
12	Osteoarthritis, hypertension, hyperlipidaemia, atherosclerosis, diverticulitis, hiatus hernia, tinnitus, chronic bronchitis, depression	73	F	(R) hip	18
13	Osteoarthritis, osteoporosis, hyperlipidaemia, sinusitis, depression	61	F	(R) hip	11
14	Osteoarthritis, ischaemic heart disease, hypertension, left ventricular failure, hiatus hernia, chronic back pain, depression	66	F	(L) knee	15
15	Osteoarthritis, aortic dissecting aneurysm repair, hypertension, benign prostatic hyperplasia, thyroid tumour	71	M	(R) hip	13
16	Osteoarthritis, asthma, gastric oesophageal reflux disease, hypertension, hyperlipidaemia	73	F	(L) knee	8
17	Osteoarthritis, hypertension, hyperlipidaemia, vertigo, fibromyalgia, costochondritis, thyroid antibodies (not treated)	56	F	(R) knee	10
18	Osteoarthritis, Type 2 diabetes, atrial fibrillation, hypertension	66	M	(R) knee	11
19	Osteoarthritis, asthma, hypertension, hyperlipidaemia, medullary sponge kidney disease, peptic ulcer, spondylosis, reflex sympathetic dystrophy	62	F	(L) hip	11
20	Osteoarthritis, rheumatoid arthritis, hypertension, hyperlipidaemia, ulcerative colitis, Ménière's disease, osteoporosis, Raynaud's disease, iron deficiency anaemia, gastric oesophageal reflux disease, hypercalcaemia, anal dysplasia secondary to radiotherapy, recurrent voiding difficulties, insomnia, depression	63	F	(R) hip	27

General wellbeing

The eight subscales of the RAND-36 surveys taken at the four key time points were averaged and compared with current Australian norms (Australian Bureau of Statistics 1995) for persons aged 65 to 74 years. All RAND-36 subscales showed improved average scores eight weeks after surgery, except Role Limitations due to Physical Health and Emotional Problems subscales. However, participants had general poor health prior to surgery, which remained below the norms at week eight, as shown in the Physical Functioning subscale in Figure 1.

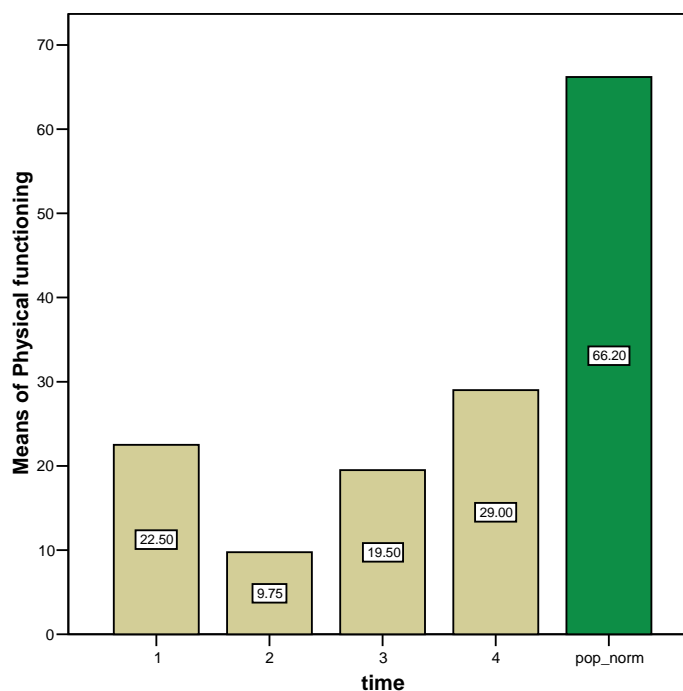


Figure 1: Mean physical functioning scores preoperatively (time 1), day of discharge (time 2), and at four (time 3), and eight weeks post discharge (time 4), compared with Australian population norms (n = 20). The scale shows worst 0 to best 100.

All parameters measured on the subscales were worst on the day of discharge, except the emotional subscales which were almost equal to, or had exceeded, population norms at this time point. The strongest association was found between the Energy/fatigue and the Physical Functioning subscales, $r = 0.746$, $P = <0.001$. Pain scores (Figure 2) were particularly low on the day of discharge and remained significant at week eight.

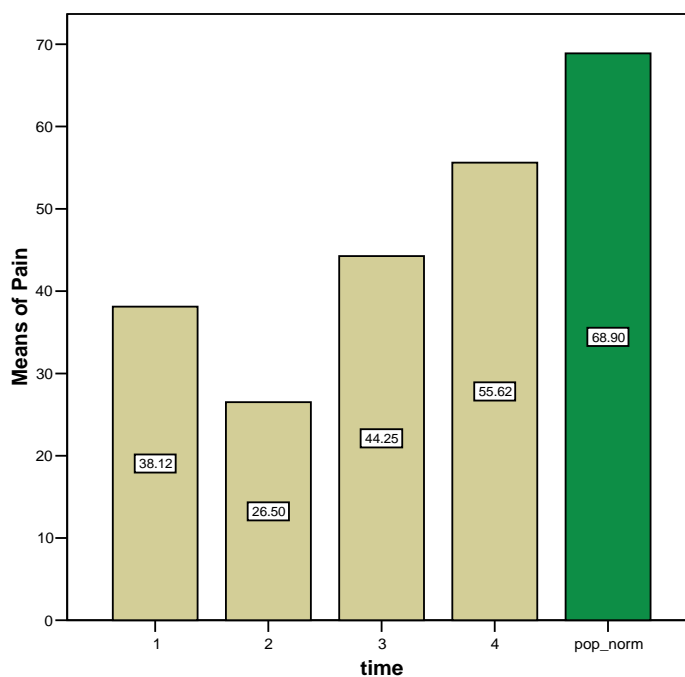


Figure 2: Mean pain scores preoperatively (time 1), day of discharge (time 2), and at four (time 3), and eight weeks post discharge (time 4), compared with Australian population norms (n = 20). The scale shows worst 0 to best 100.

Preadmission

Participants found it difficult to think of their illnesses as ‘chronic’ and were reluctant to disclose all of their illnesses and medicines at recruitment. The participants had considerable pain and discomfort and waited a long time to have joint replacement surgery. For example one participant said:

‘I use a walker. I am in pain. I can’t go to shops or get out of the car. I am crying all the time with my hips.’

Sixteen participants reported additional pain in areas other than the affected joint such as generalised arthritis, migraines, stomach ulcers, angina and peripheral vascular disease. Participants were on waiting lists to see various specialists for their concomitant symptoms.

Having a variety of comorbidities in conjunction with a major arthritic joint in need of replacement complicated health status. Specific diseases such as diabetes, stroke, heart disease and hypertension were chief sources of concern to participants because they knew disabling complications could develop. Participants felt the stress and anxiety of managing their comorbidities negatively affected comorbidity stability. Table 3 shows the CIRS-G prevalence and burden of comorbidities according to body systems.

Table 3: CIRS-G comorbidity prevalence and burden in participants according to body systems (n = 20).

Body system disease	Number of participants	Mild	Moderate	Severe	Extremely severe
Musculoskeletal & skin	20	0	9	4	7
Vascular	18	1	9	6	2
Genitourinary	17	8	7	2	0
Respiratory	14	6	5	3	0
Upper GI	10	3	7	0	0
Psychiatric	10	4	1	5	0
Endocrine, metabolic & breast	9	3	4	2	0
EENT	9	7	1	0	1
Cardiac	6	1	4	1	0
Renal	4	2	2	0	0
Lower GI	3	0	2	1	0
Neurological	2	0	1	1	0
Haemopoietic	2	0	2	0	0
Hepatic	0	0	0	0	0
Total		35	54	25	10

The clinical audit of the medical records revealed significant differences between the comorbidities participants disclosed and what the orthopaedic doctors recorded in the preadmission clinic. Participants tended to disclose illnesses, such as depression, migraines, high cholesterol and psoriasis, which were not noted in the medical preadmission examination. Participants were advised to cease comorbidity medicines that increased the anaesthetic risk and risked surgical outcomes, such as aspirin and celebrex five to seven days prior to surgery.

Fourteen participants had a history of smoking. Nine were waiting for dental treatment, most commonly re-fitting dentures and treating tooth decay. Four participants were in need of new prescription lenses to aid their deteriorating vision. Participants prioritised health care needs or were in such severe pain waiting for surgery that routine health visits were postponed. In addition, participants also felt their complaints to health professionals about additional symptoms were ignored. A participant stated:

‘My doctor takes my blood pressure and throws me out the door. I complain of ailments which are ignored, for example this pain under my rib cage.’

Participants were not always aware of the primary care role of the general practitioner (GP). Although the majority stated they had one GP, or at least attended the same medical clinic regularly, continuing to consult the same GP was often difficult. Doctors relocated, retired, or were away or clinics were not open when required.

Caring for comorbidities was relentless and required a great deal of self-care such as attending regular medical consultations, obtaining prescriptions, taking medicine, managing daily activities, and diet. Prior to having surgery, participants were prescribed an average of seven classes of medicines often in multiple doses per day, for example antihypertensives, lipid lowering agents, and analgesics. The participant with the highest CIRS-G score took 16 different classes of medicines. Participants with five comorbidities were prescribed the most medicines on average. Participants did not always take their medicines as prescribed and had insufficient information relating to their medicines.

Nine participants stockpiled prescribed medicines in advance of the surgery. Eight participants claimed their memories were fading, and participants frequently did not know what their medicines were prescribed for, or possible side effects, even though half the participants claimed to suffer side effects.

Eighteen participants regularly used over-the-counter analgesic formulations and half used complementary therapies. Family support and physical assistance was essential to manage comorbidities. Significantly, 50% of participants lived alone and family members were not always healthy or able to help.

The day of discharge

The joint replacement surgery remained the predominant health priority. Even though participants were relieved the surgery was over and hopeful for major improvements in their wellbeing at discharge, 16 participants reported they only expected to receive specific care of the joint surgery. In addition, some participants did not think the acute admission would affect their comorbidities. For example one participant with a Berry aneurysm stated:

‘I guess what I’m trying to say is that if I had blood pressure before I went in, I don’t think that a knee replacement is going to affect it in any way’.

There was no reference to the participant’s past history of stroke from her aneurysm in her clinical pathway record. Comorbidities were only recorded in the admission notes of five of the 20 participants. Medicines were changed to meet orthopaedic management according to the clinical pathway. However, two participants’ routine medicines were

ceased in hospital because of duplicated treatment or the medicine had been withdrawn from the market. Copies of discharge letters in the medical history focused on the joint replacement and related complications. Comorbidity education and management were not included in care plans and comorbidities were largely ignored unless acute symptoms developed. Participants with unstable comorbidities or complications in acute care were dissatisfied with the non-individualised care they received. One participant stated:

‘They [the nurses] were there to take your temps [temperatures] and that was it. I think you could have died, you know, that wouldn’t have been an issue... hip was working, you know, put me in the coffin.’

Patients were expected to recover at the rate specified by the clinical pathway. Four participants felt staff hounded them to progress according to the joint replacement clinical pathway. Three women wanted to stay in hospital longer rather than move to a rehabilitation setting. The length of stay in rehabilitation varied from 14 to 35 days.

Comorbidities and surgical complications increased the complexity of care following surgery. Comorbidities became symptomatic in nine participants, for example depression, vertigo, gout and lower back pain. One participant experienced angina confirmed by electrocardiograph (ECG) changes on the day of surgery but there was no further references to the angina or ECG changes in her medical record.

Pain was more significant at discharge than the other three time points. Women experienced more pain than men. There was a wide variation in the strength and type of analgesia prescribed. Participants tended to make comparisons between the ‘old’ and the

‘new’: old pain was bad, new pain will resolve itself. Fatigue was a common symptom and adequate sleep, rest, and assistance with activities of daily living (ADLs) were not always achieved. Now that surgery was over, thirteen participants disclosed they suffered from urinary incontinence, which they thought was due to an inability to quickly mobilise to the toilet, diuretic medicines, urinary tract infections, prostate problems or an ‘overactive bladder’.

Three participants felt nursing care lessened after the first day and their nursing care needs because of the surgery were neglected. All participants indicated they were reluctant to complain and expressed praise and gratitude to the nurses to ensure they would receive the care they thought they required.

Four weeks after orthopaedic surgery

Residual health consequences were apparent four weeks after discharge from the orthopaedic unit and the joint replacement remained the main concern. Thirteen participants were despondent because they expected to recover sooner, and unfulfilled expectations caused tension between family and carers. Recovery was delayed by complications, pain, poor physical health, weight gain, poor sleep and an inability to undertake usual activities. One participant stated:

‘The last couple of weeks my health has not been so bright. I’ve got sinusitis. I take sprays regularly, plus I’m constipated, breathless and have the hiccoughs.’

Participants still needed help with ADLs. Community nursing care offered by the orthopaedic unit was limited to home visits focusing on postoperative care according to

the joint replacement clinical pathway, although blood glucose and blood pressure were documented in three participants' notes. In addition, comorbidities that could impact on surgical outcomes such as diabetes increasing the risk of wound infection. However,

Pain associated with the joint replacement was the most common symptom that interfered with activities, sleep, and the type of clothes that could be worn. One participant stated:

'This joint [replacement] is worse than the last one. I'm only allowed Panadeine forte—it's burning pain'.

The presence of pain was most strongly correlated with the RAND-36 Social Functioning subscale $r = 0.795$, $P < 0.0010$. In some cases, comorbidity pain was considered to be worse than surgical pain. A participant stated:

'The surgical hip pain was not as bad as the sciatic pain'.

Analgesia was a significant stressor for 19 participants. Participants were reluctant to take analgesia, were not educated about how to manage their pain, were not given an adequate supply of analgesics, and some analgesics were ineffective. The choice of analgesia was limited by the presence of comorbidities and previous complications that included an opiate-induced bowel obstruction. In one case a participant was given antidepressant medicines that she thought were analgesics, causing her to be confined to bed for three days. Analgesia caused unwanted side effects such as drowsiness, nausea,

agitation and constipation. Two participants chose not to take analgesic medicines. One participant stated:

‘I’ve tried to take myself off them [analgesics] now because I’ll finish up killing myself taking these things.’

Nine participants were continually tired from poor sleep due to pain or having to sleep in a particular position.

Managing comorbidities was an additional strain at the four week recovery period. Nocturia was more marked postoperatively. In addition surgical adverse events and other illnesses occurred and caused pain and necessitated visits to the GP. Specific comorbidities such as gout interfered with orthopaedic management: five participants had difficulty putting on their anti-embolic stockings. One participant who could not put on his stockings developed a pulmonary embolus.

A quarter of the participants developed wound infections approximately five to ten days after going home, and in some cases after the hospital visiting nurses no longer provided care. Wound infections were more commonly associated with total knee replacement, genitourinary comorbidities, and people over the age of seventy. Wound infections necessitated three readmissions.

Eight weeks after orthopaedic surgery

As participants recovered from the acute illness their health focus returned to the demands of their comorbidities. Seven participants were waiting for a second joint

replacement. Table 4 illustrates the 20 most common preoperative symptoms and symptoms at eight weeks after surgery.

Table 4: Comparison of symptoms reported by the number of participants prior to surgery and at eight weeks following surgery (n = 20).

Presurgery				Postsurgery					
Symptom	Severity rating			Symptom	Severity rating				
	Number	Mild	Moderate		Severe	Number	Mild	Moderate	Severe
Pain	20	0	8	12	Pain	20	9	8	3
Impaired mobility	20	3	6	11	Impaired mobility	20	14	4	2
Fatigue	19	4	9	6	Impaired vision	19	19	0	0
Impaired vision	19	19	0	0	Nocturia	17	10	7	0
Bone aches	18	2	4	12	Bone aches	16	4	8	4
Tired	18	2	11	5	Tired	16	10	5	1
Swollen, painful joints	17	1	3	13	Fatigue	15	10	4	1
Nocturia	17	10	7	0	Back ache	15	9	5	1
Back ache	16	2	5	9	Urinary frequency	15	8	7	0
Morning stiffness	15	2	7	6	Aching legs	14	7	3	4
Breathless walking	15	6	7	2	Oedema	14	9	3	2
Urinary frequency	15	8	7	0	Insomnia	14	5	6	3
Aching legs	14	2	4	8	Morning stiffness	13	10	0	3
Insomnia	13	4	3	6	Swollen painful joints	13	6	6	1
Balance problems	13	5	3	5	Urinary incontinence	13	9	4	0
Urinary incontinence	13	9	4	0	Dry mouth	12	9	3	0
Dry mouth	13	8	2	3	Wind pain	11	5	6	0
Cramps	13	10	1	2	Breathless walking	11	10	0	1
Stress	13	5	6	2	Sensitivity to weather	11	11	0	0
Anxiety	13	4	7	2	Sexual health issues	10	5	1	4

Stable comorbidities such as generalised arthritis continued to limit activities as they had before surgery, and frequently interfered with sleep, which contributed to fatigue during the day. Comorbidity stability was unpredictable and participants generally required long term assistance. Participants reported they had keep up with specialist appointments and to be vigilant yet cautious about their health status. Health care appointments were geographically scattered, which increased the complexity of care and access difficulties.

In addition to orthopaedic appointments and despite stockpiling medicines prior to surgery, 17 participants consulted their GPs to obtain prescription medicines following surgery. Higher CIRS-G scores were related to increased GP use, complications, and persistent pain. All participants sustained extra health care costs after discharge from hospital, primarily for medicines and over-the-counter and complementary therapies.

Discussion:

The results are similar to the existing literature concerning the experience of a single chronic illness (Strauss 1975, Miller 1992, Lubkin *et al.* 2002, Dunning 2003), but the presence of comorbidities magnified these difficulties. Participants developed a broad range of coping mechanisms to deal with the inevitable deterioration in their general wellbeing.

The non-probability purposive sampling resulted in no obvious differences between participants having a hip or knee replacement that have been previously reported in larger studies (Kiebzak *et al.* 2002). Prior to surgery, all except one participants' CIRS-G score and one RAND-36 subscale were outside established norms, which indicated poor general wellbeing. Participants experienced extended periods of

discomfort including acute and chronic pain, fatigue, insomnia and alterations in urinary elimination that have been extensively reported in the literature (McCaffery *et al.* 1997, Dempsey *et al.* 2001, Lubkin *et al.* 2002, Kralik *et al.* 2005), and were not willing to disclose all of their illnesses, possibly because they felt it could jeopardise the chance for surgery. The severity of each comorbidity contributed to participants' mental and physical exhaustion on admission, which reduced their capacity to cope with the additional stress of admission and surgery.

The continuity of comorbidity care was inadequate or non-existent prior to having surgery, during the acute care stay and following surgery. Participants were assessed in the preadmission clinic from the perspective of surviving an anaesthetic and meeting the expected length of stay criteria. Considering and managing comorbidities in the preadmission clinic may have prevented some comorbidities from becoming unstable. Overall, the medical histories contained very few references to comorbidities, and this finding is also reported in the literature (Humphries *et al.* 2000). Thus, it appears that health professionals as well as participants have difficulty viewing health as an integrated, holistic concept.

Efforts to standardise health care contributed to less than optimal comorbidity management. Short lengths of stay inhibit effective discharge planning necessary for continuity of care (Armitage *et al.* 1998, Williams 2004). Five women wanted to stay longer in acute care. However, short lengths of stay reduce the risk of iatrogenic complications and waiting times for joint replacement. The Australian health care system is responding to reports of excessive waiting times for orthopaedic surgery by offering to overhaul public waiting lists, including waiting times to secure dental care (Noble 2005,

Nader 2006). Additionally, research strongly suggests that total joint replacement conducted earlier in the course of a patient's functional decline may improve clinical outcomes (Fortin *et al.*, 2002).

Concerns regarding medicines and ongoing comorbidity management raises questions about who should provide primary care in the community (Rothman *et al.* 2003, Gask 2005). GPs were the most common health care service accessed postoperatively in the current study and reported by other researchers (McMurray *et al.* 2002). GPs were required for the management of complications and for medicine scripts, rather than coordinated comorbidity care. Pain management was particularly problematic. Although pain usually subsides by three months after joint replacement (Nilsson 2002), effective pain management is required in the interim, including comorbidity-related pain control. An important factor affecting co-ordinated continuity of care between hospital and the community setting remains communication among healthcare providers (Sparbel *et al.* 2000).

Nursing and medicine are increasingly specialised to meet the demands of health care organisations which can erode holistic care. For example, opportunities for educating people about comorbidities and comorbidity self-management were missed by nurses and doctors because they adhered to the designated clinical pathway. It has been suggested that comorbidities are better managed using clinical pathways in joint replacement surgery, although clinical pathways were designed to standardise management of a specified illness and enhance the specialty focus (Dowsey *et al.* 1999). Clinical pathways for acute care and a complex array of comorbidities do not lend themselves to standardised care (Parker 2004).

Comorbidities were not routinely included in the caring routine, other than medication rounds, unless the comorbidity became acutely unstable. Adequate staff ratios and organisational support of nurses is required to provide care that people with comorbidities require in acute care and in the community (Aiken *et al.* 2002, Fitzgerald *et al.* 2004, Kable *et al.* 2004, Williams 2004).

Participants were aware of the care they should receive through prior exposure to the health system and knew the rules of being a ‘good patient’ to ensure they received such care (Williams *et al.* 2002). The ‘docile patient’ is at odds with the ‘expert patient’ who self-manages their chronic conditions on a daily basis (Koch *et al.* 2004). In addition, self-management was difficult when treating health professionals were located in different sites and did not communicate with each other regarding a participant’s comprehensive self-management plan.

Conclusion

The development of chronic illnesses has become an inevitable part of life for the vast majority of Australians. People with chronic illnesses almost certainly require an acute hospital admission at some stage of their lives. The merge of acute and chronic illness needs increases the complexity of care. The structure of the prevailing health care environment makes meeting the requirements of patients with comorbidities in the acute care setting, and post discharge difficult.

This study demonstrated that continuity of care of comorbidities was lacking. Management of comorbidities primarily focused on medicines. The responsibility for health rested with the individuals who relied on professional experts to assist them to manage their ill-health. However, self-management was difficult with the limitations

imposed by the clinical pathways and fragmented health care, and models of chronic illness management designed to integrate care did not feature in this study. As a result, general wellbeing was less than optimal throughout the study period. Participants' recovery was delayed and poor pain management, fatigue, insomnia and alterations in urinary elimination were the chief sources of discomfort.

Acute care, clinical pathways, and the specialisation of medicine and nursing, subordinated the general problem of patients with comorbidities. Participants with comorbidities in the public health system were in a perpetual state of waiting: waiting to have the joint replaced, waiting to recover from the surgery, waiting to recover from surgical complications, waiting for further adjustment to their limbs to achieve unhampered mobility, waiting for their unstable comorbidities to settle, waiting for doctor's appointments, and waiting in line for general health care such as dental and eye care. These findings have implications for a comprehensive and coordinated approach to patients with comorbidities.

Comorbidities require additional management and comprehensive documentation. The complex care that comorbidities require is a role for all nurses to integrate in the patient's care plan. In addition, the role of the advanced practice nurse in comorbidity management would include medicine review, strong connections to quality primary care, coordinated multidisciplinary referral and accessibility to support programs. Chronic care needs to be proactive, patient-oriented, multidisciplinary, and longitudinal rather than take a short term disease focus that suits acute care needs.

Well-controlled comorbidities enable people to enjoy active lives. Nurses are ideally placed to inform health policy through practice and research that values the needs

of people with chronic illnesses. Concomitantly, being an advocate for the patient may help restore patients' faith in a health system that has demonstrated difficulties in meeting their needs.

Recommendations for further research include an exploration of the nurses' perspective on caring for patients with comorbidities. Further clarification of the impact of the sum of comorbidities and multiple illnesses interacting with each other and pain would help health professionals develop strategies to support patients with comorbidities.

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