Patient Participation in Postoperative Care Activities: Improving the patient experience

by

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I am the author of the thesis entitled patient participation in postoperative care activities:

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Abstract

Patient participation in care is essential for ensuring safe and high quality healthcare however, processes for engaging patients as active participants, and the impact of that participation on patient recovery outcomes are not well understood. There is evidence that patients participating in their own care in chronic illness is effective in producing better health outcomes, however in the context of acute postoperative care, participation in meeting treatment goals of care during an episode of acute illness and its impact on recovery outcomes are poorly understood.

The purpose of this research program was to test the effectiveness of a bedside, multimedia, nurse-facilitated intervention (MyStay) in improving patient outcomes after surgery. The intervention was designed to increase the capability and opportunity for patients to participate in achieving their goals of recovery in the immediate postoperative period after surgery. The conceptual framework used to guide this research focused on the critical interconnected concepts of capability, opportunity and activation.

This study was designed as a cluster randomised, crossover trial with an embedded detailed process evaluation. Multimedia via iPad™ technology was selected as the intervention most likely to be effective in influencing patient participation in the context of acute postoperative recovery because of low burden, continuous availability and ease of use. The multimedia intervention was designed to deliver information that was explicit, actionable, non-ambiguous and tailored specifically to the goals of care following TKR surgery.
Four main aims guided the research:

1. To determine the primary outcome of the intervention in relation to patients’ pain intensity on Day 3 following Total Knee Replacement surgery;
2. To determine the secondary outcomes of: interference of pain on activities of daily living, length of stay in hospital, function and pain following surgery four weeks after discharge from acute care, patients’ satisfaction with care received, postoperative complications – Deep Vein Thrombosis (DVT) within 28 days of surgery and readmission to hospital within 28 days of discharge from acute care.
3. To evaluate the processes used in the conduct the trial of the multimedia intervention; and
4. To explore whether the intervention provided patients with the capability and opportunity to participate in care related to their goals of recovery.

Data collection methods included nurse group interviews and ward meetings, patient reported paper-based questionnaires, patient semi-structured interviews on Day 3 following surgery, medication chart audit, and medical records audit. Data were collected at three major time points: pre-admission (baseline), Day 3 following surgery and four weeks after discharge from acute care. The primary endpoint of pain intensity was compared between groups to determine differences between the intervention and control (usual care). A linear mixed model analysis was used to calculate the F-test to compare the means of the groups. In a supportive analysis, the REML method was used to estimate, and if necessary adjust for, period effects. Other outcome measures such as preference for participation, control preference and perceived participation in care were used to make
comparisons between groups and the analyses used a linear mixed model approach and analogous methods developed for binary and categorical data.

Qualitative data were obtained through questionnaires and patient interviews. Interview transcripts were analysed using quantitative content analysis. These provided data regarding patients' knowledge of their goals of recovery and their level of participation in achieving these goals. In addition, transcripts were analysed using the established complementary techniques of thematic and content analysis to determine the barriers and facilitators to participation after TKR surgery.

A total of 241 patients (104 intervention group and 137 control group) took part in the trial over the 15 month data collection period from March 2014 to June 2015. Patients in the intervention group reported lower pain intensity on Day 3 ($p = 0.037$), stayed in hospital one day less ($p = 0.041$), were more likely to refer a family or friend to the organisation ($p = 0.021$) and reported higher overall satisfaction with care ($p = 0.013$). An incidental finding was that intervention group patients returned to full time work sooner after discharge ($p = 0.039$).

The simultaneous embedded process evaluation provided rich data regarding implementation of the intervention into an acute care clinical practice environment. Findings provide evidence that the implementation of the multimedia intervention was robust and structured and successful in terms of patient participant recruitment and application.
Semi-structured interviews with patients \((n = 230)\) on Day three revealed intervention group patients had greater awareness of their goals of recovery related to pain management, mobility, and preventing complications and were more active in achieving their goals. Further, intervention group patients were more likely to initiate actions, seek clarification, negotiate strategies and self-monitor than control group patients, and received more PRN opioid analgesia on Day 3 \((p = 0.001)\). Barriers and facilitators to participation were: 1) patient reported personal influences on capability for participation, 2) clinician behaviours that influenced opportunity for participation and 3) structural factors that impacted on opportunity to participate.

In conclusion, the *MyStay* bedside, multimedia, facilitated intervention designed to increase the capability and opportunity for patients to participate in achieving their goals of recovery in the immediate postoperative period after TKR surgery enhanced patient participation in their care after surgery. Enhanced participation resulted in improved outcomes. In-hospital pain intensity and length of stay in acute care were reduced and patient satisfaction was increased. Patients who engaged with *MyStay* were more likely to recommend the hospital to family and friends who were undergoing similar surgery.

The embedded process evaluation confirmed the relationships between capability, opportunity and activation proposed by the conceptual framework informing this research and identified facilitators and barriers related to patient perceived clinician behaviours and processes of care that impact on participation. The findings contribute to our evolving understanding of patient participation and provide a tool and framework for implementing
and evaluating interventions to promote patient participation in recovery after TKR surgery.

Future research is needed to confirm findings across health services and rigorous translation science processes investigated to increase the potential for consistent, positive outcomes and sustainability.
# Table of Contents

Abstract....................................................................................................................................................................... i

Table of Contents ................................................................................................................................................. vi

List of Figures ................................................................................................................................................... xviii

List of Tables ........................................................................................................................................................ xxi

List of Abbreviations ...................................................................................................................................... xxiii

Chapter 1 .................................................................................................................................................................. 1

The Research Problem ........................................................................................................................................ 1

1.1 Quality and Patient Safety ..................................................................................................................... 3

1.2 Acute Care Environments ...................................................................................................................... 8

1.2.1 Total Knee Replacement (TKR) surgery ........................................................................................... 9

1.2.1.1 Key treatment goals of recovery after TKR surgery ................................................................. 10

1.3 Purpose of the Study.............................................................................................................................. 14

1.4 Aims and Objectives of the Study ..................................................................................................... 14

1.5 Thesis Structure ...................................................................................................................................... 16

Chapter 2 ................................................................................................................................................................ 17

Patient Participation in Health Care: Review of the literature .......................................................... 17

2.1 Patient Participation: Definitions and enactment .............................................................................. 19

2.1.1 Definitions........................................................................................................................................... 20
2.1.2 Key elements underpinning patient participation ................................................................. 22
   2.1.2.1 Patient knowledge and capability ................................................................................... 22
   2.1.2.2 Opportunities for participation ..................................................................................... 24
   2.1.2.3 Patient activation ............................................................................................................ 26

2.1.3 Summary ..................................................................................................................................... 28

2.2 Outcomes of Patient Participation in Healthcare .................................................................. 29
   2.2.1 Chronic illness ...................................................................................................................... 29
   2.2.2 Acute care .......................................................................................................................... 33
      2.2.2.1 Falls prevention ........................................................................................................... 34
      2.2.2.2 Infection prevention .................................................................................................. 36
      2.2.2.3 Care transitions ......................................................................................................... 39
      2.2.2.4 Goal setting and recovery ......................................................................................... 41
      2.2.2.5 Pain and symptom management .............................................................................. 42

2.2.3 Summary ..................................................................................................................................... 45

2.3 Barriers to Participation in Acute Care .................................................................................. 45
   2.3.1 Organisation-related factors .............................................................................................. 46
   2.3.2 Clinician related factors .................................................................................................... 48
   2.3.3 Patient related factors ....................................................................................................... 50
   2.3.4 Summary .................................................................................................................................. 54
2.4 Multimedia Interventions to Improve Patient Participation in Care

2.4.1 Systematic narrative review of the effectiveness of multimedia in patient engagement

2.4.1.1 Review questions

2.4.1.2 Results

2.4.1.3 Discussion

2.5 Conclusions

2.6. Conceptual Framework

2.6.1 MyStay TKR intervention

Chapter 3

The Research Program and Methods

3.1 Aims, Hypothesis and Objectives of the Study

3.1.1 Aims and objectives

3.1.2 Hypothesis

3.2 Cluster Randomised Crossover Trial

3.2.1 Research design

3.2.1.1 Control group - usual care

3.2.1.2 Randomisation

3.2.1.3 Potential for contamination
3.2.1.4 Blinding ..................................................................................................................................... 81

3.2.2 Participants................................................................................................................................................ 82

3.2.2.1 Inclusion criteria.................................................................................................................................. 83

3.2.2.2 Exclusion criteria.............................................................................................................................. 83

3.2.2.3 Recruitment ..................................................................................................................................... 83

3.2.2.4 Handling of withdrawals ............................................................................................................. 84

3.2.2.5 Replacements ................................................................................................................................... 84

3.2.3 Research setting....................................................................................................................................... 85

3.2.4 Multimedia intervention....................................................................................................................... 85

3.2.4.1 Design of the intervention........................................................................................................... 87

3.2.4.2 MyStay content topics and structure ....................................................................................... 89

3.2.4.3 Intervention application procedure ......................................................................................... 92

3.2.5 Primary and secondary outcomes .................................................................................................... 94

3.2.5.1 Primary endpoint ....................................................................................................................... 94

3.2.5.2 Secondary endpoints ................................................................................................................. 94

3.2.6 Outcome measurement......................................................................................................................... 96

3.2.6.1 Baseline measurement - pre admission...................................................................................... 96

3.2.6.2 Outcome measurement – Day 3 ................................................................................................. 97

3.2.6.3 Outcome measurement – follow up.......................................................................................... 98
3.2.7 Data collection tools ................................................................................................................................ 99

3.2.7.1 Patient Activation Measure .................................................................................................................. 99

3.2.7.2 Control Preference Scale ....................................................................................................................... 100

3.2.7.3 Barriers Questionnaire .......................................................................................................................... 102

3.2.7.4 American Pain Society Outcome Questionnaire – revised version ....................................................... 103

3.2.7.5 Pain Numerical Rating Scale .................................................................................................................. 103

3.2.7.6 Satisfaction and Net Promoter Score (NPS) .......................................................................................... 104

3.2.7.7 Oxford Knee Score ................................................................................................................................... 106

3.2.8 Statistical analyses ................................................................................................................................ 107

3.2.8.1 Sample size calculation .......................................................................................................................... 107

3.2.8.2 Quantitative analysis ............................................................................................................................... 110

3.3 Process Evaluation ...................................................................................................................................... 110

3.3.1 Process evaluation procedure to evaluate the conduct of the trial .......................................................... 113

3.3.1.1 Data analysis ........................................................................................................................................... 114

3.3.2 Process evaluation of the effect of the intervention on capability and opportunity for participation ........................................................................................................................................... 118

3.3.2.1 Quantitative content analysis .................................................................................................................. 119

3.3.2.2 Qualitative analyses ............................................................................................................................... 127

3.4 Ethical Considerations .................................................................................................................................. 127
4.2.3 Patient activation .................................................................................................................................. 142

4.2.4 Control preference ................................................................................................................................ 142

4.3 Outcomes of the Cluster Randomised, Crossover Trial ................................................................................. 143

4.3.1 Primary outcome ................................................................................................................................... 143

4.3.1.1 Pain Day 3 - Numerical Rating Scale ......................................................................................... 144

4.3.2 Secondary outcomes ............................................................................................................................ 144

4.3.2.1 Interference of pain on activities of daily living (APSOQ-R) on Day 3 .............................. 145

4.3.2.2 Length of hospital stay (days) ........................................................................................................ 146

4.3.2.3 Function and pain following TKR surgery (Oxford Knee Score) .............................................. 146

4.3.2.4 Patient overall satisfaction and Net Promoter ........................................................................ 148

4.3.2.5 Postoperative complications – Deep Vein Thrombosis ................................................................. 149

4.3.2.6 Readmissions to hospital (within 28 days) ................................................................................... 150

4.4 Discussion ............................................................................................................................................... 153

4.4.1 Primary outcome ................................................................................................................................... 154

4.4.2 Secondary outcomes ............................................................................................................................ 156

4.5 Conclusions ............................................................................................................................................ 162

Chapter 5 ............................................................................................................................................................. 164

Process Evaluation: Implementation, Usability and Sustainability ........................................................................... 164

5.1 Methods ................................................................................................................................................... 165
5.1.1 Pre-implementation phase ................................................................. 165

5.1.1.1 Nurse group interview ................................................................. 166

5.1.1.2 Ward and in-service meetings ...................................................... 166

5.1.1.3 Flyers/handouts ........................................................................ 167

5.1.1.4 Email correspondence ............................................................... 167

5.1.2 Implementation phase ................................................................. 167

5.1.3 Evaluation phase ........................................................................ 168

5.2 Findings and strategies ..................................................................... 169

5.2.1 Findings from pre–implementation phase ...................................... 169

5.2.1.1 Strategies for implementation of the intervention ....................... 171

5.2.1.2 Recruitment ................................................................................ 172

5.2.2 Findings from the implementation phase ..................................... 175

5.2.2.1 Identification of patients post-surgery enrolled in the study ............ 175

5.2.2.2 Application of the intervention .................................................. 176

5.2.2.3 Maintenance of the intervention and participants ....................... 176

5.2.3 Findings from evaluation phase .................................................. 178

5.2.3.1 Reach, usability and acceptability .............................................. 178

5.2.3.2 Barriers to implementation ...................................................... 182

5.3 Discussion ...................................................................................... 184
5.3.1 Recruitment and maintenance ................................................................. 185
5.3.2 Implementation of the intervention ......................................................... 185
5.3.3 Usability and acceptability ...................................................................... 188

5.4 Conclusions ............................................................................................... 191

Chapter 6 ......................................................................................................... 193

Process Evaluation: Capability and Opportunity for Participation .................. 193

6.1 Methods ..................................................................................................... 193

6.2 Knowledge and Participation in Relation to TKR Goals of Recovery .......... 197

6.2.1 Knowledge and participation in pain management strategies ................. 197
6.2.2 Participation in knee exercises ............................................................... 200
6.2.3 Participation in mobility ................................................................. 202
6.2.4 Participation in daily goals of recovery ............................................... 204
6.2.5 Summary ............................................................................................ 206

6.3 Analysis of Facilitated Opportunities for Patient Participation .................. 206

6.3.1 Pain assessment and management ......................................................... 207

6.3.1.1 Pain assessment ............................................................................... 207
6.3.1.2 Analgesic management ................................................................. 211
6.3.2 Patient reported barriers and facilitators to participation ...................... 219

6.3.2.1 Perceived influences on capability for participation ....................... 219
6.3.2.2 Clinician behaviours and processes of care that influence opportunity to participate

6.3.2.3 Structural factors that impacted on opportunity to participate

6.4 Patient Activation and Preference for Participation

6.4.1 Patient activation

6.4.2 Control preference

6.5 Discussion

6.5.1 Knowledge of goals of recovery after TKR

6.5.2 Processes of care and opportunities for participation

6.5.2.1 Assessment, documentation and treatment of pain

6.5.2.2 Barriers and facilitators to participation in recovery

6.5.3 Patient activation and participation

6.6 Conclusions

Chapter 7

Integration and Conclusions

7.1 Integration of Findings

7.1.1 Outcomes of the research program

7.1.1.1 A facilitated multimedia intervention enhances participation in the acute postoperative context
7.1.1.2 Patient capability and opportunity to participate leads to better outcomes of care ................................................................. 258

7.1.2 Summary of integration .................................................................................................................................................................. 264

7.1.3 Contribution to knowledge ......................................................................................................................................................... 266

7.2 Implications of the Research for Practice ................................................................................................................................. 266

7.3 Strengths and Limitations of the Research ............................................................................................................................... 271

7.3.1 Strengths of the research ......................................................................................................................................................... 271

7.3.2 Limitations of the research ....................................................................................................................................................... 273

7.4 Future research agenda ................................................................................................................................................................. 274

7.5 Conclusions ..................................................................................................................................................................................... 275

References ....................................................................................................................................................................................... 276

Appendices ...................................................................................................................................................................................... 305

List of Appendices ........................................................................................................................................................................ 305

Appendix 1: TKR Care Guide .......................................................................................................................................................... 306

Appendix 2: PCIF Patients ............................................................................................................................................................... 317

Appendix 3: Pre-admission questionnaire ........................................................................................................................................ 324

Appendix 4: Day 3 Patient questionnaire .......................................................................................................................................... 336

Appendix 5: Semi-structured Interview ........................................................................................................................................... 349

Appendix 6: Chart Audit Tool .......................................................................................................................................................... 351
Appendix 7: Deakin Ethics Approval

Appendix 8: Hospital Ethics Approval

Appendix 9: Nursing Staff Handout

Appendix 10: Flyer Patient Notes

Appendix 11: MyStay Evaluation Questionnaire

Appendix 12: Laminated Cards
List of Figures

Figure 2.1 PRISMA diagram ............................................................................................................................ 59
Figure 2.2 Conceptual framework of patient participation ............................................................................. 73
Figure 3.1 Study design .................................................................................................................................... 79
Figure 3.2 MyStay Total Knee Replacement main page screenshot .................................................. 89
Figure 3.3 “My Day” section of the MyStay Total Knee Replacement multimedia program .................. 90
Figure 3.4 Day 1 goals presentation MyStay Total Knee Replacement multimedia program .......... 91
Figure 3.5 Exercise program MyStay Total Knee Replacement multimedia program .................. 91
Figure 3.6 Handout given to patients with the iPad on Day 1 post operatively ................................. 93
Figure 3.7 Levels of measurement on the Patient Activation Measure (PAM) survey .................. 100
Figure 3.8 The Net Promoter Score (NPS) ................................................................................................. 106
Figure 3.9 Process evaluation flow chart ................................................................................................. 114
Figure 4.1 Patient participant flow through each stage ................................................................................. 134
Figure 4.2 Recruitment method of patient patients to the trial (N = 241) ........................................ 135
Figure 4.3 Percentage of patients allocated to intervention or control cohort by method of recruitment ........................................................................................................................................... 135
Figure 4.4 Final assignment of patients to clusters and periods (N = 241) ........................................ 136
Figure 4.5 Previous hospital admission in acute care in the past five (5) years (N = 241) 139
Figure 4.6 Patient Activation Measure (PAM) Pre-Admission (N = 240) .................................... 142

Figure 4.7 Distribution of Control Preferences (CPS) pre-admission (N = 239) ......................... 143

Figure 4.8 Median pain scores by condition at Day 3 post-surgery (n = 237) ......................... 144

Figure 4.9 Median length of stay in days for each condition (n = 241) ................................. 146

Figure 4.10 Mean satisfaction scores at 4 weeks after discharge between groups (n = 209) ................................................................................................................................................................................. 148

Figure 5.1 Flow of participants through each stage of the trial: preadmission to follow up 4 weeks post discharge ...................................................................................................................................... 174

Figure 5.2 Number of patients who indicated that nurses discussed information in the MyStay TKR program with them in the previous 24 hours (N = 103) ............................. 178

Figure 5.3 Reported ease of use of the MyStay TKR program via the iPad™ (N = 103) ........ 179

Figure 5.4 Number of times the iPad™ program was viewed in the previous 24 hours (N = 103) ................................................................................................................................................................................. 180

Figure 5.5 Number of patients able to view the iPad™ program as often as they wanted to (N = 103) ................................................................................................................................................................................. 180

Figure 5.6 Patient reported reasons for difficulty viewing “MyStay” program ...................... 182

Figure 6.1 Mean frequency of pain score documentation in 24 hours ........................................ 208

Figure 6.2 Person responsible and number of times pain was documented in patients’ progress notes ................................................................................................................................................................................. 211

Figure 6.3 Allergies as stated by control and intervention groups ........................................... 213
Figure 6.4 Proportion of patients prescribed multimodal analgesics by medication class 214

Figure 6.5 Proportion of patients who received their prescribed regular, fixed-interval multimodal analgesics.................................................................................................................................... 217

Figure 6.6 Total amount of oxycodone administered in 24 hours in milligrams............... 219

Figure 6.7 Patient Activation Measure (PAM) Day 3 (N = 235) ..................................................... 231

Figure 6.8 Patient Activation Measure (PAM) 4 weeks post discharge (N = 202) ................. 231

Figure 6.10 Control Preference 4 weeks after discharge (N = 203)....................................... 233
List of Tables

Table 2.1 Clinician, patient and organisational barriers to participation ........................................... 53

Table 2.2 Articles included in the review of multimedia interventions used to improve patient participation in acute care ............................................................................................................... 60

Table 3.1 Application of the principles of universal design ............................................................... 88

Table 3.2 Concepts measured and tools used in the pre-admission questionnaire .................. 96

Table 3.3 Concepts measured and tools used in the Day 3 outcomes patient questionnaires, interviews and medical record audit .......................................................................................................... 97

Table 3.4 Concepts measured and tools used in the 4-week follow up questionnaire .......... 99

Table 3.5 Sample size calculations ............................................................................................................. 109

Table 3.6 Sample size calculations ............................................................................................................. 109

Table 3.7 Implementation and process evaluation components and methods used .......... 116

Table 3.8 Structured coding scheme for Goal 1: participation in pain management .......... 121

Table 3.9 Structured coding scheme for Goal 2: participation in exercises ......................... 122

Table 3.10 Structured coding scheme for Goal 3: participation in mobility ......................... 123

Table 3.11 Structured coding scheme for Goal 4: participating in daily goals necessary for recovery ............................................................................................................................................................... 124

Table 4.1 Baseline characteristics of patients overall, intervention patients and control patients, in the MIME study (N = 241) ....................................................................................................................... 138

Table 4.2 Perceived barriers to pain management (BQ) at baseline (N = 241) ................. 141
Table 4.3 Patients’ employment status at follow up ................................................................. 148
Table 4.4 Net promoter scores (N = 209) ................................................................................ 149
Table 4.5 Primary and secondary outcomes: Treatment means, standard errors of the means (SEM), 95% confidence intervals (CI) for the differences between the means and P-values from the F-tests for the treatment main effect (FAS). ................................................. 151
Table 5.1 Methods used in the trial implementation and data collection ................................ 165
Table 5.2 Application of the intervention procedure ............................................................... 175
Table 5.3 Reasons patients indicated for not viewing iPad™ Program as often as they wanted (n = 39) .......................................................................................................................... 181
Table 6.1 Concepts measured, methods used and analysis of the process evaluation .......... 194
Table 6.2 Participation in pain management strategies (n = 230) .............................................. 198
Table 6.3 Structured coding scheme for Goal 1: participation in pain management .......... 199
Table 6.4 Participation in knee exercises (n = 230) ................................................................ 200
Table 6.5 Structured coding scheme for Goal 2: participation in exercises.......................... 201
Table 6.6 Participation in mobility (n = 230) ........................................................................... 202
Table 6.7 Structured coding scheme for Goal 3: participation in mobility .............................. 203
Table 6.8 Participation in daily goals necessary for recovery (N = 230) ................................. 204
Table 6.9 Structured coding scheme for Goal 4: participating in daily goals necessary for recovery ........................................................................................................................................ 205
Table 6.10 Frequency of patients who received their full dose of NSAIDs in 24 hours ....... 215
List of Abbreviations

ACSQHC Australian commission on safety and quality in health care
ANOVA Analysis of variance
ANUM Associate nurse unit manager
AOANJRR Australian Orthopaedic Association National Joint Replacement Registry
APSOQ-R American pain society outcome questionnaire – revised
BQ Pain barriers questionnaire (brief)
CPS control preference scale
CVA Cerebrovascular accident
DVT deep vein thrombosis
FAS full analysis set
ITT Intention to treat
LOS Length of stay
NPS net promoter score
NSAIDs non-steroidal anti-inflammatory drugs
NRS numerical rating scale
OKS Oxford knee score
PAM patient activation measure
PRN pro re nata (as necessary)
REML restricted maximum likelihood
RCT Randomised control trial
SEM standard error mean
SPSS Statistical Package for the Social Sciences
TKR total knee replacement
USA United States of America
UK United Kingdom
WHO World Health Organisation
Chapter 1

The Research Problem

Patient participation is considered worldwide as a key pillar of quality health care. It is recognised as a method to improve the quality and safety of health care delivery (Davis, Jacklin, Sevdalis, & Vincent, 2007). Patients require both capability, in terms of having the required knowledge and understanding of how they can be involved in their care, and the opportunity, facilitated by clinicians, to engage in their care. Patient participation is a complex concept, and the contexts in which it applies across the spectrum of health care are highly variable, adding to the difficulties associated with understanding its dimensions in everyday clinical practice, and importantly, its measurement. Further, there are inconsistencies regarding the meaning of participation within acute settings where the term “patient participation” is often used interchangeably with “patient involvement”, “patient collaboration”, “patient-centred care”, “patient activation” and “patient engagement” (Brownlea, 1987; Gruman et al., 2010; Hibbard & Cunningham, 2008; Hill, 2011). The lack of a clear definition contributes to the complexities associated with the enactment and measurement of patient participation.

There are patient factors that can reasonably be expected to impact on patients’ ability to participate in their own care. Patients need to have knowledge of their health history and understand treatment goals associated with their illness. This knowledge is usually imparted by clinicians through formal and informal interactions. In addition,
clinicians providing care, and the processes of care delivery, are fundamental in facilitating patient participation. To date, the majority of studies examining patient participation in their care have focused on involvement in medical treatment decisions and self-management associated with chronic life-long illness (Cahill, 1998; Florin, Ehrenberg, & Ehnfors, 2008; Hill, 2011). Patient participation in meeting treatment goals of care during an episode of acute illness and its impact on recovery outcomes are poorly understood and requires further exploration.

The aim of this study was to test whether a facilitated multimedia intervention improved patient participation in an acute postoperative context determined by patient-reported and organisational measures of recovery. Total knee replacement (TKR) surgery was chosen as the surgical procedure for the cluster randomised, crossover trial because of the salience of patient participation in achieving optimal recovery and benefits from this type of surgery. Currently, there is little evidence of the impact of existing strategies to support participation in care during the postoperative recovery period and in particular, the impact of participation on recovery outcomes and patient satisfaction in this context. This study provides essential data about the nature of patient-clinician interactions that facilitate participation and the role of knowledge and opportunity in providing patients with the capability to participate. In addition, the findings provide a framework for informing clinicians about the barriers and enablers of patient participation in acute care in order to inform care processes that enable patients to participate in their own recovery after surgery.
1.1 Quality and Patient Safety

The quality and safety movement began early in the 20th century when Ernest Codman introduced morbidity and mortality conferences and promoted the idea of systematically monitoring patient outcomes in order to improve the quality of health care (Small & Barach, 2002). Since the early 1900s until the 1970s to 1980s, many attempts were made to improve health care quality and safety however interest from both the public and governments was intermittent.

In the late 1990s, when the Institute of Medicine released its report, To Err is Human, (Kohn, Corrigan, & Donaldson, 2000), the quality and safety movement began to attract the attention of clinicians, governments and policy makers and, importantly health care consumers. The speed and intensity with which this report captured media, public, political and health professionals’ attention was significant. The quoted estimates of 44,000 to 98,000 annual deaths in US hospitals due to medical error was disturbing to both the public and policy makers (Kohn et al., 2000). Funding opportunities were created and organisations were established specifically focused on improving the safety and quality of care in hospitals. Researchers began refocusing their attention from the collection of data to quantify the preventable harm or deaths that were occurring to developing strategies that would lead to improvements in safety and quality care outcomes and find ways to minimise risk to patients.

One strategy used by researchers to determine the quality of care was to collect information from patients regarding their hospital stay by rating overall satisfaction with an organisation. From the 1970s onwards, alongside the consumer movement in the
business industry, there was a steady increase in healthcare organisations wanting to obtain feedback from patients in an attempt to understand what needed to improve within their service delivery (Bostan, Acuner, & Yilmaz, 2007; Dasu & Rao, 1999; Yellen, Davis, & Ricard, 2002).

By the 1990s, patient satisfaction surveys became quite common, but were heavily criticised on the basis of methodological and conceptual weaknesses (Carr-Hill, 1992; Draper & Hill, 1995; Sitzia & Wood, 1997). In addition, what remained perplexing was that the prevalence of preventable harms that were occurring to patients during episodes of hospitalisation did not correspond with the overall high satisfaction ratings patients reported after discharge. Results from patient satisfaction surveys typically reported high levels of overall satisfaction with healthcare despite patients reporting poor experiences in certain aspects of their care. For example, studies emerged that indicated patients reported high levels of uncontrolled pain during their hospitalisation yet rated satisfaction with treatment as highly satisfied (Dawson et al., 2002; Ward & Gordon, 1996).

This paradox resulted in the movement of organisations, particularly within the United States and Europe (e.g. Picker Institute and Kings’ Fund), away from measuring traditional satisfaction ratings, to survey approaches that assessed actual reports of patient experience. It was claimed that the data obtained from patient experience surveys enabled a more direct link to actions required by the organisation to improve quality (Cleary, Edgman-Levitan, Walker, Gerteis, & Delbanco, 1993). By bringing patients’ perspective to the design and delivery of health services, it was proposed that organisations could
improve their ability to meet patients’ needs and increase the quality of care provided (Gerteis & Care, 1993).

Measuring patients’ experience and satisfaction with healthcare is one aspect of the quality and safety movement that provides organisations with information for the purpose of improving the quality of service delivery based on patients’ opinions. Ensuring the safety of patients whilst in the care of health services is also in the forefront of the quality and safety agenda. One approach suggested to ensure the safety of patients is to engage patients as participants in the management of their own health care. This notion of participation or engagement is believed to have a significant role in patient safety and quality (Longtin et al., 2010) and has been integrated into health care policy worldwide.

The Institute of Medicine’s publication “Crossing the Quality Chasm” (Crossing the quality chasm : a new health system for the 21st century, 2001) published in 1996, provided strategies and methods for improving the quality of care delivery in health care organisations. The Institute outlined six aims for improvement built around the core need for health care to be: safe; effective; patient centred; timely; efficient; and equitable (Crossing the quality chasm : a new health system for the 21st century, 2001). It was envisaged that this would ensure patients would experience care that is “safer, more reliable, more responsive to their needs” (Crossing the quality chasm : a new health system for the 21st century, 2001, p. 3). To assist in achieving these aims, the Institute developed a list of 10 guiding rules, four (4) of these relate directly to patient participation: 1) care is customised according to patient needs and values; 2) the patient is the source of control; 3) knowledge is shared and information flows freely; and 4) transparency is necessary.
Following the release of this document, governments and health care organisations worldwide began to include these aims and principles into policy documents and various frameworks for strategic transformation of health care delivery (Patients as Experts, Patients as Partners: Integrating the Patient and Family Voice into Hospital Operations, 2009).

In 2004, the World Health Organization (WHO) launched a patient safety program with an aim to coordinate, disseminate and accelerate improvements in patient safety worldwide. The program “Patients for Patient Safety” aimed to enhance healthcare throughout the world by involving patients as partners in their care ("Patients for patient safety," 2011). This program recognised the important shared role patients have with clinicians, not only in providing feedback on their experiences to improve the quality of health service delivery, but also to actively participate in aspects of their care that contributes to their overall wellbeing.

In line with the WHO initiative, the Australian Commission on Safety and Quality in Health Care (ACSQHC), in 2006, developed a national strategic framework to guide efforts to improve safety and quality across the health care system in Australia and in 2011, released 10 national safety and quality health service standards (National Safety and Quality Health Service Standards, 2011). Partnering with Consumers was one of the standards adopted to support the WHO strategies to ensure patients have a shared role in improving quality outcomes as well as in the evaluation of their healthcare.

Many organisations worldwide have since listed patient participation as a priority for the delivery of safe healthcare. The USA launched a National Patient Safety Foundation
and a National Committee for Quality Assurance both aiming to increase the patient’s voice in healthcare. The United Kingdom (UK) and Europe also began quality and safety programs aimed to ensure patients’ right to be involved in their own healthcare. Despite the emergence of these organisations and reporting bodies, guidance for both clinicians and patients regarding how participation can be enacted effectively is lacking.

In Australia, increasing patient participation in clinical practice has become an integral part of the patient safety agenda. Initiatives such as patient involvement in hand hygiene, clinical communication and medication safety practices by the Australian Commission on Safety and Quality in Healthcare ("The Australian Commission on Safety and Quality in Health Care. Home Page," 2012) highlighted the crucial role patients can play in ensuring their own safety. For example, a number of organisations have implemented guidelines to promote patient participation in hand hygiene by encouraging patients to ask their health professionals to ‘wash their hands’ (Longtin et al., 2010). Medication safety initiatives involve giving patients guidelines to highlight how they can be involved in preventing medicine errors when going in and coming out of hospital, changing wards or seeing different health professionals ("Medication Safety," 2012). For these initiatives to succeed, the environment within which patients are encouraged to participate needs to be conducive to participation by providing capability and opportunity (Longtin et al., 2010).

Operationalisation of patient participation in health care occurs at two levels. Higher level participation occurs through involvement of consumers in health care policy and organisational governance through the inclusion of consumers in clinical quality and safety governance structures within organisations. Patient participation at the point of care
delivery is less clear because the proposed standards lack structured guidelines for clinicians and patients in terms of how participation could be enacted in the realities of clinical practice. In addition, current lack of reporting or measurement of the extent to which patients participate in their care means that the impact of participation on quality and safety and patient outcomes is not known.

1.2 Acute Care Environments

In the acute care environment, treatment decisions often involve multiple clinicians within a short-stay period, where the acuity of patients’ illness is high. As such, patients may have little opportunity or limited capability to participate in their care. Within this context, research findings suggest that patients are rarely participants in decisions made about their care (Doherty & Doherty, 2005; Henderson, 2000; McTier, 2013). Despite evidence that participating in care has led to positive health outcomes for patients with chronic illness, evidence of health outcomes associated with patient participation in acute care contexts is lacking (Longtin et al., 2010).

The intricacies of the acute postoperative environment in particular, and the complexities of patient symptoms after surgery may limit patients’ ability and opportunity for participation in self-care. Factors specific to the acute care environment such as reduced length of stay in hospital (Gruman et al., 2010), acuity of illness (Eldh, Ekman, & Ehnfors, 2006) and the fast pace of the environment (Gravel, Legare, & Graham, 2006; Timonen & Sihvonen, 2000) can affect the quality of interactions between patients and clinicians. In addition, specific patient and clinician-related factors are known to impact on participation in care.
Patient-related factors that impact patients’ participation in care include acceptance of their new role (Levinson, Kao, Kuby, & Thisted, 2005), medical knowledge (Coulter, 2006; Greenfield, Kaplan, & Ware, 1985; Guevara, Wolf, Grum, & Clark, 2003; Katz, Jacobson, Veledar, & Kripalani, 2007), level of confidence (Henderson, 2003; Hibbard, Peters, Slovic, & Tusler, 2005), knowledge related to their condition (Edwards & Elwyn, 2006; Eldh et al., 2006; Hill, 2011), acuity of illness and existing comorbidity (Arora & McHorney, 2000; Ende, Kazis, Ash, & Moskowitz, 1989; Levinson et al., 2005; Mansell, Poses, Kazis, & Duefield, 2000). Factors known to affect clinician acceptance and promotion of patient participation in care are influenced by factors such as clinicians’ desire to maintain control (Efraimsson, Rasmussen, Gilje, & Sandman, 2003; Greenfield et al., 1985; Henderson, 2003), perceived acuity of patients’ illness (Levinson et al., 2005; Van Den Brink-Muinen et al., 2006), lack of understanding regarding where patients can participate (Doherty & Stavropoulou, 2012; Mira, Guilabert, Pérez-Jover, & Lorenzo, 2012), and available time (Anderson & Funnell, 2010; Greenfield et al., 1985; Van Den Brink-Muinen et al., 2006).

1.2.1 Total Knee Replacement (TKR) surgery

Total knee replacement is a surgical procedure to treat end stage arthritis and is used when other treatment methods have not improved patient symptoms. It involves replacement of the femoral and tibial articulation of the knee joint as well as, in many cases, the addition of a patella component. It is an increasingly common treatment for patients with severe arthritis and is performed to reduce knee pain, improve function and quality of life (Singh, 2011).
The Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR) monitors all joint replacements in Australia and TKR surgery is performed in over 300 hospitals. In 2015, 50,000 TKR were performed nationally and there has been an increase of 130 percent in TKR surgery from 2003 to 2015.

In order for patients to achieve maximum benefit from TKR surgery, several factors are involved including: proper insertion of the components, restoration of alignment of the knee, and early mobilisation of the knee joint to maximise range of movement (Fischer et al., 2008; Laskin & Beksac, 2004; Lucas, 2008). TKR surgery, although a relatively common and successful procedure, is also considered one of the most painful (Brander et al., 2003; McGrath et al., 2004; Strassels, Chen, & Carr, 2002) particularly in the early postoperative period. Adequate pain management is fundamental to achieving early mobilisation to meet postoperative goals of recovery and minimise complications.

1.2.1.1 Key treatment goals of recovery after TKR surgery

Three key treatment goals of recovery that, if not met, have the potential to affect patients’ recovery outcomes after TKR surgery are: pain management; physical mobility; and prevention of complications (such as infection and deep vein thrombosis). Nursing management in the immediate postoperative phase is focused on monitoring patients’ recovery from the anaesthetic and surgery, pain management and facilitating the initial stages of rehabilitation (Lucas, 2008).
Pain management

Pain is a common symptom for patients after TKR surgery; high prevalence of moderate to severe pain on movement and at rest during the first three postoperative days after TKR surgery has been well documented (Apfelbaum, Chen, Mehta, & Gan, 2003; Brander et al., 2003; Kehlet, Jensen, & Woolf, 2006; Strassels et al., 2002; Wylde, Rooker, Halliday, & Blom, 2011). Variability in the quality of postoperative pain management, in the context of joint replacement surgery, can have significant consequences for patients. High intensity of postoperative pain is linked to reduced physical functioning and knee mobility (Harvey, Barry, Kirby, Johnson, & Elloy, 1993; Laskin & Beksac, 2004; Strassels et al., 2002), poor overall recovery (Husni et al., 2010), prolonged recovery times (Laskin & Beksac, 2004; Peters, Shirley, & Erickson, 2006; Ranawat & Ranawat, 2007), increased length of stay in hospital (Kim, Losina, Solomon, Wright, & Katz, 2003), and an unsatisfactory patient experience overall (Dy et al., 2005). Poorly controlled pain postoperatively has also been associated with the development of ongoing chronic pain (Kehlet et al., 2006).

A strategy to enhance treatment of postoperative pain, known as multimodal pain management, was introduced in the early 1990s (Dahl & Kehlet, 1993). Using this approach, two or more analgesic agents with different mechanisms of action are administered simultaneously (White, 2008). For example, non-steroidal anti-inflammatory drugs (NSAID), paracetamol and opioid medications are prescribed for patients in the postoperative phase to be administered at regular intervals. Multimodal analgesic strategies have been found to decrease opioid usage, improve pain experience, increase satisfaction and enhance early recovery (Lamplot, Wagner, & Manning, 2014). Patients also need to be aware of their role in ensuring they receive adequate pain management.
Pain is a subjective experience (Jensen, Karoly, O’Riordan, Bland, & Burns, 1989) and in order for clinicians to understand patients’ level of pain and provide appropriate interventions, patients need to be involved and actively participate in the control of their pain (Botti et al., 2014; Bucknall, Manias, & Botti, 2001; Gordon et al., 2005).

**Physical therapy**

A primary goal following TKR surgery is high intensity rehabilitation (Brunenberg et al., 2005) where mobilisation commences as soon as possible, preferably on the day of surgery (Berend, Lombardi, & Mallory, 2004; Mauerhan, Mokris, Ly, & Kiebzak, 1998; Vanhaecht et al., 2005). Mobility and specific knee exercises commence the day of surgery (Day 0) not only to ensure the knee joint is kept mobile but also to prevent complications such as blood clots. The goal is to promote mobility gradually towards weight bearing as tolerated, sitting up, first time standing up, ambulation, and finally, stair climbing. Physiotherapy sessions ideally range from two to four times each day to promote knee joint mobility (Hypnar & Anderson, 2001; Laskin & Beksac, 2004; Mauerhan et al., 1998). Patients participate in their physical therapy during their hospitalisation to maximise mobility of the ‘new’ knee joint and to prevent any long term complications (Hypnar & Anderson, 2001). A direct inverse relationship between knee function and pain following TKR has been reported (Baker, Van der Meulen, Lewsey, & Gregg, 2007; Laskin & Beksac, 2004). Patients who experience higher pain intensity and functional impairment after TKR are also less likely to be satisfied with the procedure overall (Baker et al., 2007).

In order to participate in rehabilitation, patients need a clear understanding of how to perform specific knee-strengthening exercises and to what extent they need to mobilise
and participate in particular daily goals such as sitting out of bed. Factors in the post-
surgery recovery period that can impede participation in rehabilitation include drowsiness
as side-effects of analgesics, poor concentration, variability of information provided and
lack of reinforcement of the goals of recovery (Flanigan, Everhart, & Glassman, 2015;
Kendell, Saxby, Farrow, & Naisby, 2001).

Prevention of complications

Thromboprophylaxis is an essential part of the postoperative pathway for TKR
patients (Gregor, Pope, Werry, & Dodek, 1996; Vanhaecht et al., 2005). Anti-embolism
stockings (Stratton, 2000; Walter, Bass, Bock, & Markel, 2007), sequential compression
devices (Stratton, 2000; Walter et al., 2007) and specific exercises are used to minimise the
risk of deep venous thrombosis (DVT). Early mobilisation and the use of anticoagulants
also minimise the risk of DVT (Fischer et al., 2008; Gregor et al., 1996; Walter et al., 2007).
Recognition by patients of what they can do to minimise the risk of DVT occurring is an
important participatory activity. Moreover, patients’ awareness of the signs and symptoms
of DVT can expedite treatment.

In summary, the early postoperative period after TKR surgery involves a complex
balance between recovery, rehabilitation and prevention of complications, occurring within
a high acuity environment. The premise underpinning the adoption of patient participation
as a key pillar of high quality health care is the belief that participation will enhance
recovery and patient experience overall. For patients to participate to their full potential in
their postoperative recovery, they need an explicit and comprehensive understanding of
how they can work with clinicians in order to benefit from the health care available to them
Patients also need to understand and act on information about their recovery, work together with clinicians to select appropriate treatments or pain management options, and provide feedback on health care processes and outcomes (Coulter, Safran, & Wasson, 2012).

1.3 Purpose of the Study

The purpose of this research was to test the effectiveness of a bedside, multimedia, nurse-facilitated intervention in improving patient outcomes after surgery. The intervention was designed to increase the capability and opportunity for patients to participate in achieving their goals of recovery in the immediate postoperative period. The surgery investigated was TKR, the intervention was the multimedia application MyStay TKR.

1.4 Aims and Objectives of the Study

Aim 1. To determine the primary outcome of the intervention in relation to patients’ pain intensity on Day 3 following Total Knee Replacement surgery.

Aim 2. To determine the secondary outcomes of the intervention in relation to:

- Interference of pain on activities of daily living;
- Length of stay in hospital;
- Function and pain following surgery four weeks after discharge from acute care;
- Patients’ satisfaction with care received;
- Postoperative complications – Deep Vein Thrombosis (DVT) within 28 days of surgery;
• Readmission to hospital within 28 days of discharge from acute care.

Aim 3. To evaluate the processes used in the conduct the trial of the multimedia intervention

The related objectives were to:

i. Determine the extent to which recruitment procedures were appropriate in enrolling and maintaining patients in the trial;

ii. Determine the extent to which the processes used to implement the multimedia intervention were successful;

iii. Determine the system or environmental factors that may have impacted on the effectiveness of the intervention;

iv. Determine the usability and acceptability of the multimedia intervention in the context of acute recovery after surgery.

Aim 4. To explore whether the intervention provided patients with the capability and opportunity to participate in care related to their goals of recovery.

The related objectives were to:

i. Analyse differences in knowledge regarding the goals of recovery after TKR between intervention and control group patients;

ii. Analyse patient-reported personal and clinician behaviours that may have impacted on capability and opportunity for participation in postoperative care;

iii. Measure differences in activation between intervention and control group patients.
1.5 Thesis Structure

The research reported in this thesis explored the effectiveness of a nurse facilitated multimedia intervention on improving patient recovery outcomes and is presented in seven chapters. Chapter One provides an overview of the research problem, the quality and safety context within which the study is situated, the impact of TKR on recovery and a summary of the aims of this research. The purpose of Chapter Two is to critically examine previous research investigating participation in the context of acute care. In this chapter, gaps in previous research that highlight the importance of exploring the capability of an intervention to improve patient participation in recovery in the acute postoperative context are identified and used to inform the intervention and design of the study.

In the third chapter, the study methods and ethical considerations are described in detail. The results of the cluster randomised, crossover trial are presented in Chapter Four. Chapter Five, details the findings from the concurrent process evaluation related to the processes used to conduct the trial. In Chapter Six, findings demonstrating how the intervention changed patient behaviour in the context of acute recovery are presented. The integrated findings and conclusions, implications for practice and future research recommendations are presented and discussed in Chapter Seven.
Delivering a positive patient experience and user satisfaction with healthcare received is a priority for governments and healthcare organisations worldwide. Patient participation in care is proposed to be important for ensuring safe and high quality healthcare, enhancing health outcomes and improving user satisfaction. It has been integrated into health care policy as a significant component of strategies to achieve patient safety and quality outcomes. Patient participation features in the Australian Charter of Healthcare Rights in which it is stated that patients “… have a right to be included in decisions and choices” and “… have a right to be informed about services, treatments and costs” (ACQSHC, 2008, p. 1). Patient participation is also highlighted as one of the Australian National Safety and Quality Health Standards (National Safety and Quality Health Service Standards, 2011). Described as “Partnering with Consumers”, this standard endorses patient participation in care as enhancing the patient experience, improving outcomes and decreasing adverse events (National Safety and Quality Health Service Standards, 2011, p. 23).

Engaging patients in their care has been shown to produce better health outcomes for patients with chronic illness and there is emerging evidence that participation can enhance patient outcomes in acute care environments, particularly in relation to patient safety. Despite the perceived and emerging benefits of promoting patient participation in
their healthcare, there are limited evidence-based guidelines to support its implementation in acute care settings. In particular, there is a notable lack of studies evaluating the effectiveness and sustainability of interventions to promote patient participation in acute healthcare environments. Challenges associated with promoting and achieving patient participation in acute care include the higher acuity of illness, greater complexity in medical treatment regimens, and shorter length of stay compared to other environments. These factors may all impact on patients’ ability to participate to the level they would prefer and in a way that may impact on their outcomes. In addition, patients may lack the capability to participate, be unclear about how and when they are expected to actively participate in their care and recovery, or have limited opportunity do so.

The challenges to participation inherent in acute care environments require that patients are facilitated to take on a more active role and that interventions designed to enhance participation are appropriate and specific to the context of care. For example, resources to support patients to participate in their care following surgery need to be procedure-specific but also provide patients with clear guidance about how and when they can participate in their recovery. An important barrier to participation in acute care is providing patients with timely information, relevant to their stage of recovery that can be used to support and encourage their participation. The significant uptake of digital technology across all generations within the past decade provides a potentially useful medium for overcoming this barrier to participation.

Although multimedia approaches, in both their design and functionality, are well placed to provide patients with what is needed to participate in their postoperative
recovery, there has been limited research evaluating whether the use of tailored multimedia interventions improves patient participation and patient outcomes.

The discussion in this chapter is divided into five main sections. The first section contains a description of the notion of patient participation and the key elements that underpin participation with the purpose of providing the conceptual framework underpinning the research undertaken. In the second section, evidence of the benefits of patient participation in chronic and acute illness is reviewed with the intent of outlining the known impact of interventions designed to improve patients' engagement in their disease management and the relationship to their health outcomes. The third section explores the known barriers to participation in acute care environments. It is argued that the complexity of acute care provides particular challenges for the enactment of patient participation and has implications for the types of interventions that are likely to be successful in facilitating participation. The fourth section contains a systematic narrative review of the effectiveness of multimedia interventions as a way of delivering information to patients specifically in the acute care context that had a particular focus on engaging patients. The final section of this chapter presents a summation of the discussion by outlining the conceptual framework for this research.

2.1 Patient Participation: Definitions and enactment

Patient participation is a multidimensional concept from both a conceptual and operational perspective and it is argued that despite its recognition as a key component in the quality and safety of healthcare it remains poorly articulated in the research literature.
In particular, the ambiguity of current definitions of patient participation makes it difficult to establish an operational understanding of the notion of participation in clinical practice.

### 2.1.1 Definitions

Patient participation is a broad and complex concept for which there is no universally accepted operational definition in either the nursing or the medical literature (Cahill, 1998). The terms patient engagement, patient involvement, patient collaboration, and patient centred care are often used interchangeably with patient participation (Gruman et al., 2010; Hill, 2011). The World Health Organization (WHO) *International Classification of Functioning Disability and Health* (ICF) definition of participation is “… involvement in a life situation” ("International Classification of Functioning, Disability and Health (ICF)," 2001) however this definition provides little direction regarding what is meant by involvement or what type of life situations are included.

Early definitions were based on the notion of an *act* of participating or ‘to take part in’ (Simpson, 1985; Wilkes & Krebs, 1991). Sandstrom et al (2007, p. 834) were more specific and defined participation as “… making decisions on one’s own and acting of one’s own accord” however this definition is limited to participation in the decision making process. A more comprehensive description by Brownlea (1987, p. 605) defined participation as the action of “… getting involved or being allowed to become involved in the decision-making process or the delivery of a service or even simply to become one of a number of people consulted on an issue or a matter” (p 605). The key feature of this definition is that it includes many forms and levels of participation or engagement, not merely focusing on patients taking part in (treatment) decision making nor in taking a
particularly active role. However, all these definitions fail to fully embrace the complexities of the concept within modern day healthcare, particularly in acute care. Early definitions focused on personal responsibility where one must take part, rather than taking an individualistic perspective of the concept where a patient can choose to participate and may have a particular preference for the level of participation.

For the purpose of the current study, the definition used by the Australian Commission on Safety and Quality in Healthcare (ACSQHC) provides a balanced view, where participation is described as a partnership between clinicians and patients. The partnership exists when patients are treated with dignity and respect; information is shared; participation and collaboration in healthcare processes are encouraged and supported to the extent that patients can make choices (Patient centred care: Improving quality and safety through partnerships with patients and consumers, 2011). Patient participation therefore, takes place when there is an interaction between clinicians and patients. The relationship between patients and clinicians is critical; it is considered an essential attribute and prerequisite of the concept of patient participation (Sahlsten, Larsson, Plos, & Lindencrona, 2005). Importantly, the ACSQHC’s description appears to be well aligned with clinical practice in acute care however research studies informing how to operationalise patient participation in acute care and whether this has a positive impact on patient outcomes are lacking. Many clinicians may therefore be unclear about how to facilitate patient participation in their care and may not be persuaded that patient participation has an objective impact on patients’ outcomes in acute care.
2.1.2 Key elements underpinning patient participation

Definitions of patient participation have implicit within them the notion that participation is an action or set of behaviours that are related to patients’ health and may influence their outcomes. Patient factors that impact on participation involve a complex interplay of intrapersonal characteristics and knowledge and capability (Belcher, Fried, Agostini, & Tinetti, 2006; Coulter & Ellins, 2007; Johansson, Nuutila, Virtanen, Katajisto, & Salantera, 2005; O’Leary et al., 2010; Smith, Dixon, Trevena, Nutbeam, & McCaffery, 2009). Key factors that have been recognised as contributing to whether patients are active participants in their own health care are: (1) knowledge and capability, (2) opportunities for participation and (3) patient activation.

2.1.2.1 Patient knowledge and capability

Knowledge is defined as the condition of knowing or being aware of something (Soanes & Stevenson, 2008). Known barriers to participation in health care are low health literacy and lack of illness-related knowledge (Coulter & Ellins, 2006; Katz et al., 2007). Indeed, patients are more likely to participate in decisions that do not require specialist medical knowledge (Arora & McHorney, 2000). As well as being the basis for decision making, knowledge also gives patients confidence, and with confidence patients are more likely to trust their ability to make decisions (Henderson, 2003).

There has been a gradual increase in the volume of research of patient participation within acute care settings over the past 15 years (Cohen, 2012; Eldh et al., 2006; Elwyn et al., 2001; Florin, Ehrenberg, & Ehnfors, 2006; McTier, 2013; Timonen & Sihvonen, 2000). A majority of this work has focused on uncovering patients’ preference for participation in
specific aspects of their care. When asked, most patients want to play an active role in their own care (Coulter & Cleary, 2001; Coulter, Parsons, & Askham, 2008; McTier, 2013). Patients generally want to know what they need to do for themselves to recover and improve their health. Knowledge provides patients with the capability for participation (Coulter et al., 2008) should they desire to do so.

One of the most commonly identified barriers to patients accessing self-management support resources, is their lack of knowledge that the resources are available. As a result an important focus of interventional approaches in community and ambulatory care settings has been to facilitate easier access to information (Guevara et al., 2003; Harun, Harrison, & Young, 2013; Ibrahim, Khan, Nizam, & Haddad, 2013). In acute care, the main barrier to participation is likely to be patients’ lack of knowledge and poor understanding of their health condition and treatment options (Almborg, Ulander, Thulin, & Berg, 2009; Cohen & Botti, 2015; Efraimsson, Sandman, & Rasmussen, 2006; O’Leary et al., 2010). In an exploratory descriptive study that investigated patient preference for participation in cancer symptom management for example, lack of information was perceived by patients to be the biggest barrier to participation (Cohen & Botti, 2015).

Provision of information through paper-based materials designed to improve the level and quality of information received by patients has been investigated in several studies (Bjørnnes et al., 2016; Hart, 2012; Murphy et al., 2011; Nicolson, Knapp, Raynor, & Spoor, 2009). The findings have been mixed, as patients do not always read the material and may not completely understand the information provided (Bjørnnes et al., 2016; Nicolson et al., 2009). If the information offered is complex, or delivered in a way that is not
appropriate for patients’ level of health literacy or education (Ishikawa & Yano, 2008; McKinstry, 2000), it can be overwhelming or confusing. In this situation, information provision becomes a barrier rather than a facilitator for patient participation in care because it amplifies the perceived knowledge gap between patients and health professionals, a factor that is known to impede participation (Ishikawa & Yano, 2008). Further, provision of inconsistent or poorly structured information has been associated with patient dissatisfaction, decreased functional recovery and poor recovery outcomes overall (Ben-Morderchai, Herman, Kerzman, & Irony, 2010; Suhonen & Leino-Kilpi, 2006).

For information that is provided to patients to impact on their knowledge it needs to be explicit, actionable, consistent and specific to the context. Particularly, in the postoperative phase, information should address the specific requirements of the surgical procedure and should make clear the specific recovery goals linked to the health condition, accommodate different learning styles, and be communicated when patients are prepared to receive information (Berman, Kozier, & Erb, 2012).

Although information provision and knowledge acquisition can be considered fundamental requisites for patients to be involved in their care and treatment, knowledge alone does not necessarily lead to participation.

2.1.2.2 Opportunities for participation

Opportunities for participation occur throughout the trajectory of a patient’s illness (Davis, Sevdalis, Jacklin, & Vincent, 2012). Periods within surgical pathways where opportunities for patient participation can occur include the pre admission phase, when patients are providing informed consent for a procedure (Beamond, Beischer, Brodsky, &
Leslie, 2009; Coulter & Ellins, 2006; Skene & Smallwood, 2002); making decisions about which healthcare provider to access (Howe, 2006), and discussions in pre-admission meetings regarding pre-existing illness or medication regimens that may impact on their recovery (Coulter & Ellins, 2006; Davis et al., 2007). During hospitalisation, once the choice for a specific treatment has been made, situations where patients can participate can range from decisions regarding their preferred food and drink (Davis et al., 2007); management of symptoms (Cohen, 2012; McTier, Botti, & Duke, 2014, 2015), medications (Belcher et al., 2006; McTier, Botti, & Duke, 2013), timing of care related to activities of daily living (Davis et al., 2007), or participation in functional activities and rehabilitation (Allegrante et al., 2007). Prior to, and after discharge from hospital, decisions required relate to destination (e.g. rehabilitation or home), support needs (Almborg et al., 2009; Anthony & Hudson-Barr, 2004; Carroll & Dowling, 2007; Efraimsson, Sandman, Hyden, & Rasmussen, 2004) or recovery programs such as cardiac rehabilitation (McDonall, Botti, Redley, & Wood, 2013).

Clinicians play a fundamental role in providing patients with opportunities to be involved in decisions and activities relevant to their care and recovery (Carman et al., 2013; Cohen & Botti, 2015; McTier et al., 2014). However, in the context of acute recovery, occasions where patients can take an active role can be missed. This may be due to the nature of the environment and/or patient or clinician related barriers (Joseph-Williams, Elwyn, & Edwards, 2014; Lane, Monefeldt, & Rosenhead, 2016; McTier et al., 2015) and is illustrated in the findings of a descriptive study of patients’ perceptions of their involvement in discharge planning. Most patients reported receiving enough information to enable participation however lacked opportunity to engage in the process (Almborg et al., 2009). Patients’ reported feeling overlooked during the discharge process.
Creating opportunity for patient participation in acute care requires facilitation through a patient centred care model whereby clinicians and patients work together and patients are encouraged and empowered to participate (Gravel et al., 2006). It is incumbent therefore on clinicians to find ways to provide opportunities for patients within this complex setting. Failure to make opportunities for participation explicit in care can mean that patients perceive that a passive role is what is expected of them (Coulter et al., 2008).

2.1.2.3 Patient activation

During the early 2000s, the behavioural science concept of ‘patient activation’ came to the fore (Hibbard, Stockard, Mahoney, & Tusler, 2004) as a way to measure patients’ willingness to take an active role in their own health. Activation “... refers to people’s ability and willingness to take on the role of managing their health and health care” (Hibbard, Mahoney, Stockard, & Tusler, 2005). It incorporates knowledge, skills and confidence to engage in health related behaviours (Hibbard et al., 2004). Patients who are activated are thought to be willing to take ownership over their health as well as their capacity to understand information (Greene & Hibbard, 2012), and are more likely to take part in their own care and recovery (Hibbard & Cunningham, 2008). Activation research has mostly been situated within chronic illness management where patients need to be activated to engage in self-management behaviours and, with their treating clinicians, negotiate complex health care systems and acquire new knowledge to enable them to adhere to long-term treatment programs (Altshuler et al., 2016; Hibbard & Cunningham, 2008).
Increasing the level of patients’ activation in health care has been shown to improve outcomes for patients with chronic illness (Hibbard, Peters, et al., 2005; Hibbard et al., 2004). For example, Shively (2013) tested the effectiveness of an intervention specifically targeted to increase patient activation in a randomised controlled trial. The intervention was a 6-month program developed to enhance self-management of patients with heart failure. It involved setting individualised/tailored goals for skills and behaviours related to patients’ management of their heart failure. Results provided evidence that a targeted intervention, specifically designed to increase patient activation, did lead to a higher level of activation in patients and that patients in the intervention group had fewer hospitalisations at 3 and 6 months.

In acute care, patient activation has potential implications for outcomes. Patients in this context can participate in negotiating pain management, reporting symptoms, preventing complications and meeting the goals of recovery. However, trials where the aim has been to target patients’ level of activation in this context are limited, with one notable exception. O’Leary et al. (2015) conducted a randomised controlled trial using a multimedia patient portal to provide information about: the care team; active medications with web-based links to drug information; and a list of scheduled procedures for the day. It was hypothesised that use of the portal would lead to increased knowledge and patient activation. Patient activation was measured by the Short Form of the Patient Activation Measure (PAM-SF), a commercial product which assesses an individual’s knowledge, skill, and confidence for managing his/her health and healthcare (Hibbard, Mahoney, et al., 2005). Apart from daily orientation to the portal, explicit information about the care team, medications and procedures, and the opportunity for patients to seek further information
about their medications via the internet, no other interventions relating to patients’ skills and behaviours were implemented. Outcomes were measured a day after application of the portal. O’Leary et al. (2015) found that patients in the intervention group had greater knowledge of the names and roles of their hospital physicians, but there was no difference in knowledge of nurses’ names, planned tests, planned procedures, new medications, and discontinued medications. The level of patient activation was not different between intervention and control group patients. The findings suggest that time may be a factor in the ability of an intervention to have an effect in activating patients. In other words, providing additional information may not be sufficient to activate patients in the acute care context. Further work is needed to determine the influence that interventions designed to activate patients have on patients’ level of activation and whether, in the context and challenges of acute care, activation leads to participation.

It is likely that participation in acute care is a function of knowledge, opportunity and activation whereby patients who understand their illness episode are activated to engage in their recovery within an environment that accommodates and facilitates participation. If interventions are to be successful in promoting participation, they need to incorporate strategies to assist both clinicians and patients (Greene & Hibbard, 2012).

**2.1.3 Summary**

Definitions of patient participation are often broad, ambiguous and lack clarity despite the value that is placed on participation in healthcare. In acute care, this lack of clarity makes operationalisation and evaluation of participation difficult. Known factors impacting on participation are a complex interaction of patients’ knowledge, their
understanding of how they can take part, willingness, skills and confidence (activation),
and opportunity. Attempts to operationalise and evaluate outcomes of participation need
to acknowledge that the concepts of knowledge, opportunity and activation are likely to be
highly interdependent.

2.2 Outcomes of Patient Participation in Healthcare

2.2.1 Chronic illness

In the context of ambulatory and chronic care settings there is robust evidence of
the benefits of patient participation in improving adherence to treatment regimens and
management of long-term outcomes. This is explained by the recognised need for patients
with chronic illness to live with and manage their disease effectively outside the boundaries
and support of acute hospital care. Patients need to be motivated and involved, develop
self-management skills and have an understanding of their illness and associated
treatments (Hamine, Gerth-Guyette, Faulx, Green, & Ginsburg, 2015; Hibbard &
Cunningham, 2008; Skolasky et al., 2011) in order to enhance their quality of life.

Interventions used in the chronic illness context that aim to enhance patients’ self-
management capability include: group education and counselling sessions (Kettunen,
Poskiparta, & Karhila, 2003; Schreurs, Colland, Kuijer, de Ridder, & van Elderen, 2003), long
term follow-up visits and phone calls (Efraimsson, Hillervik, & Ehrenberg, 2008; Gibson et
al., 2002), instructional videos (Ciciriello, Buchbinder, Osborne, & Wicks, 2014; Harun et al.,
2013), education material via written pamphlets (Coulter & Ellins, 2006) and web-based
multimedia interventions (Harris et al., 2010). Interventions are often tailored specifically
for patients, include a wide variety of methods to engage and involve patients in their disease management and have been found to be effective.

For example, in the randomised controlled trial with repeated measures designed by Shively et al (2013) and described earlier, the aim was to examine the effect of a self-management toolkit for chronic heart failure in improving patients’ ability to self-manage. Participants in the intervention group had fewer hospitalisations and a significant increase in activation (PAM) from baseline to 6 months. The intervention was comprised of a comprehensive program conducted over a six month period and based on activation theory. It was tailored to each participant’s activation level where goals were individualised and tailored for existing skills and behaviours. Each participant was linked into a management team including an intervention nurse, who conducted more than 6 follow up visits and telephone calls for the duration of the trial.

Similarly, earlier seminal work by Lorig (1993) and colleagues that sought to enhance self-management strategies for patients with chronic arthritis implemented multiple component intervention strategies over six weeks. They conducted a randomised trial where intervention group participants were involved in education sessions held in community settings such as churches, community halls and shopping centres. Participants would attend weekly two hour sessions where they received information specific to the self-management of their arthritis, delivered in a variety of ways (face-to-face, written material, visual material). Health benefits of the trial included a reduction in pain and fewer visits to physicians (Lorig et al., 1993).
Patient-related health benefits of participation in comprehensive chronic disease management programs have also been demonstrated in patients with chronic lung disease and diabetes. For example, findings of a systematic review of 36 trials to determine the effectiveness of educational interventions to facilitate self-management of asthma in adolescents, concluded that adolescents who participated in the interventions had improvements in lung function, functional status and reduction in symptoms such as wheezing (Guevara et al., 2003; Khan, O’Meara, Stevermuer, & Henry, 2004). Interventions ranged from long term follow up visits or telephone calls from specially trained staff, group sessions, one-to-one individualised education sessions where participants were provided with information related to disease management, and involved coaching sessions in self-management methods such as symptom identification.

Another review by Gibson et al. (2002) of trials focused specifically on adult asthma self-management found greater reductions in symptoms, hospitalisations, and emergency department use compared to usual care. The interventions reviewed included a combination of tailored education sessions, self-monitoring of symptoms, regular review by physicians, written action plans and follow up consultations that linked individual participants with a care team (Gibson et al., 2002). The duration of the intervention programs varied, however typically occurred over extended periods of time (Gibson et al., 2002). Similarly, a systematic review investigating interventions tailored for diabetes disease management included group based programs, one-to-one sessions with health practitioners, and educational material. The demonstrated benefits for patients were better disease control and improved self-efficacy (Deakin, McShane, Cade, & Williams, 2005), and glycaemic control (Renders, Valk, Griffin, Wagner, & Assendelft, 2001).
The extended duration of these programs allows participants time to acquire the required knowledge and skills related to disease management. In addition, collaboration with healthcare specialist teams may make participants feel accountable and therefore attend appointments that provide opportunities to engage, ask questions, seek clarification and motivation to engage in self-management. It is also possible that patients who commit to and attend comprehensive self-management programs may already have higher activation or motivation to improve their health than those that do not.

In summary, there are clear benefits for patients with chronic illnesses in completing comprehensive intervention programs specifically designed to engage patients in lifelong self-management behaviours. There is evidence that those who take an active role in their own health care by participating in programs have better health outcomes. The duration of these interventional programs varies but typically programs are lengthy and have several components. The duration and complexity of programs designed for people with chronic illness has implications for the feasibility and utility of such programs in acute care where time is limited. Further, patients with chronic illness may be more likely to be motivated than those with short term illnesses to invest in their own health because in order to live with and manage their ongoing illness they need to take an active role. In acute care, patients’ focus and motivation may be different. During episodic illness (including surgery), patients are typically hospitalised for short periods of time, acuity of symptoms related to pain and comfort tends to be high, understanding of their illness and familiarity with the environment is low. Patient activation in this context is not well understood. Further, the effects of patient participation on outcomes in the context of acute illness requiring hospitalisation are still to be determined.
2.2.2 Acute care

The focus of patient participation research in the context of acute care delivery has predominately been concentrated in five areas: 1) patients’ preference for participation in care, (for example, Ekdahl, Andersson, & Friedrichsen, 2010; Merchant & Federman, 2016; Uldry, Schäfer, Saadi, Rousson, & Demartines, 2013), 2) patients’ experience of participation (for example, Drach-Zahavy & Shilman, 2015; McTier et al., 2013; Tobiano, Bucknall, Marshall, Guinane, & Chaboyer, 2015), 3) participation in decision making (for example, Kolovos, Kaitelidou, Lemonidou, Sachlas, & Sourtzi, 2015; Légaré et al., 2012; McKinstry, 2000), 4) participation in safety initiatives to minimise adverse events (for example, Davis, Pinto, et al., 2012; Greenberg, Battles, & Haskell, 2010; Pittet et al., 2011; Rainey, Ehrich, Mackintosh, & Sandall, 2015), and 5) participation in patient-clinician communication specifically during transitions of care and discharge planning (for example, Griffin et al., 2004; Joosten et al., 2008; Légaré et al., 2012; Stacey, Samant, & Bennett, 2008).

Outcomes of research into patients’ preferences for participation suggest that patients want to be involved in their care but do not feel they have the capability or opportunity to do so (Eldh et al., 2006; McMurray, Chaboyer, Wallis, Johnson, & Gehrke, 2011; McTier et al., 2013; Tobiano et al., 2015). The majority of this research has been descriptive using survey methods to elicit patients’ preferences for participation in acute care. For example McMurray (2011) interviewed patients to gain their perspectives of participation in shift-to-shift, bedside nursing handover. Patients were asked their views about bedside handover including the benefits and limitations, their existing and potential role in handover, the role of family members, and issues related to confidentiality. Findings
revealed four major themes. First, patients appreciated being acknowledged as ‘partners’ in their care. Second, they viewed bedside handover as an opportunity to amend any inaccuracies in the information being communicated. Third, some preferred passive engagement rather than being fully engaged in the handover and fourth, most patients appreciated the inclusive approach of handover as it facilitated nurse-patient interaction (McMurray et al., 2011). However, when patients’ actual experience of participation in nursing care was examined, Tobiano et al. (2015) found that patients described a power imbalance and feelings that opportunities for participation were restricted. Therefore, the notion of opportunity cannot be implicit; it needs to be made explicit to patients and facilitated so that it is clear that participation is welcomed and expected so that patients have the confidence to engage in the process.

How confidence to participate can be enhanced in acute care where time constraints and other factors present particular challenges, is not well understood. Typically interventions tested to engage patients in acute care have included written paper-based materials, visual materials such as posters, video instruction and tailored education programs. The majority of this work has been in the areas of falls prevention, infection prevention, improving care transitions, planning goals of care, and symptom management.

### 2.2.2.1 Falls prevention

Specific interventions aimed at encouraging patients to participate in falls prevention by informing patients and families regarding risks include posters, handouts or tailored information delivered via information technology (Dykes et al., 2010), one-to-one patient sessions (Haines et al., 2011), alerts (coloured armbands, notices), patient risk
identification and tailored physical therapy (Krauss et al., 2008), and nutrition assessments and training for mobilisation activities (Stenvall et al., 2007). These interventions are usually multi-component and consequently, enactment and implementation often required system and process changes.

Outcomes of these patient-focused fall prevention interventions, measured as a reduction in the number of falls between time points, vary. In a randomised controlled trial testing a multidisciplinary, multifactorial falls prevention intervention in an orthopaedic unit, there was a reduction in the incidence of falls shown (Stenvall et al., 2007). The intervention involved patient and family participation in a comprehensive geriatric assessment, management plan, and targeted rehabilitation and mobilisation plan designed to actively prevent, detect, and treat high falls risk patients (Stenvall et al., 2007). Similarly, outcomes of a cluster randomised controlled trial of over 2200 hospitalised patients designed to test a complex, multiple component intervention to reduce falls and adverse events (pressure injury, urinary tract infections) showed a reduction in falls and adverse events (van Gaal et al., 2011). The intervention was designed to involve patients and families by providing written and verbal information related specifically to each patient’s identified risks. Although successful, these intervention were detailed and complex to apply, resource-intensive and dependent on several health disciplines working together, raising questions of their sustainability over time and this was not measured. Further, it was difficult to disentangle the role that patient participation played in achieving the outcomes.
2.2.2.2 Infection prevention

Increasingly, strategies to prevent healthcare associated infection have involved patients as participants. Relatively simple interventions have been effective in improving patients’ knowledge and intention to act to reduce their risk of infection. For example, in a pilot, pre-peri-post design study that involved placing a poster in each patient’s room containing detailed descriptions, with diagrams, regarding standards required for five high impact (infection prevention) interventions (Hart, 2012), it was hypothesised that the posters would trigger patients to address noticeable lapses in infection prevention technique and this would change staff behaviours. The study design was complex and carried out in five stages over a period of 210 days. The design of the study was intended to determine whether the presence of a detailed poster would influence patients’ perceptions, knowledge and feelings of empowerment related to infection prevention, and whether this knowledge would encourage patients to identify lapses by staff, and whether this would influence staff’s behaviours related to infection control over time. One-to-one interviews were conducted with a random sample of 10 patients to explore patients’ expectations and knowledge of best practice (Hart, 2012). In the first two weeks poster presence was associated with a significant increase in patients noticing lapses compared to patients without posters indicating that knowledge had improved as a function of the posters. Intervention patients also had greater knowledge of strategies used to prevent spread of infection (e.g. hand hygiene). Additionally, the posters created a sense of empowerment as 61 percent of patients in the intervention group indicated that they would address the lapse with clinicians (Hart, 2012). In the interviews, of the six patients who had noticed a lapse, five had addressed this lapse with clinicians however it was noted that patients
addressed lapses with nurses or cleaners but did not feel comfortable addressing lapses with consultants, ward doctors or specialists. Hart et al (2012) suggested that patients may have concerns about the consequences of alienating their treating doctors in case this may compromise their care. Although this was a small study where data were obtained via patient-reported questionnaires and interviews, this relatively simple intervention, does suggest that increasing knowledge and perceived empowerment can influence patients’ readiness to participate in activities related to their own safety but that this participation may be limited if patients believe that there may be negative consequences.

A recent descriptive study also investigated patients’ views of, and sense of empowerment and willingness to engage with clinicians about identified safety risks (Seale et al., 2015). The participants were inpatients in a surgical ward and data were collected via semi-structured interviews. Participants acknowledged that they (patients) could play a role in preventing infections while in hospital however the majority of patients interviewed indicated they would feel uncomfortable approaching clinicians about safety issues and would not want to cause ‘trouble’ with clinicians by asking them, for example, to wash their hands (Seale et al., 2015). This finding suggests that while patients may be willing to take an active role in safety and prevention of infections, without a sense of opportunity or encouragement from clinicians, involvement may not actually occur.

In a study that sought to evaluate patients’ perspectives on infection prevention and control, it was concluded that any intervention to improve safety is dependent on patient-provider relationships. Wyer et al. (2015) used video-reflexive ethnography, a process of video recording a stream of activity during patient-clinician interactions and then playing
back the video recordings with patients in individual reflexive sessions with the researcher. Patients were able to articulate safety and infection risks after viewing and discussing video footage of clinical care (Wyer et al., 2015). Patients felt more informed about minimising identified risks related to healthcare associated infections, however barriers that would impact on patients’ ability to report these risks were noted. They included intrapersonal factors such as feeling physically and psychologically able to focus at the time and insufficient knowledge related to specific infection control practices they could initiate. In addition, inadequate knowledge (of risks and preventative measures) meant that patients felt they had limited capability to contribute in these interactions. Participants also reported a lack of clinician responsiveness toward the patients’ role in infection control that could deny them opportunity to contribute meaningfully (Wyer et al., 2015). These findings highlight the risk that attempts to enhance patient participation without ensuring that this occurs within an environment that allows and encourages participation may create tensions between patients and clinicians. The findings also suggest that simply promoting participation without some form of facilitation is unlikely to be successful.

The relevance of facilitation was shown in the findings of a pre-post-test intervention study of a patient participation intervention to improve clinicians’ hand hygiene practices (McGuckin, Taylor, Martin, Porten, & Salcido, 2004). Patients were enrolled in the study if they agreed to ask clinicians who had direct contact with them “Did you wash/sanitise your hands?” Patients received educational brochures and other instructional material about the importance of hand hygiene. During the trial patients were visited daily by a researcher. Outcomes indicated a 94 percent increase in hand hygiene compliance by clinicians during the intervention phase however this dropped to 64 percent
compliance post intervention suggesting that engaging patients in this initiative leads to better outcomes, however outside of the trial conditions, in particular the daily researcher visits, the effects were diminished (McGuckin et al., 2004).

In summary, relatively simple interventions can improve patients’ knowledge of infection control practices and can enhance participation, however knowledge alone does not translate to better outcomes unless patients feel that the environment is conducive and receptive to participation. Sustaining improvements outside of trial conditions is unlikely unless the underlying mechanisms associated with interventions are better understood.

2.2.2.3 Care transitions

Patient participation in transitions of care has the potential to reduce communication errors and the risk of hospital readmission. Discharge planning is an area that has been studied extensively in nursing. The majority of research has focused on patients’ willingness to participate or perceptions of participation in the process (Almborg et al., 2009; Efraimsson et al., 2004; Efraimsson et al., 2006; Huber & McClelland, 2003). Many patients report the desire to participate in discharge planning however report they are not active participants in the process.

Transfer of care from one clinician to another is a time of risk for communication errors. The use of bedside handover is seen as a way of reducing these risks by involving patients in shift-to-shift transitions (McMurray et al., 2011). Whether patients are actually participants in bedside handover and if this has an impact on outcomes is not well understood possibly because in many instances there is failure to implement the
intervention as intended (Gonzalo, Wolpaw, Lehman, & Chuang, 2014; O’Leary, Killarney, et al., 2015). For example O’Leary et al. (2015) tested a ‘patient-centred bedside rounds’ intervention in a cluster randomised controlled trial. The intervention involved a multidisciplinary team, using a structured communication tool designed to be used at the bedside. The tool was based on a communication framework where clinicians were given direct instructions for example, introduce yourself to the patient, update patients’ care team on the white board, review report from previous shift, perform safety checklist, and plan discharge. The hypothesis was that patients who were more informed of their care plan and the members of their healthcare team, would be more activated. Main outcomes were patient preference for participation (control preference scale), patient activation (PAM) and satisfaction. These outcomes were measured via patient interviews. Failure to show any difference in patient preference for participation, patient activation or satisfaction between groups was attributed to the finding that implementation of patient-centred bedside rounds only occurred 54 percent of the time. The authors questioned whether clinicians valued the inclusion of patients in the transition process (O’Leary, Killarney, et al., 2015). Gonzalo et al (2014) also found that ‘inter-professional bedside rounds’ occurred only 64 percent of the time and were more likely to occur with younger doctors and during periods of lower workload.

While including patients in transitions of care is widely accepted as a quality and safety strategy for patient engagement, there is little evidence that patient participation actually occurs. Clinicians’ acceptance of the strategies and their endorsement and support of patient involvement are core to the success of the process.
2.2.2.4 **Goal setting and recovery**

Findings of studies examining the relationships between patient participation in goal setting and recovery after surgery provide evidence that participation leads to better outcomes for patients. For example, a randomised controlled trial aimed to test the effects of active patient participation in physical therapy treatment goal setting in an in-hospital rehabilitation unit between physiotherapists and patients with rheumatoid arthritis (Arnetz, Almin, Bergström, Franzen, & Nilsson, 2004). The intervention involved identification of current pain intensity, goals for pain treatment and management and current physical and functional ability; over several sessions, patients and therapists agreed on treatment goals. Patients were monitored by two therapists assigned to the rehabilitation unit. A total of 77 patients participated in the study and the findings were that intervention group patients had more favourable outcomes in terms of goal achievement, pain treatment, range of motion, physical strength and balance than patients in the control group (Arnetz et al., 2004). Although there were limitations to this study in terms of blinding of therapists in the measurement of outcomes, the results suggest the importance of facilitated interactions between clinicians and patients in achieving goals of recovery. Shared goal setting facilitated interactions with clinicians where patients were encouraged, they were subsequently willing and activated to continue with physical therapy to achieve their goals.

Identifying shared goals and instituting interventions to combine motivational, confidence and self-efficacy components are considered core elements of rehabilitation but are understandably resource intensive and demanding of patients’ time and commitment. Allegrante et al (2007) designed and tested a multi-component intervention to improve
Chapter 2 Patient Participation in Health Care: Review of the literature

functional recovery after hip fracture. The intervention involved before hospitalisation, during and after hospitalisation components. During hospitalisation, a 30 minute motivational audio tape was used, titled Getting Up Again, Getting Better, designed to enhance motivation and confidence in mobility exercises. After discharge supportive peer counselling sessions delivered via weekly supportive telephone calls for 4-5 weeks were followed by referral to a high intensity muscle strength training programs. There were no significant differences in functional outcomes between groups, with the exception of an improvement in the self-reported role physical domain measured via the SF-36. Possibly due to the complexity of this intervention, compliance was very low and not all patients completed the three components.

2.2.2.5 Pain and symptom management

Adequate pain management is a fundamental right of patients, yet observational and descriptive studies continue to report suboptimal management of postoperative pain (Apfelbaum et al., 2003; Ene, Nordberg, Bergh, Johansson, & Sjöström, 2008; Maier et al., 2010; Raschke et al., 2015). During the postoperative period, patients are dependent upon nurses to assist with pain management through physical repositioning, pharmaceutical analgesia or non-pharmaceutical methods of pain relief (such as cryotherapy). This is particularly the case for patients who have undergone orthopaedic surgery, where their physical incapacitation means a high reliance on nursing care (Lucas, 2008).

The subjectivity of pain symptoms requires some degree of participation from patients. A recent systematic review investigating the benefits related to a pre-operative education on postoperative pain relief, specifically after joint arthroplasty concluded that
pre-operative educating sessions have little effect on postoperative pain (Louw, Diener, Butler, & Puentedura, 2013). The findings indicate that provision of education (information) alone, irrespective of the delivery medium, may not be enough to improve pain outcomes after surgery suggesting that a more comprehensive approach is needed.

Complex interventions that include not only provision of information but also ‘tools’ to enable patients to negotiate treatment are effective and have been termed ‘coaching interventions’. These interventions have been shown to be effective in helping cancer patients communicate their pain concerns (Street Jr et al., 2010; Syrjala et al., 2008). Street Jr (2010) and colleagues implemented a tailored educational coaching session using a RCT design, aiming to help patients discuss their pain-related questions, concerns, and preferences with physicians more effectively. The tailored coaching intervention assessed each patient’s learning needs, goals and values to develop a set of individualised messages and skill-building exercises were designed to increase self-efficacy, enhance patient–physician communication and improve care of cancer-related pain. Specially trained health care providers assessed current knowledge related to pain, clarified misconceptions, provided detailed information, coached patients in negotiation techniques, established goals and co-ordinated role-play exercises. Patients in the intervention group were more activated, asked more questions of their physicians, were more assertive and expressed more pain related concerns to their physicians than the control group patients. Whether this increased activation led to better pain control was not measured. What was measured was the change in patient behaviour.
A randomised trial where an educational session was delivered during hospitalisation for cancer patients with moderate to severe pain reported a significant reduction in pain intensity in the intervention group (Lai et al., 2004). The intervention included a 10-15 minute structured pain education session delivered by oncology specialist nurses every day for 5 days using a 16-page booklet. Similarly, a quasi-experimental designed study (pre-test/post-test) by Wong (2010b) and colleagues that tested a 30 minute coaching intervention for patients admitted with musculoskeletal trauma found a significant difference in pain intensity scores, decrease in anxiety and more requests for analgesia in the intervention group. The intervention was delivered in hospital the day before surgery for the musculoskeletal injury and aimed to enhance patients’ self-efficacy by providing them with knowledge about pain and the use of analgesics, and skills in performing relaxation breathing exercises. The intervention was delivered by a specially trained researcher one day before surgery. Outcomes were measured at baseline, on day 2, day 4, and then at 4 weeks and 12 weeks. The intervention group reported significantly lower levels of pain, less anxiety and better self-efficacy during hospitalisation (before surgery to Day 7), compared to the control group.

These interventions involved detailed coaching components where patients were given strategies to negotiate better analgesic and symptom management resulting in positive effects on outcomes. The findings of these studies provide evidence that facilitated patient participation can improve pain and symptom management and outcomes in acute care settings however, the resource intensiveness of these interventions and the skills required of the clinicians who facilitated participation raise real concerns about their
feasibility and sustainability in acute care services where throughput of patients is high and resources are low.

2.2.3 Summary

The consensus that patients should participate in their healthcare to improve the quality and safety of care delivered is unmistakable, especially in the chronic illness context. Benefits of participation in chronic illness are linked to improved patient capability for complex self-management obtained through targeted educational programs, and enhanced opportunity through networks and community supports to ensure that patients are activated to take on a self-care role in the management of their health. Benefits of participation are most likely to occur when complex multicomponent interventions are used that combine coaching or follow up as part of the program. In acute care, simple interventions can be effective however there is limited evidence of sustainability of these interventions outside of trial conditions because benefits are particularly reliant on facilitation by clinicians or researchers. Acute care environments present unique challenges for patient participation that need to be better understood if interventions are to be effective and sustainable. In the section to follow, known barriers to patient participation, and the role patients and clinicians play in achieving participation in the context of acute care are explored and discussed in order to identify factors that may impact on patient participation in postoperative care.

2.3. Barriers to Participation in Acute Care

The value of patient participation in care during episodic illness and acute hospitalisation has been recognised increasingly because of the potential reductions in
length of stay (LOS) in hospital and the expectation that patients will continue their recovery in their own homes or in subacute care environments. To optimise recovery once discharged from hospital, patients (and their families) need to know and understand their recovery goals and plan of care, and feel confident in their ability to care for themselves. The challenge for clinicians is finding feasible, evidence-based approaches to facilitate participation during this time so patients can take an ongoing active role in their recovery. While the move towards increasing patient participation is a positive one, and the potential for benefits are high, learnings derived from the chronic illness context may or may not be able to be applied to the acute context, particularly the postoperative setting. Weingart (2011) attributes the relative lack of research into patient participation in recovery outcomes and of the effects specific to the acute care context, to the challenge of investigating episodic illness events; the impact of acute illness on patients, and/or beliefs that clinicians hold responsibility for the care provided within the acute context. Factors known to affect the enactment of participation are discussed below and outlined in Table 2.1 (Page 53).

2.3.1. Organisation-related factors

Acute care delivery is a process of health care in which patients are treated for brief but significant episodes of illness, in the sequelae of an accident or other trauma, or during recovery from planned or unplanned surgery (Berman et al., 2012). Care is provided by specialised personnel often using complex and sophisticated technical equipment and materials. Unlike chronic care, acute in-hospital care is often necessary for only a short time (Berman et al., 2012). Patients admitted for acute care require 24-hour monitoring and treatment by specialised staff due to the nature of their illness. Recovery is highly
dependent on management by clinicians (Berman et al., 2012) who monitor patients’
progress, assist with their activities of daily living, and provide ongoing treatments that
may require specialised skills or the use of technology. The care also involves providing
knowledge and education in order for patients to manage their recovery or ongoing health
issues once discharged from hospital (Berman et al., 2012). Elements specific to the acute
care environment include an emphasis on a short length of hospital stay, high turnover of
staff, high acuity of patients and the rapid pace of the work in this environment. These
factors have the potential to affect the quality of interactions between clinicians and
patients, and therefore the enactment of participation.

Length of stay

There has been a steady decrease in the amount of time patients spend in hospital
over the last two decades (Barad, Howell, & Tom, 2015). Limited length of stay after
surgery means that patients in acute care have higher acuity of illness and often greater
complexity of needs (Gruman et al., 2010) and this can have an impact of the enactment of
patient participation in two ways. First, it decreases the amount of time clinicians and
patients have to build rapport and interact. The limited time clinicians have to spend with
patients during clinical encounters is recognised to be a factor affecting patient
participation in care (Gravel et al., 2006; Timonen & Sihvonen, 2000). Second, as patients
tend to be sicker, have reduced activity tolerance, their ability to take in and retain
information provided by clinicians may be reduced (Sahlsten, Larsson, Sjostrom,
Lindencrona, & Plos, 2007). Therefore finding ways to provide important information for
patients in time efficient ways that accommodates limited cognitive and physical capacity
and the context of a busy environment is a challenge.
High frequency transitions and exposure to clinicians

The 24-hour nature of acute care related to surgery in particular, means frequent interdepartmental transitions as well as exposure to a large number of health care professionals. Patients may see several different clinicians each day and may not necessarily have continuity of care across transitions and between clinicians. There is also room for inconsistent information delivery with multiple clinicians with varying expertise who interact with patients (Mosadeghrad, 2014). These factors may negatively impact the quality of relationships and the quality of information delivered between clinicians and patients and may be a barrier to patient participation (Gravel et al., 2006; Sainio, Lauri, & Eriksson, 2001).

2.3.2. Clinician related factors

For clinicians to successfully foster patient participation in their own health care, several conditions must be realised (Sofaer & Schumann, 2013). First, a patient centred approach to the delivery of health care, which not merely focuses on tasks and skills but where patients are genuinely at the centre of care provision, is needed. Second, clinicians need to embrace the principle that patients can assume a central role and can make informed decisions about their own care. Third, clinicians must be willing to relinquish power and assist patients to navigate the complex health care system and assist when obstacles arise. Achieving these conditions may require clinicians to adapt their practice, attitudes and behaviours, in particular, the way they interact with patients (Hibbard, Collins, Mahoney, & Baker, 2010; Sofaer & Schumann, 2013).
In a number of studies, a collaborative relationship between clinicians and patients was identified as a fundamental factor in patients’ decisions to participate in their care (Cohen, 2012; Davis, Koutantji, & Vincent, 2008; Entwistle, Carter, Cribb, & McCaffery, 2010; Gruman et al., 2010; Hovey et al., 2010; Keatinge et al., 2002; Kuzel et al., 2004; McTier, 2013; Timonen & Sihvonen, 2000). Participation has been described by patients as a collaboration with clinicians where opportunities are provided to participate (Larsson, Sahlsten, Sjöström, Lindencrona, & Plos, 2007). Similarly, Doherty (2012) reported patients were generally more willing to participate when clinicians encouraged their involvement. To determine what patients defined as participation, Eldh et al., (2010) conducted a study that revealed patient descriptions of participation included being respected (listened to) and regarded as individuals (receiving information tailored to the individual). Eldh et al. further concluded that a precondition for participation is the patient “being considered as a resourceful individual who comprehends” (Eldh et al., 2010, p. 28). Therefore, clinicians have an important role in the clinician-patient relationship to pre-empt and address communication barriers by providing education tailored to patients’ specific needs and appropriate to their level of health literacy (Glasgow et al., 2002; Gruman et al., 2010; Jerant, von Friederichs-Fitzwater, & Moore, 2005).

Facilitating or promoting patients’ participation in care entails communicating openly with patients, giving information that is tailored to their needs, and allowing patients to express their views and opinions (Martin, DiMatteo, & Lepper, 2001, p. 111). This often involves relinquishment of power on behalf of clinicians in order to empower patients to take an active role in their recovery (Sahlsten, Larsson, Sjöström, & Plos, 2008). Patients’ also need support to understand their own health situation. Patients’ readiness to
actively participate is dependent not only on knowledge and opportunity but also taking into account personal preference for participation (Larsson, Sahlsten, et al., 2007).

When examining concordance between patients’ and nurses’ perceptions of patient preference for participation in clinical decision making about nursing care, Florin (2006) found patients most often reported a preference to adopt a passive role (61%) while, nurses perceived patients wanted to be more active. Conditions that enable patient participation, include recognition of each patient’s unique knowledge and respect for individuals’ description of their situation rather than just inviting participation (Eldh et al., 2010; Florin et al., 2006; Frank, Asp, & Dahlberg, 2009).

2.3.3. Patient related factors

Patient related factors that are identified as barriers to the enactment of participation include a lack of information or understanding, physical acuity of illness, sociodemographic characteristics such as age and education level and activation or willingness to take on the participatory role (Table 2.1). A common barrier to patients accessing resources to support self-management is their lack of information and awareness of such support (Jerant et al., 2005). For example, O’Leary’s (2010) study of 241 hospitalised patients’ understanding of their plan of care found many did not know their plan and hence, by their definition did not participate in their care (O’Leary et al., 2010). If patients are to be participants in their own health care they need to be provided with the tools necessary to enable it to occur.

The physical limitations of acute illness or surgery can also impact on patients’ capability to participate. Patients in acute settings are likely to feel less informed about
their acute illness if they are feeling sick or vulnerable, and consequently they report feeling disempowered in this context (Frank, Fridlund, Baigi, & Asp, 2011; Heggland, Mikkelsen, & Hausken, 2013; Löfman, Pietilä, & Häggman-Laitila, 2007). Further, feelings of being overwhelmed by the illness can prevent patients’ participation despite expressions of a preference to participate (Chung, Lawrence, Curlin, Arora, & Meltzer, 2012; Cohen & Botti, 2015; Kvangarsnes, Torheim, Hole, & Öhlund, 2013; Latimer, Chaboyer, & Gillespie, 2014; McInnes, Chaboyer, Murray, Allen, & Jones, 2014). If clinicians appear busy then patients are unlikely to ask questions or attempt to be involved in decisions about their care as they may perceive this to be an additional ‘burden’ for clinicians (Cohen & Botti, 2015; Gravel et al., 2006; Larsson, Sahlsten, Segesten, & Plos, 2011b; McTier, 2013; Sainio, Eriksson, & Lauri, 2001). These factors make providing opportunity for participation within an acute illness context a challenge.

Understanding patients’ preferences for participation has been a significant focus of research. A national study in the USA by Levinson et al (2005) found that in general, patients wanted more involvement, more choice (including different treatment options), more time, more information, and more participation in decision-making, but they also acknowledged there were limitations to their involvement. Moreover patients felt more in control when they could ask questions, were listened to, had enough information, were given choices and were involved in decisions (Stacey, Paquet, & Samant, 2010). Patients described a sense of control in relation to choice (Levinson et al., 2005; Stacey et al., 2010). Positive attitudes towards ensuring their own safety has been found to increase patients’ willingness to participate in safety actions (Hibbard, Peters, et al., 2005; Schwappach & Wernli, 2011). Active coping styles compared to more passive coping styles have also been
associated with preference for more active participation in health care (Arora & McHorney, 2000).

In the context of postoperative recovery, patients need to understand the goals of care in order to participate in meeting the milestones of recovery. Information provided to patients in the postoperative phase must meet the specific needs of the individual patient and be delivered in a way that is inclusive of all learning styles (Suhonen & Leino-Kilpi, 2006).
Table 2.1 Clinician, patient and organisational barriers to participation

<table>
<thead>
<tr>
<th>Barriers to participation</th>
<th>Clinician factors</th>
<th>Patient factors</th>
<th>Organisational factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Power/control</td>
<td>Knowledge and understanding</td>
<td>Length of stay</td>
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<td></td>
<td>(Sahlsten et al., 2008; Sahlsten et al., 2005; Sofaer &amp; Schumann, 2013)</td>
<td>(Ishikawa &amp; Yano, 2008; Jerant et al., 2005; McKinstry, 2000; O'Leary et al., 2010)</td>
<td>(Barad et al., 2015; Gruman et al., 2010; Sahlsten et al., 2007)</td>
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<td></td>
<td>Communication/collaboration</td>
<td>Preference for participation</td>
<td>High frequency exposure to clinicians</td>
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<td></td>
<td>(Cohen, 2012; Davis et al., 2008; Doherty &amp; Stavropoulou, 2012; Entwistle, Carter, et al., 2010; Gruman et al., 2010; Keatinge et al., 2002; Larsson, Sahlsten, et al., 2007; Martin et al., 2001; McTier, 2013; Timonen &amp; Sihvonen, 2000)</td>
<td>(Hibbard, Peters, et al., 2005; Levinson et al., 2005; Stacey et al., 2010)</td>
<td>(Gravel et al., 2006; Sainio, Lauri, et al., 2001)</td>
</tr>
<tr>
<td></td>
<td>Notion of time</td>
<td>Illness severity</td>
<td>Acuity</td>
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<td></td>
<td>(Bolster &amp; Manias, 2010; Cohen, 2012; McTier, 2013; Sahlsten et al., 2005)</td>
<td>(Biley, 1992; Frank et al., 2011; Heggland et al., 2013; Jerant et al., 2005; Löfman et al., 2007)</td>
<td>(Chung et al., 2012; Cohen &amp; Botti, 2015; Kvangarsnes et al., 2013; Latimer et al., 2014; McInnes et al., 2014)</td>
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<tr>
<td></td>
<td>Understanding where patients can participate</td>
<td>Time/opportunity for participation</td>
<td>Work environment/culture</td>
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<td></td>
<td>(Doherty &amp; Stavropoulou, 2012; Mira et al., 2012)</td>
<td>(Bolster &amp; Manias, 2010; Gravel et al., 2006; Larsson et al., 2011b)</td>
<td>(Bolster &amp; Manias, 2010; Entwistle, Carter, et al., 2010; Sainio, Lauri, et al., 2001)</td>
</tr>
<tr>
<td></td>
<td>Opportunity provided</td>
<td>Acceptance of new patient role/attitude and coping styles</td>
<td>Ward routine</td>
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<td></td>
<td>(Doherty &amp; Stavropoulou, 2012; Gruman et al., 2010; Jerant et al., 2005)</td>
<td>(Arora &amp; McHorney, 2000; Hibbard, Peters, et al., 2005; Schwappach &amp; Wernli, 2011)</td>
<td>(Bolster &amp; Manias, 2010; Gravel et al., 2006)</td>
</tr>
<tr>
<td></td>
<td>Sociodemographic characteristics</td>
<td>(Adams, Smith, &amp; Ruffin, 2001; Arora &amp; McHorney, 2000; Deber, Kraetschmer, Urowitz, &amp; Sharpe, 2007; Florin et al., 2006; Mira et al., 2012; O'Donnell &amp; Hunskaar, 2007; Schouten, Meeuwen, Tromp, &amp; Harmsen, 2007; Street, Gordon, Ward, Krupat, &amp; Kravitz, 2005)</td>
<td>Model of care delivery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Bruster et al., 1994; Cohen, 2012; Gravel et al., 2006; McTier, 2013; Sainio, Lauri, et al., 2001)</td>
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</tbody>
</table>
2.3.4. Summary

Factors such as brief length of stay, perceived busyness of clinicians, and acuity of patients after surgery are all likely to play a role in the achievement of patient participation within the acute care environment because they impact on the opportunity patients have to engage with clinicians. Finding sustainable ways that enable patients to participate within this context for the duration of their acute recovery are needed. Multimedia tools are emerging as possible platforms for the effective delivery of information to patients with varying needs and capability. Multimedia tools, if embedded in care processes, may create opportunity and provide a feasible solution for patient participation in acute care environments.

2.4 Multimedia Interventions to Improve Patient Participation in Care

Advances in information technology and multimedia techniques provide a unique opportunity to develop innovative approaches to the provision of consistent, accessible, evidence-based information for patients during episodes of acute care. The use of multimedia as a platform for providing information and education has increased significantly over the past decade. Multimedia tools have been used in a wide range of health situations including: preparing patients for specific procedures or surgery by providing education pre-operatively or to gain pre-operative consent (Armstrong et al., 2010; Batuyong, Jowett, Wickramasinghe, & Beischer, 2014; Beamond et al., 2009; Bob, Goldsmith, & Gambardella, 2015; Cornoiu, Beischer, Donnan, Graves, & de Steiger, 2011; Migden, Chavez-Frazier, & Nguyen, 2008; Yin, Goldsmith, & Gambardella, 2015); providing health information for patients to assist them to make informed decisions regarding
treatment (Beischer et al., 2008; Maasland, Koudstaal, Habbema, & Dippel, 2007); presenting information to enable self-management in chronic illness (Kandula, Malli, Zei, Larsen, & Baker, 2011); increasing knowledge about postoperative care, for example how to use a patient controlled analgesic pump after surgery (Chen, Yeh, & Yang, 2005); and improving patient overall satisfaction (Huber et al., 2013).

Two systematic reviews of the use of multimedia technologies to extend the patient education process (Fox, 2009; Wofford, Smith, & Miller, 2005) concluded that these technologies are beneficial in delivering patient education, in particular, the value added to the patient education process in terms of increased knowledge, increased confidence in self-care and ability to participate in decision making (Fox, 2009; Wofford et al., 2005). However evidence for the use of these types of interventions was drawn from the chronic illness and ambulatory care settings. What is less clear is the acceptability and usability of multimedia interventions during acute recovery from illness or surgery. Further, evidence that multimedia interventions provide patients with the capability to participate and improve patient outcomes is not yet established.

2.4.1 Systematic narrative review of the effectiveness of multimedia in patient engagement

The purpose of this systematic narrative review of the research literature was to uncover what is known of the effectiveness of multimedia interventions in: engaging patients in their care; as a platform for delivery of information to patients; and improving postoperative recovery outcomes. Typically, information/education in acute care is delivered to patients verbally by clinicians, can be inconsistent or ad hoc and often focuses
on topics that clinicians themselves consider important (Fredericks, Guruge, Sidani, & Wan, 2010). Multimedia tools may be useful ways to reduce variation in the information provided, enabling and activating patients to self-monitor and gather information in a timely manner when patients are ready to receive it. Continuously available information via multimedia may overcome barriers to participation in acute care, specifically addressing patients’ difficulty in retaining information, due to the effects of anaesthetics, medications and fatigue, as well as their symptoms, for instance pain and nausea (Stern & Lockwood, 2005). Whether multimedia resources are any more acceptable, useable or effective in facilitating recovery for patients in the acute postoperative context than other resources needs to be understood.

2.4.1.1 Review questions

Two specific questions guided this review:

1. How effective are multimedia interventions in facilitating patient participation in the acute care context, and what outcomes have been measured? and
2. What is the acceptability, usability and feasibility of multimedia interventions in an acute care context?

For the purpose of this review, *usability* was defined as the degree to which a multimedia intervention is easy to use for patients in the acute care context, and *feasibility* was defined as the ease or convenience of applying a multimedia intervention.
Data Sources and Search Methods

Four electronic data bases were searched: MEDLINE, CINAHL, EMBASE and PsychInfo in November, 2015 and repeated October, 2016. No limitations were placed on the time period or publication type. Three concepts were used to guide the search strategy: multimedia interventions, and acute hospital care and patient participation. The search also included use of Google Scholar to screen for grey literature, as well as citation searches and reference lists of included studies, and websites of peak bodies.

The search terms used included:

- Patient OR client OR consumer OR user OR customer OR recipient; AND
- Participation OR engagement OR involvement OR collaboration; AND
- Interventions, tools, multimedia, education; acute care, hospitalised, hospitalised, inpatient, hospital, acute, post-operative.

Inclusion criteria

- Adult patients
- In hospital – specifically acute care clinical setting
- Multimedia as the intervention tested
- Must have had a specific aim to enhance patient engagement, involvement or participation.
Exclusion criteria

- Did not report outcomes from the use of the intervention (i.e. study protocols, reviews or discussion papers)
- Did not describe the intervention
- Was not specifically multimedia or did not incorporate two or more methods (text, sound, graphics)
- Not written in English language
- Pre-admission or outpatient settings (attached to hospital however not acute care).

2.4.1.2 Results

The initial search identified 281 manuscripts: MEDLINE, 156; CINAHL, 66; EMBASE, 32, and PsychInfo, 27. A further 13 articles were found through other sources such as Google Scholar. After removing duplicates, 277 titles were reviewed, 242 abstracts were screened and 53 full text papers were identified for review; 43 papers were excluded based on the exclusion criteria outlined above. The final review consisted of 10 papers reporting the outcomes of 7 individual studies of multimedia interventions for patients in the acute in-hospital context. See Figure 2.1 (PRISMA flow diagram) for the summary of the literature selection process and Table 2.2 for the summary of studies included in the review. The seven studies reviewed all tested multimedia interventions predominately for the purpose of evaluating usability and feasibility in acute care settings.
Figure 2.1 PRISMA diagram
**Table 2.2** Articles included in the review of multimedia interventions used to improve patient participation in acute care

<table>
<thead>
<tr>
<th>Author</th>
<th>Study design</th>
<th>Purpose and primary outcome</th>
<th>Outcome measures</th>
<th>Intervention</th>
<th>Limitations</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Cook et al., 2013; Cook et al., 2014)</td>
<td>Quasi experimental Post-test design</td>
<td>1. Test the feasibility of delivering detailed information and acquiring patient reported outcome (PRO) measures via iPad™ technology post cardiac surgery. 2. Test if patient reported data were predictive of length of stay or discharge disposition.</td>
<td>I-MOVE mobility scale. Length of stay (LOS) Discharge disposition (home or rehabilitation) Modules accessed Patient outcomes reported (pain &amp; mobility scores)</td>
<td>E-health platform delivered via iPad™ technology. Commenced pre-admission then each day following ICU discharge Contents:  - Personalised care plan  - “to do lists”  - Self-assessment tools and reporting capabilities  - Education specific to surgical procedure  - Recovery/discharge planning  - Early screening for discharge  - Assessment of mobility</td>
<td>No control group/comparison group  Did not examine participation in recovery outcomes  No measure of engagement  Reported engagement with the intervention rather than in care  No measure of patient outcomes</td>
<td>149 older patients post cardiac surgery participated. High scores on the mobility scale in early recovery were associated with a reduced LOS. Reports of pain had no relationship with LOS. Patients completed 97.6% of self-assessment modules. Feasible and effective way to deliver information in postoperative context</td>
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<tr>
<td>Author</td>
<td>Study design</td>
<td>Purpose and primary outcome</td>
<td>Outcome measures</td>
<td>Intervention</td>
<td>Limitations</td>
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<tr>
<td>(Dalal et al., 2015) (Dykes et al., 2014)</td>
<td>Quasi experimental Post intervention test only 2 intervention units - Medical intensive care unit (MICU) &amp; oncology unit</td>
<td>To test the enrolment strategy, use and usability of patient tools and patient generated message system Pilot test</td>
<td>System usability and user satisfaction survey Number of times system accessed by patient or care giver Number of times messages were sent Number of messages viewed by health team Number of goals or health concerns entered</td>
<td>PCTK (patient-centred tool kit) that provides patients and care givers 'tools to participate in plan of care'. Web based (computer required) intervention Specific information provided related to test results, medications, team members Ability for patients to interact by sending questions and care goals to health care team Used the toolkit for 1-4 days (MICU) and 5-10 days (oncology)</td>
<td>No control group/comparison group Did not examine participation in recovery outcomes Reported engagement with the intervention rather than in care No measure of patient outcomes</td>
<td>30 minutes required to enrol patients 72% were satisfied or extremely satisfied with the tool Usability scores were moderate to high. Use of the portal was modest-66% entered a daily goal; 32% preferences; 7% health concerns, and 64% feedback.</td>
</tr>
<tr>
<td>(Greysen, Khanna, Jaconobia, Lee, &amp; Auerbach, 2014)</td>
<td>Quasi experimental Pre and post intervention test (pilot)</td>
<td>Prospective study of tablet computers to engage patients in their care and discharge planning through Web-based interactive health education modules and use of personal health record. Prospective pilot project to explore inpatient satisfaction with bedside tablets and barriers to usability.</td>
<td>Device ownership Health related internet activities Problems with usability Time needed to orientate Overall experience Observation of ability to access information</td>
<td>Web based interaction health education modules delivered via tablets Content covered: • Medication list • Communicating with health care team • Advanced directives • Safety (Handwashing &amp; falls prevention) • Discharge planning • View and modify appointments</td>
<td>No control group/comparison group Small sample Did not examine participation in recovery outcomes Reported engagement with the intervention rather than in care No measure of patient outcomes Device only left with patient for 3 to 5 hours</td>
<td>30 patient enrolled in the study 70% accessed PHR 52% communicated with a provider 90% satisfied using the tablet 87% required 30 minutes of education for basic operation Most patients could access modules</td>
</tr>
<tr>
<td>Author</td>
<td>Study design</td>
<td>Purpose and primary outcome</td>
<td>Outcome measures</td>
<td>Intervention</td>
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<tr>
<td>(Vardoulakis et al., 2012)</td>
<td>Quasi-experimental Post intervention test only</td>
<td>Feasibility of using a mobile phone device in the emergency department setting. The aim was to present information related to patients’ care plan and care team</td>
<td>Mobile phone feasibility for delivering information Phone usage patterns Patient anxiety Patient empowerment</td>
<td>Presented (via mobile device) a dynamic, interactive report on their progress, care plan, and care team throughout their emergency department stay.</td>
<td>No control group/comparison group Did not examine participation in recovery outcomes Reported engagement with the intervention rather than in care No measure of patient outcomes</td>
<td>25 patients and families (average age 46 years) Only received 2-4 minute tutorial 22 participants interacted with the phone a total of 10.8 times Patients reported they liked being in control of the device</td>
</tr>
<tr>
<td>(Pinto, Vincent, Darzi, &amp; Davis, 2013)</td>
<td>Descriptive exploratory Post test</td>
<td>To explore patients’ attitudes towards the PINK video, a patient education video aimed at encouraging hospital patients’ involvement in safety-relevant behaviours. Primary outcome: patient perceptions of relevance, acceptability and how informative the video was and barriers or negative effects of watching</td>
<td>Semi-structured interviews: acceptability, relevance, perceived informative. Attitudes towards participating in recommended behaviours; side effects; suggestions for improvement</td>
<td>The PINK video is a short (4 minutes) animated educational video aimed at encouraging patients to be involved in the safety of their care during hospitalisation.</td>
<td>No control group/comparison group Did not examine participation in recovery outcomes Reported engagement with the intervention rather than in care No measure of patient outcomes</td>
<td>Encouraged ‘willing’ involvement in safety behaviours Easy to understand Very informative Mixed results related to the suitability Importance was rated highly</td>
</tr>
<tr>
<td>Author</td>
<td>Study design</td>
<td>Purpose and primary outcome</td>
<td>Outcome measures</td>
<td>Intervention</td>
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<tr>
<td>(Vawdrey et al., 2011)</td>
<td>Quasi-experimental Post-test design</td>
<td>To evaluate the role tablet computers play in providing information in hospital patient and facilitating communication with health care providers. Patient satisfaction with, knowledge of, and engagement in their hospital care through semi-structured interviews.</td>
<td>Semi-structured interviews • Satisfaction • Knowledge • Engagement in care 25 item survey feasibility and acceptability</td>
<td>Delivered via iPadTM Information about care providers; medications; conditions; tests; procedures</td>
<td>No control group/comparison group. Did not examine participation in recovery outcomes. Reported engagement with the intervention rather than in care. No measure of patient outcomes.</td>
<td>5 patients in cardiac step down unit. Mean age 55 years. Feasible and acceptable way to deliver information to patients in the post operation context.</td>
</tr>
<tr>
<td>(O'Leary, Lohman, et al., 2015)</td>
<td>Controlled trial – 2 units (medical wards) (one intervention and one control)</td>
<td>To assess the effect of tablet computers with a mobile patient portal application on hospitalised patients' knowledge and activation.</td>
<td>(I&amp;C) interviewed day 2 or 3 to determine knowledge of: • Care team members • planned tests/procedures • medications • activation (PAM) Frequency of use &amp; Satisfaction</td>
<td>Patients on the intervention unit were given iPadsTM with the &quot;portal application&quot; for use during their hospitalisation.</td>
<td>Yes – did have comparative group however could have ward-level confounders. Did not examine participation in recovery outcomes. Reported engagement with the intervention rather than in care. No measure of patient outcomes.</td>
<td>120 (I) patients given the iPadTM 100 completed the interviews. 102 (C) patients interviewed. (I) patients younger (p=0.05) 76% satisfied – easy to use. 71% useful information. Difference in knowledge of care givers between groups (p=0.001) PAM mean higher in (I) group not significant.</td>
</tr>
</tbody>
</table>
2.4.1.3 Discussion

Studies identified in the review used multimedia as a tool to deliver patient specific information during hospitalisation, with an overall aim to test usability and feasibility of multimedia tools as a way of doing this. Overall, the findings suggest that multimedia, as a way to deliver information to patients in the acute care setting, is acceptable to patients and/or caregivers. Further, the time taken to instruct patients to navigate the system, although not always reported, appears low. Patients show moderate engagement with the tools, however the effectiveness of multimedia interventions in increasing patient participation in their care or in improving patient outcomes has not been investigated.

Effectiveness of multimedia interventions in acute care and link to outcomes

Only one of the studies reviewed measured patient participation or patient outcomes as a function of using multimedia interventions designed to increase patients’ involvement in their care. The majority of studies were not designed to measure patient participation or outcomes. The findings however, provide insight into the likelihood that patients will use these interventions in acute care.

Of the seven studies reviewed, only one had a control group although not randomly allocated. This study by O’Leary (2015) and colleagues assessed the effect of a tablet computer with a mobile patient portal application. The aim was to improve patients’ knowledge of their health care team and their roles, planned tests or procedures, medications and, hospitalised patients’ knowledge and activation. The device used was an iPad™. The hypothesis was that using this portal would improve patients’ knowledge of their care team and pharmacological treatment plan. The results were not consistent.
Patients who received the intervention were more likely to remember their physicians’ names and roles ($p=0.001$), however, there was no difference between groups in terms of correctly naming a nurse ($p=0.45$), awareness of planned tests, procedures or medications. The patient activation measure (PAM) was used to determine differences in level of activation between groups but although there was a trend towards higher activation in the intervention group, no significant difference between groups was revealed. It is possible that the study was not sufficiently powered to detect a difference because activation was not a primary outcome.

In the study of an e-health platform intervention by Cook (2013) and colleagues, patients whose self-reported mobility scale reports were high had associated shorter length of stay in hospital compared to usual length of stay. However it is important to note that there was no objective measure of patient mobility and no comparison control group, nor do Cook et al claim that the multimedia intervention may have mediated the higher mobility. Instead they investigated whether the tool would be feasible as a means of collecting patient reported outcomes. Findings suggest that patients were using the intervention as evidenced by the high number of self-reports. Patients completed 97.6 percent of self-assessment modules and therefore it was concluded that the platform was a feasible and effective way to deliver information in the postoperative context. This is significant, as patients in Cook’s study were recovering from cardiac surgery. In another related study in 2014, Cook (2014) and colleagues tested the e-health platform as a way to deliver information to older patients after cardiac surgery. Patients indicated a greater understanding of information delivered, 98 percent of patients specified they understood the information however, these data were collected using a self-reported ‘tick box’ where
patients marked if they understood (yes) or did not understand (no) the information. There was no measure of patients’ actual knowledge or if their understanding of their recovery increased as a result of the program.

All of the studies reviewed reported high patient satisfaction as an outcome of the use of multimedia interventions, this is an important finding in terms of ensuring patients are comfortable using this type of intervention in the context of acute care and recovery. Further work is needed using sound methodologies such as randomised controlled trials or quasi-experimental studies, to determine if multimedia interventions do increase patients’ ability to receive and retain information in acute care contexts.

Usability and feasibility of multimedia interventions in acute care

All of the studies reviewed reported the usability and feasibility of their interventions in the context of acute care delivery. That is, how easy they are to use for patients, and the degree to which using these multimedia interventions are convenient for patients. The findings suggest that multimedia interventions are both useable and feasible for patient use in the context of acute recovery.

One of the barriers identified by patients in understanding their care goals and enactment of participation, is conflicting or inconsistent information received (Cahill, 1998; Davis et al., 2007; Jerant et al., 2005; Levinson et al., 2005). To overcome this barrier, Dykes (2014), Dalal (2015) and colleagues implemented an intervention delivered via interactive web-based design, specifically intended to engage hospitalised patients in their plan of care. Outcomes reported included a system usability and satisfaction survey that
indicated patients found the system easy to use and were very satisfied (74% satisfied). The most frequently accessed pages via the portal included goals, test results, care team members, medications, messages and education regarding tests results and medications (Dalal et al., 2015). However no measure of patients’ ability to understand their plan of care was reported.

Vardoulakis (2012) also confirmed that a multimedia intervention was an acceptable and useable way to deliver consistent and reliable information to patients in acute care. Patient satisfaction and usability was high amongst the patients and families who engaged with the intervention (Vardoulakis et al., 2012). Again, Greysen (2014) and colleagues found that patients were satisfied with using tablet computers for discharge planning and were able to show that patients engaged with the intervention.

In 2011, Vawdrey (2011) tested patients’ perceived usefulness and satisfaction with iPad™ technology following cardiac surgery. Engagement with the intervention was measured as the number of times the program was accessed by patients (Vawdrey et al., 2011). Whilst the iPad™ was found to be useable and a useful way to deliver information in the acute context, the study outcomes measured did not provide any evidence that patients were engaged in their care as a function of using the multimedia program.

The studies reviewed provide evidence of the feasibility and usability of multimedia interventions in acute care to provide patients with information relating to their care. There is also evidence that this usability of the multimedia interventions can increase patients’ perception of their knowledge related to their care. If we accept that patients do
engage with multimedia what effect does this engagement have on their ability to engage with their care?

A major limitation of the studies reviewed was the quasi-experimental, post-test design and lack of a comparative or control group. One exception was O’Leary (2015) who had a control group with similar patient characteristics in both groups that allowed comparisons between those who did and did not receive the intervention. However the two groups (intervention and control) were allocated to two separate wards in the same hospital (O’Leary, Killarney, et al., 2015) and the structural, process and ward culture characteristics may have differed between wards.

Only one of the studies reviewed attempted to investigate whether the interventions had an effect on patient activation, participation or outcomes of care.

2.5 Conclusions

There is a worldwide movement to include patients as participants in their own care in the recognition that participation will enhance the quality and safety of the care patients receive. The enactment of patient participation involves a complex interplay between patients’ capability, opportunity and activation.

Current research evaluating patient participation in care in both chronic and acute care environments was reviewed to provide a context for the interventional research study reported in this thesis. Evidence-based guidance for facilitating participation in acute care, the implications of patient participation for nursing and healthcare practices and what patient outcomes are likely to be impacted upon is emerging but ill-defined. The acute care
context presents unique challenges to participation and it is not clear how patient participation is enacted in this environment, or indeed, if it is possible to implement sustainable interventions to support patient participation in this context. Although there is evidence linking participation with improvement in patient outcomes in acute care, these interventions are often resource intensive and the mechanisms for achieving participation are not well understood.

2.6. Conceptual Framework

The investigation of the effectiveness of a facilitated multimedia intervention designed to enhance patient participation in meeting the goals of recovery after surgery is underpinned by a conceptual framework derived from existing knowledge of the factors that impact on patient participation. Much of this knowledge has emerged from research in subacute and chronic illness health care settings but more recently in acute care.

The enactment of patient participation is conceptualised as the outcome of the complex interplay of three key concepts: capability, opportunity and activation. Figure 2.2 provides an illustrative view of the conceptual framework by identifying concepts related to participation.

Capability is the information that is required to equip patients to understand their goals in order to achieve them. It is considered a modifiable factor that can be applied externally through a variety of media, unlike knowledge which is a more complex internal state based on learning and experience. The context of acute care presents unique and
complex challenges to providing patients with information that can be received, understood, internalised and acted upon.

The delivery and structure of information are considered to be two fundamental aspects of building capability in this context. Delivery refers to the medium through which information is provided. It is proposed that multimedia is likely to be effective because it has been shown to be usable and feasible in high acuity areas and requires minimal effort from patients who are ill, drowsy or in pain. Further, the medium allows continuous access to information accommodating periods when patients may not be able to access it. The structure of the information refers to whether it is explicit, actionable, non-ambiguous and consistent.

Opportunity for participation occurs predominately through patient-clinician interactions because in the post-surgical context patients need assistance to achieve activities of daily living, pain management, surveillance for complications and rehabilitation. Whether patients initiate interactions, accept interventions or negotiate with their clinicians when assistance is required are all aspects of participation. The quality of the opportunity is determined by having access to clinicians, perceptions of clinicians’ willingness to engage and clinicians’ responses. In a sense this is about patients feeling that they have ‘permission’ to engage with clinicians to negotiate strategies to achieve goals. The notion of being given ‘permission’ appears to perpetuate a paternalistic model of care, however there is evidence that patients do not feel that questioning, clarifying and suggesting alternatives is accepted and that doing so could jeopardise relationships with their clinicians.
Activation for participation is a less clear concept that is likely to be influenced by internal patient factors as well as perceived capability and opportunity. Activation refers to patients’ skill, knowledge and confidence to participate. Perceived knowledge is likely to play an important part in patients’ confidence to initiate interactions with clinicians and initiate and engage in activities to enhance recovery. Whether knowledge is sufficient to bring about changes in patients’ behaviours in this context is not known. Previous research suggests that this may not be the case. Interventions such as individual coaching, that have shown effectiveness in changing behaviours in acute care, have been resource intensive and required specialist clinicians and, are unlikely to be feasible in postsurgical environments with rapid turnover of patients.

In summary, antecedents to achieving participation in acute postoperative recovery require the interplay between capability, opportunity and patient activation. These concepts are expected to be highly interdependent and synergistic. Attempts to facilitate participation by intervening in one aspect independent of the others is unlikely to be effective.

2.6.1 MyStay TKR intervention

The specificity of the multimedia program in terms of TKR meant that there were very explicit goals related to exercises and mobility that made it possible for goals of recovery to be set a priori. Although the intention was not that patients and clinicians would establish shared goals explicitly there was an expectation that patients and clinicians would interact in a way that ensured that the goals of recovery were clear and that patients and clinicians would work together to achieve these goals. Setting goals for
pain management was expected to be a shared process where patients would understand their prescribed analgesics, the importance of managing pain, reporting pain and managing analgesics to provide comfort and to be able to meet exercise and mobility goals of recovery.
Figure 2.2 Conceptual framework of patient participation
Chapter 3

The Research Program and Methods

The detailed description of the research methods and ethical considerations in the design, implementation and evaluation of a nurse-facilitated, multimedia education intervention to improve postoperative outcomes for patients following Total Knee Replacement (TKR) surgery\(^1\) is presented in three major sections. This research was designed as a cluster randomised, crossover trial with an embedded detailed process evaluation. The first section outlines the design and methods used to conduct the cluster randomised, crossover trial. The second section provides a description of the process evaluation designed to explore the implementation of the intervention, provide a context for understanding the outcomes of the trial, and investigate the experiences of participants. The ethical issues considered and how these were addressed are discussed in the final section.

3.1 Aims, Hypothesis and Objectives of the Study

3.1.1 Aims and objectives

1. To determine the primary outcome of the intervention in relation to patients’ pain intensity on Day 3 following Total Knee Replacement surgery.

2. To determine the secondary outcomes of the intervention in relation to:

   i. Interference of pain on activities of daily living;

   ii. Length of stay in hospital;

   iii. Function and pain following surgery four weeks after discharge from acute care;

   iv. Patients’ satisfaction with care received;

   v. Postoperative complications – Deep Vein Thrombosis (DVT) within 28 days of surgery;

   vi. Readmission to hospital within 28 days of discharge from acute care.

3. To evaluate the processes used in the conduct of the trial of the multimedia intervention

The related objectives were to:

   i. Determine the extent to which recruitment procedures were appropriate in enrolling and maintaining patients in the trial;

   ii. Determine the extent to which the processes used to implement the multimedia intervention were successful;

   iii. Determine the system or environmental factors that may have impacted on the effectiveness of the intervention;
iv. Determine the usability and acceptability of the multimedia intervention in the context of acute recovery after surgery.

4. To explore whether the intervention provided patients with the capability and opportunity to participate in care related to their goals of recovery. The related objectives were to:

   i. Analyse differences in knowledge regarding the goals of recovery after TKR between intervention and control group patients;

   ii. Measure differences in activation (PAM) between intervention and control group patients;

   iii. Analyse patient-reported personal and clinician behaviours that may have impacted on capability and opportunity for participation in postoperative care.

3.1.2 Hypothesis

   Pain intensity outcomes (pain scores) Day 3 after surgery can be improved through an intervention that promotes patient participation in meeting the postoperative goals of recovery (including pain management) after TKR surgery.

3.2 Cluster Randomised Crossover Trial

3.2.1 Research design

   This study was designed as a cluster randomised, crossover trial with an embedded detailed process evaluation. Data collection and analyses involved an integration of mixed methods. Multimedia was selected as the intervention most likely to be effective in influencing patient participation in the context of acute postoperative recovery because of
ease of use and the nature of the information to be delivered, specifically, knee mobility exercises.

Consistent with the design of cluster randomised, crossover studies, cohorts of patients were randomly assigned to receive either an intervention or a control condition within a cluster (Rietbergen & Moerbeek, 2011). For the purpose of this study, cluster refers to a hospital ward (1, 2 or 3), period refers to a particular interval of time within a cluster (to which either the intervention or control condition was assigned), and cohort refers to the group of patients admitted to the ward during a specified period of time. The study design consisted of four periods crossed with two wards (or clusters) and an additional “overflow” ward. Figure 3.1 provides a graphic description of the study design.

In cluster randomised studies without crossover, there is often concern about whether any differences in outcome between the intervention and control groups can be attributed to the intervention alone or may be due to pre-existing differences between clusters (Turner, White, & Croudace, 2007). To avoid this, a crossover design was used in which the clusters (wards) received either the intervention and control (usual care) conditions in different time periods. Two wards were randomised to sequences of conditions to ensure that at least one ward received the intervention and another ward received the control condition in each period. A third “overflow” ward received control conditions only. The necessity for an overflow ward was due to the admission processes at the hospital site. Patients were recruited to the study at pre-admission clinic but were admitted to one of the orthopaedic wards (clusters) after surgery through routine hospital admission procedures.
The hospital has two main orthopaedic units and a third ward acts as an overflow when the beds are occupied on the other two wards. At the time of recruitment, it was not known to which ward patients would be allocated. Patients could be admitted to one of two primary orthopaedic wards or an additional 'overflow' ward. Because it was not known which patients would be admitted to particular wards, the secondary 'overflow' ward was always assigned the control condition in each period as the numbers of patients through this ward was significantly less than the two primary wards (approximately two patients per week). In this way, all consented patients who underwent a TKR and were admitted to any of the three wards were retained in the study.

The two primary wards were randomly assigned to a sequence of control (A) and intervention (B) conditions. The intervention, B, was allocated to at least four cohorts. The intervention appeared once in each period and twice in each of the two primary wards. Ward 1 was randomly assigned the sequence ABBA and Ward 2 the sequence BAAB. Ward 3, the overflow ward was assigned AAAA (Figure 3.1). Each cohort within a cluster was accrued and monitored over a period of 12-15 weeks. In addition to usual care, patients admitted to the intervention (B) ward during a data collection period received the multimedia intervention (via iPad™) each day, commencing on Day 1 after surgery.
Figure 3.1 Study design
3.2.1.1 Control group - usual care

Patients admitted to a ward during a control condition (A) received usual care based on the clinical pathways for TKR recovery approved by the hospital quality governance process and in use in the hospital (Appendix 1).

3.2.1.2 Randomisation

The wards (clusters) were randomly assigned to a sequence of control (A) and intervention (B) periods by the statistician (JR) prior to recruitment of patients and commencement of the trial. At the time of patient recruitment, it was not known which cluster or period individual patients would be allocated to. Moreover, allocation of patient participants to clusters occurred via the hospital process of ward allocation and was largely dependent on bed availability at the time of a patient’s surgery.

3.2.1.3 Potential for contamination

Careful consideration was given to the possibility of carry-over effects, in which the effects of the intervention delivered in one time period continue into a subsequent time period (Turner et al., 2007). A key concern was that nurses involved in the study may change their behaviour over time, that there would be a general improvement in pain management over the life of the study and that this would lower the ability (or power) to detect a difference between usual practice (which may be improving over the life of the study) and the intervention (which may, or may not, improve over the life of the study).

To mitigate the risk of contamination between control and experimental conditions, a washout or buffer period (usual care on all wards, no intervention or data collection) was introduced between cohorts of patients (periods). The washout period of two weeks
between each period was considered long enough to allow temporary changes in nurses’
practice to fade and thereby reduce the likelihood of a period-by-treatment interaction.
This time period was also sufficient to ensure a complete turnover of patients in a ward
from one period to another. As the intervention in this study was delivered via iPad™, the
intervention itself was removed from the wards during the washout periods and the
control periods to ensure that, at the very least, implementation of the multimedia
intervention did not continue.

3.2.1.4 Blinding

Blinding can occur at several points in a trial: at recruitment, application of the
intervention, data collection and data analysis (Karanicolas, 2010). As stated earlier, it was
not known which cluster or period patients would be allocated to at the time of
recruitment because patients were recruited pre-operatively.

Blinding of clusters or data collection was not practical in this study as all clinicians
on the clusters were aware of the allocated treatment. As stated by Campbell (2012) in
cluster randomised, crossover trials, it is widely acknowledged that blinding of the
intervention is often not possible. Further, it is recognised that blinding in improving
internal validity can decrease external validity in effectiveness (pragmatic) studies and a
balance is required between the two (Rothwell, 2005). The intervention (iPad™) was
delivered by ward nurses and the nurse researcher who was also involved in the collection
of data at Day 3 of the postoperative period. To limit bias in this trial the primary outcome
measure was obtained via a patient self-reported questionnaire that asked patients to
indicate the ‘worst pain score in the previous 24 hours’. Other outcome measures such as
patient activation and interference of pain on activities of daily living were also collected via a patient self-reported questionnaire on Day 3. Length of stay, postoperative complications, and readmission to the study hospital were collected via the hospital information data system. Patient satisfaction, NET promoter score and return to work were collected via a patient self-reported questionnaire sent to patients four weeks after discharge from acute care.

### 3.2.2 Participants

Patient inclusion in this study was focused on a specific patient population undergoing a relatively standardised procedure (primary elective TKR surgery) to avoid confounding factors that may differ across surgical procedures (e.g. physical trauma, duration of surgery) and because the intervention was tailored to this particular cohort of patients. The intervention was tailored for elective TKR surgery because it is a high volume procedure particularly at the participating hospital; more than 2,200 knee and hip replacement surgeries are performed each year ("Orthopaedic surgery," 2016). Patients in the postoperative period after TKR surgery experience high pain intensity (Ranawat & Ranawat, 2007), they are required to participate in their postoperative management and are therefore most likely to benefit from adequate pain management in order to participate in their postoperative recovery. The study included nine (9) surgeons who perform TKR surgery at the hospital, a number of surgeons (7) were not included in this study because their patients were participating in other research projects.
3.2.2.1 Inclusion criteria

- Planned elective admission for unilateral primary total knee replacement surgery
- Over 18 years of age

3.2.2.2 Exclusion criteria

- Cognitive impairment (as determined by the Consultant or Pre Admission Nurse Coordinator) that would interfere with informed consent, ability to navigate the multimedia intervention or ability to complete questionnaires.
- Patients not proficient in English language

3.2.2.3 Recruitment

Recruitment took place prior to surgery, thus allowing for the collection of baseline data. Pre-surgery recruitment also allowed potential participants time to reflect and seek clarification about their involvement in the research.

Recruitment method

- The coordinator of the hospital preadmission clinic telephoned all patients scheduled for TKR surgery prior to their attendance at the clinic and/or admission for surgery. Patients received a brief explanation of the study and were informed that they may be approached at the clinic in relation to possible participation in a research study.
- At the preadmission clinics (conducted fortnightly), eligible patients were identified by a coloured name tag and were approached by the researcher after liaising with the clinic coordinator. Patients were invited to read the brief study information sheet and meet with the researcher to discuss the project and clarify requirements.
of participation. Those interested in participation were provided with a Participant Information and Consent Form (Appendix 2) and the pre admission questionnaire to either take home or complete while in the clinic.

- If patients were not able to attend the pre admission clinic, the coordinator obtained their permission to disclose their details to the researcher so that information about the study could be sent to them by mail:
  - If patients agreed they were sent further information about this study and invited to participate,
  - Patients who agreed to participate were asked to complete and return via mail, the Participant Information and Consent Form and written pre-admission questionnaire (Appendix 3) prior to admission for surgery.

### 3.2.2.4 Handling of withdrawals

Patients could withdraw from the study at any stage up to and including the follow-up period. If patients withdrew, their baseline data were retained to enable analyses of potential biases associated with withdrawals. If patients in the intervention period chose or were not able to interact with the multimedia program, analyses were according to intention to treat.

### 3.2.2.5 Replacements

Patients who withdrew from the study within a period (pre-admission) were replaced. A particular period was closed to data collection once the pre-specified number of patients per cohort had been recruited and participated.
3.2.3 Research setting

Data were collected in three acute, inpatient orthopaedic wards of a major private, not-for-profit, metropolitan hospital in Melbourne, Australia. The wards comprised a total of 79 acute orthopaedic beds and provided care for approximately three new patients undergoing TKR surgery per day on two wards, with the third ward used as an ‘overflow’ ward. The units were staffed with teams of nursing, medical and allied health personnel who were specialists in the management of orthopaedic conditions.

3.2.4 Multimedia intervention

The multimedia intervention known as “MyStay Total Knee Replacement” (referred to as MyStay) was designed to be both nurse-facilitated and patient self-directed; that is, able to be accessed and used independently by patients as a stand-alone program packaged for iPad™ presentation. The intervention therefore had two interacting components:

1. Information tailored to each day of recovery to enhance patients’ understanding of the goals of recovery and their role in their own recovery

   The multimedia program included information about expected mobility for each day of the inpatient recovery period from Day one (1) to Day five (5) or day of discharge after TKR surgery, acceptable pain scores and the importance of managing pain, and specific instructions about promoting mobility in the new knee joint to improve function (British Orthopaedic Association - Knee replacement: a guide to good practice, 1999) and to avoid complications such as thromboembolism and pneumonia.
By providing patients with explicit knowledge, actions and behaviours that would enhance their recovery, it was expected that the intervention would facilitate patient participation in their care and activate patients to take an active role in their recovery by initiating exercise and mobility activities and seeking assistance to achieve their goals.

2. Opportunity for patients to achieve their recovery goals.

It was expected that the intervention would facilitate interactions between patients and clinicians about daily goals and plans of care for each day of recovery after TKR surgery and provide an opening for patients to discuss their pain management. Nurses were asked to incorporate the intervention at the beginning-of-shift patient assessments by assisting their patients to navigate through the program, clarify any uncertainties and plan their management together.

Through these structured interactions, it was expected that patients would perceive that actions they may take to achieve their goals of recovery would be supported and encouraged by clinicians.

The intervention met the criteria for a complex intervention. According to the UK Medical Research Council, complexity of an intervention is determined by the number of interacting components; the number and difficulty of behaviours required by those delivering or receiving care; the number of groups or organisational levels targeted by the intervention; the number and variability of outcomes; and the degree of flexibility or tailoring of the intervention permitted (Craig et al., 2011, p. 1). Inherent in definitions of
complex interventions is the emphasis on multiple interacting components and non-linear causal pathways (Petticrew, 2011).

3.2.4.1 Design of the intervention

The multimedia program was developed specifically for patients undergoing TKR by Enlighten Health®, a medical multimedia production company specialising in validated content for patient and clinical education. *MyStay* was developed specifically for this study by the research team. The multimedia intervention was presented in a chapter based format that combined text, sound, graphics and animation to provide information to patients in relation to postoperative recovery and goals of care following TKR surgery.

The seven principles of universal design (Mace, 1997) were applied to developing the intervention as described in Table 3.1. These principles guided the design of the multimedia intervention, as patients in the acute phase of their hospitalisation, commencing Day one after major orthopaedic surgery, were expected to be in some discomfort, tired and medicated, and, consequently may have had limited energy or concentration to read material or listen to a verbal presentation. The intervention was designed to be self-directed and easy to use for patients with a wide range of abilities.
### Table 3.1 Application of the principles of universal design

<table>
<thead>
<tr>
<th>Principle</th>
<th>Explanation</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Equitable Use</td>
<td>The design is useful and marketable to people with diverse abilities.</td>
<td>The Apple iPad™ is made for finger touch integration and provides a high level of convenience in terms of ease of use and portability. Information was easily accessible and identical content could be delivered for all patients using multiple iPads™. The intuitive and user friendly interface removed the need for complex instructions from nurses assisting patients.</td>
</tr>
<tr>
<td>2: Flexibility in Use</td>
<td>The design accommodates a wide range of individual preferences/abilities.</td>
<td>The multi-media intervention was usable in terms of flexibility for a wide range of patients, for example those with arthritis of the fingers. The program could be navigated at patients’ own pace, allowing patients to view presentations forwards or backwards. The iPad™ also accommodates right or left handed persons and those with sight or physical impairment.</td>
</tr>
<tr>
<td>3: Simple and Intuitive Use</td>
<td>Use of the design is easy to understand, regardless of users’ experience, knowledge, language skills, or current concentration.</td>
<td>In order to eliminate unnecessary complexity and be consistent in terms of accessibility, the program was written at a literacy level of Year 8 English. This was verified with a third party linguistic specialist.</td>
</tr>
<tr>
<td>4: Perceptible Information</td>
<td>The design communicates necessary information effectively to the user, regardless of ambient conditions or the user’s sensory abilities.</td>
<td>Pictorial, written, and tactile modes were incorporated in the development of the multimedia program. The iPad™ has the capability to be navigated with a finger or stylus (if required), the brightness can be increased for use in ambient light and the wording can be enlarged with the touch of a finger.</td>
</tr>
<tr>
<td>5: Tolerance for Error</td>
<td>The design minimizes hazards and the adverse consequences of accidental or unintended actions.</td>
<td>The program had a built in safety feature to ensure no alterations could be made to individual presentations by anyone other than the account holder.</td>
</tr>
<tr>
<td>6: Low Physical Effort</td>
<td>The design can be used efficiently and comfortably, with minimum fatigue.</td>
<td>The iPad™ allowed patients less than 24 hours following major orthopaedic surgery to visualise the program with minimal effort.</td>
</tr>
<tr>
<td>7: Size and Space for Approach and Use</td>
<td>Appropriate size and space is provided for approach, reach, manipulation, and use regardless of users’ body size, posture, mobility.</td>
<td>The iPad™ can be held or rested on a table and is large enough to be readable for patients with sight impairment with advantages such as touchscreen, no mouse required, lightweight &amp; portable. Patients could view the intervention sitting in bed or in a chair. It was large enough for multiple viewers.</td>
</tr>
</tbody>
</table>

The Principles of Universal Design, Version 2.0, Copyright 1997: North Carolina State University, the Center for Universal Design (Mace, 1997)
3.2.4.2 MyStay content topics and structure

The content of the MyStay intervention was based on information derived from:

- Practice guidelines for recovery after TKR surgery
- Clinical pathways for TKR surgery
- Anecdotal patient information
- Nursing staff experience
- Surgeons’ experience
- Physiotherapists’ experience

The multimedia program contained six main chapters: 1. My Day, 2. Exercises, 3. My Healthcare Team; 4. Preventing Blood Clots; 5. Pain Control, and 6. Planning Ahead for Discharge (Figure 3.2).

Figure 3.2 MyStay Total Knee Replacement main page screenshot
Patients were able to navigate through the program at their own pace, review previous presentations or skip ahead to later presentations. The “My Day” section (Figure 3.3) of MyStay included explanations of each postoperative day’s specific goals and details related to physiotherapy, bedside care and overall general details about the specific day using text, audio and animation components.

**Figure 3.3** “My Day” section of the MyStay Total Knee Replacement multimedia program

The goals of care for a particular postoperative day appeared when patients touched the last icon on the “My Day” screen titled “Goals for Day X”. An example of the Day 1 goals are shown in Figure 3.4, the goals were explicit, achievable and specific to the goals of recovery after TKR surgery.
The exercise component of the program was divided into the specific knee exercises required after TKR and additional exercises to prevent complications (Figure 3.5). This section also used text, sound and animation to provide a detailed explanation and illustration of the specific exercises required for recovery.

**Figure 3.4** Day 1 goals presentation *MyStay* Total Knee Replacement multimedia program

**Figure 3.5** Exercise program *MyStay* Total Knee Replacement multimedia program
3.2.4.3 Intervention application procedure

Application of the intervention commenced on Day 1 after TKR surgery. The nurse researcher met with the Nurse Unit Manager and/or Team Leader each morning prior to clinical handover to:

1. Inform them that the researcher was on the ward for a period of the day (notification provided to ward clerks);
2. Provide a list of patients enrolled in the study for the day on the designated ward;
3. Speak to the nurse in charge to determine nurses allocated to patients enrolled in the study and inform them of their and the researcher’s roles.

The nurse researcher visited the intervention ward patients on the morning of Day 1, introduced herself and reminded patients of their participation in the study. The iPads™ were secured to the patient’s bedside table and the nurse researcher, together with patients, navigated the components of the MyStay program for the first time. This took approximately 5-10 minutes (depending on the patient’s familiarity with an iPad) to ensure they were familiar with the iPad™ and could navigate all aspects of the program.

A laminated (A5), paper-based handout outlining access to the program was left with each patient (Figure 3.6). The nurse allocated to the patient was informed that the iPad™ MyStay program was available and was asked to meet with the patient and determine if they had any further questions or if further instruction was required. The researcher left the ward area once the patients and nurses were satisfied. Only patients who had consented to participate in the study were given access to the iPad™ program.
Figure 3.6 Handout given to patients with the iPad on Day 1 post operatively
Daily, until discharge from the ward, following nursing handover and after patients’ morning meal (approximately 0900hrs), the nurse allocated to care for a patient enrolled in the study was reminded to review and discuss the corresponding day’s goals of care package on the iPad™, with their patients.

The researcher visited all patients each subsequent day, until discharge, with particular attention to intervention patients, to ensure the iPad™ was functioning and to answer questions the patient or staff may have had. It was anticipated that after viewing the goals of care animation, patients together with their nurse would discuss the specific goals for the day.

3.2.5 Primary and secondary outcomes

3.2.5.1 Primary endpoint

Patients’ reported worst pain intensity score was measured on Day 3 after surgery. Worst pain was measured using the 11-point Numerical Rating Scale (NRS) in which 0 equates to “No pain” and 10 equates to “Worst possible pain”. Patients were asked to choose a whole number from 0 to 10 that best described their worst pain in the previous 24 hours.

3.2.5.2 Secondary endpoints

1. Interference of pain on activities of daily living (APSOQ-R) on Day 3

2. Length of hospital stay (days). LOS was calculated from day of admission (Day 0) and including day of discharge from acute care
3. Function and pain following TKR surgery (Oxford Knee Score) 4 weeks after discharge from acute care

4. Patient overall satisfaction (NET promoter score) 4 weeks after discharge from acute care

5. Postoperative complications – Deep Vein Thrombosis (within 28 days)

6. Readmissions to study hospital (within 28 days).

Rationale for pain as the primary endpoint

Pain intensity was measured on Day 3 after TKR surgery using the NRS. Alleviation of pain is a fundamental obligation of healthcare providers, yet clinical studies continue to show that current practices to alleviate pain are unsatisfactory (Browne, Andrews, Schug, & Wood, 2011; Cohen et al., 2008; Haller et al., 2011). Poor pain management is associated with serious physiological and psychological sequelae that compromise recovery and negatively affect morbidity and mortality (Dunwoody, Krenzischek, Pasero, Rathmell, & Polomano, 2008). Suboptimal treatment of acute postoperative pain is also strongly associated with the development of chronic pain (Kehlet et al., 2006; Pagé et al., 2015; Visser, 2006). Risk factors for developing chronic post-surgical pain include unrelieved acute pain, persistent severe pain, inappropriate use of analgesics following surgery, as well as patients’ pain-related beliefs (Dunwoody et al., 2008; Visser, 2006). Patient participation in pain treatment decisions can positively influence their postoperative pain experience and lessen risk of progression to chronic pain (Cousins, Brennan, & Carr, 2004) however studies show that patients have few opportunities to participate in pain management decisions (McTier et al., 2014).
For patients to achieve the benefits from TKR surgery, early mobilisation of the knee joint is necessary to maximise range of movement (Fischer et al., 2008; Laskin & Beksac, 2004; Lucas, 2008). This is achieved through specific physiotherapy directed knee joint exercises and mobilisation through progressive walking and stair climbing. In order to achieve this level of mobility, adequate pain management is fundamental.

### 3.2.6 Outcome measurement

Data collection was undertaken as shown in Figure 3.1. It should be noted that some elements of data collected were related to the embedded process evaluation and will be described in Section 3.3.

#### 3.2.6.1 Baseline measurement - pre admission

All patients were given a paper self-report questionnaire to complete in the pre-admission clinic, or return by mail prior to their admission to hospital for surgery. The concepts measured and the tools used in the pre-admission questionnaire are outlined in Table 3.2. Baseline characteristics collected were: age, sex, previous acute hospital experience and control preference; factors known to impact on patients’ level of participation and patient perceived barriers to pain management.

**Table 3.2 Concepts measured and tools used in the pre-admission questionnaire**

<table>
<thead>
<tr>
<th>Concept measured</th>
<th>Tool used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Preference for participation</td>
<td>• Patient Activation Measure (PAM)</td>
</tr>
<tr>
<td>2. Baseline characteristics</td>
<td>• Control Preference Scale (CPS)</td>
</tr>
<tr>
<td>3. Patient perceived barriers to management of pain</td>
<td>• Age, sex, previous hospital experience, cultural background, employment status</td>
</tr>
<tr>
<td></td>
<td>• Pain barriers questionnaire (BQ)</td>
</tr>
</tbody>
</table>
3.2.6.2 Outcome measurement – Day 3

Data were collected from each patient (A or B conditions) on postoperative Day 3 via semi-structured interview, patient self-reported questionnaire (Appendix 4) and medical record audit. Semi-structured interviews with all patients (intervention and control) included questions pertaining to knowledge of goals of recovery after TKR surgery and detailed descriptions of processes of care and interactions with clinicians relating to achieving their goals of recovery. The patient self-reported questionnaire included information related to participation preferences, level of activation, interference of pain on activities of daily living were applied as outlined in Table 3.3. Patients in the intervention cluster (B) were also invited to respond to specific questions related to the intervention. The full semi-structured interview topic and question guide is in Appendix 5.

Table 3.3 Concepts measured and tools used in the Day 3 outcomes patient questionnaires, interviews and medical record audit

<table>
<thead>
<tr>
<th>Concept measured on Day 3</th>
<th>Tool used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pain intensity</td>
<td>• Numerical Rating Scale (NRS)</td>
</tr>
<tr>
<td>2. Pain quality</td>
<td>• American pain society outcome questionnaire-revised version (APSOQ-R)</td>
</tr>
<tr>
<td>3. Pain treatment and management</td>
<td>• Medical record audit</td>
</tr>
<tr>
<td>4. Preference for participation</td>
<td>• Patient Activation Measure (PAM)</td>
</tr>
<tr>
<td></td>
<td>• Control Preference Scale (CPS)</td>
</tr>
<tr>
<td>5. Application of intervention (daily)</td>
<td>• Observation by researcher and patient self-reports</td>
</tr>
</tbody>
</table>

Medical record audit

The medical record audit was used to explore processes of care delivery and provide additional information related to pain management and communication of pain treatment postoperatively, specifically, documentation practices related to management of postoperative pain over a 24 hour period (Day 3). The audit of pain treatment included a
review of the medication charts to determine prescription and administration of analgesics in the 24 hour period prior to eliciting the worst pain score (primary outcome) on Day three after surgery. Data collected in the medication audit included type, dose and frequency of analgesic medications prescribed, and the amount of analgesics administered. In addition, the total amount of Pro Re Nata (PRN) analgesic medications administered was also recorded. This allowed comparisons between groups in terms of total amount of regular and PRN medications ordered and received. The medication chart audit tool used is in Appendix 6.

3.2.6.3 Outcome measurement – follow up

A follow up paper self-reported questionnaire was mailed to patients four weeks after they were discharged from the acute care ward and is summarised in Table 3.4. The concepts measured in this questionnaire included preference for participation (PAM & CPS), pain and functioning of the knee after knee surgery (OKS), patient satisfaction (net promoter & global satisfaction), and return to employment after discharge status. Patients returned the completed questionnaire using the pre-paid envelope provided. Approximately two weeks after the questionnaire mail-out, if patients had not returned the questionnaire, a reminder follow up telephone call was made to remind them to complete and return the questionnaire. Data related to length of stay, complications and readmission to hospital (within 28 days of discharge) were obtained through hospital information systems.
### Table 3.4 Concepts measured and tools used in the 4-week follow up questionnaire

<table>
<thead>
<tr>
<th>Concept measured</th>
<th>Tool used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Preference for participation</td>
<td>• Patient Activation Measure (PAM)</td>
</tr>
<tr>
<td></td>
<td>• Control Preference Scale (CPS)</td>
</tr>
<tr>
<td>2. Pain and function of knee after surgery</td>
<td>• Oxford Knee Score Questionnaire (OKS)</td>
</tr>
<tr>
<td>3. Overall satisfaction with care</td>
<td>• Global satisfaction questions</td>
</tr>
<tr>
<td></td>
<td>• Net Promoter Score</td>
</tr>
</tbody>
</table>

#### 3.2.7 Data collection tools

##### 3.2.7.1 Patient Activation Measure

Patient activation refers to people’s ability and willingness to take on the role of managing their health and health care (Hibbard et al., 2004). Positive changes in patient activation have been shown to lead to positive self-management behaviour changes in patients with chronic conditions (Hibbard & Cunningham, 2008).

The Patient Activation Measure (PAM) (Hibbard et al., 2004) is a 13-item questionnaire designed to measure the level of patient engagement in their healthcare. The PAM assesses patient knowledge, skill, and confidence for self-management (Hibbard & Cunningham, 2008). PAM was developed by Hibbard and colleagues in 2004 originally as a 22 item scale, and subsequently as the 13 item short form which was used in this study (Hibbard, Mahoney, et al., 2005). Patients’ beliefs, knowledge and confidence for engaging in a wide range of health related behaviours are obtained via the 13-item PAM tool.

A raw score is calculated by adding all of the responses to the 13 questions. Each response from ‘strongly disagree’ (=1), to strongly agree (=4) receives a score from 1-4. The scores are combined to achieve a ‘raw score’ (between 13-52) which is then converted...
into an activation score by using the tool provide in the licence package. The final activation score is then categorised into four levels (Figure 3.7)

The majority of studies using the PAM have been undertaken in patients with chronic illness (Hibbard & Cunningham, 2008; Hibbard et al., 2010; Hibbard, Peters, et al., 2005), mental health issues (Green et al., 2010), and in primary care settings (Donald et al., 2011). There is limited evidence for its validated use in acute care. One study, published in 2015, validated the PAM in hospitalised patients with multiple morbidities (Schmaderer, Pozehl, Hertzog, & Zimmerman, 2015), however these patients also had chronic conditions that required lifelong changes. A recent study in 2016, validated the PAM in acute care and found adequate internal consistency overall (Cronbach’s α = 0.81); the PAM was a valid and reliable measure for use in acute care (Prey et al., 2016). The PAM was used in this study to identify any potential impact of the intervention on patients’ activation after surgery.

### 3.2.7.2 Control Preference Scale

The control preference scale (CPS) was used in this study to measure patients’ preference for participation at three time points (pre admission, Day 3 after surgery and
four weeks after discharge). The CPS is a five item ordinal scale developed to measure how treatment decisions are made among people with life threatening illnesses. The control preferences are defined by the creators of the scale as “the degree of control an individual wants to assume when decisions are being made about medical treatment” (Degner, Sloan, & Venkatesh, 1997, p. p21). These roles range from active, where the patient makes the decisions, shared where the patient makes decisions jointly with clinicians, through to passive where clinicians make the final decisions.

The CPS consists of five questions each of which portrays a different role in treatment decision-making using a statement. Patients were asked to rank their participation preferences in order from most preferred option to least preferred option. The CPS has been validated in numerous contexts, including acute care (Degner et al., 1997; Florin et al., 2006; Ford, Schofield, & Hope, 2003; Ramfelt, Lützen, & Nordström, 2005). While patients ranked their preference for participation in decisions, in this study, their first preference was reported (Wallberg Helena Michelson & Nils Wilking, 2000). As is consistent with reporting the CPS in other studies (Arora, Ayanian, & Guadagnoli, 2005; McTier et al., 2014; Wallberg Helena Michelson & Nils Wilking, 2000) the five items were collapsed into three, active (statement 1 and 2), passive (statement 4 and 5) collaborative (statement 3). The five statements are as follows:

- I prefer to make the final selection about which treatment I will receive
- I prefer to make the final selection of my treatment after seriously considering my doctor’s opinion
• I prefer that my doctor and I share responsibility for deciding which treatment is best for me

• I prefer that my doctor makes the final decision about which treatment will be used, but seriously considers my opinion

• I prefer to leave all decisions regarding my treatment to my doctor.

The CPS was used in this study to identify any potential differences in patients’ control preference that may impact on their participation in care after surgery.

3.2.7.3 Barriers Questionnaire

The Barriers Questionnaire (BQ) was used in this study to measure patient reported barriers to management of pain. The BQ is a self-report instrument with eight questions aimed to measure patients’ concerns about pain reporting and use of analgesics and has been reported as valid and reliable (Cronbach’s α = 0.73) (Gunnarsdottir, Donovan, Serlin, Voge, & Ward, 2002; Ward et al., 1993). The eight questions are based around the following categories:

1. Medicine cannot control pain
2. Fear of addiction
3. Good patients avoid talking about pain
4. Side effects of analgesics
5. Complaining of pain distracts physicians from treating underlying illness
6. Potential to develop tolerance to analgesics
7. Pain builds character—it’s good for you.
8. Pain as an indicator of progression of disease
Patients were asked to rate the extent to which they agreed with each item on a six-point Likert type scale, anchored by 0 (do not agree at all), and 5 (agree very much). Mean scores for the total BQ were derived for analysis. This was measured before admission for surgery to allow for baseline comparisons between groups.

3.2.7.4 American Pain Society Outcome Questionnaire – revised version

The American Pain Society Outcome Questionnaire (APSOQ) was first published in 1991 by the American Pain Society (Gordon et al., 2005) as a means of measuring the quality of postoperative pain management. It can be used to determine patients’ experiences of pain management and the outcomes of pain treatment. The revised (APSOQ-R) version (Gordon et al., 2010), used in this study, was designed to evaluate adult hospital pain management quality improvement activities and measures six aspects of quality, including (1) pain severity and relief; (2) impact of pain on activity, sleep, and negative emotions; (3) side effects of treatment; (4) helpfulness of information about pain treatment; (5) ability to participate in pain treatment decisions; and (6) use of nonpharmacological strategies. The APSOQ-R is a well validated (Cronbach’s α 0.85) instrument that has been used in a number of studies in Australia and internationally (Gordon et al., 2010). Each item response was analysed independently to determine mean differences in item responses between groups. The APSOQ-R was paper based questionnaire for patients on Day 3 after TKR surgery.

3.2.7.5 Pain Numerical Rating Scale

Pain intensity is commonly rated in health care on an 11-point scale, where the anchors 0 refers to “no pain” and 10 refers to “worst possible pain”. The numerical pain
rating scale (NRS) (Hartrick, Kovan, & Shapiro, 2003) is a unidimensional measure of pain intensity in adults and is the most widely used scale in pain assessment (Hartrick et al., 2003; Pagé et al., 2012). Patients select a whole number (0–10 integers) that best reflects the intensity of their pain. Most commonly, patients are asked to select a number along the scale that represents their worst and average pain intensity “in the last 24 hours” (Dworkin et al., 2005). This method of pain rating has been studied extensively and appears to have sufficient discriminative power to express pain intensity (Smith et al., 2015). In addition, the scale has been shown to have validity and reliability (Cronbach’s $\alpha = 0.87$) as a tool for the reporting of pain intensity (Hjermstad et al., 2011; Jensen, Turner, & Romano, 1994; Williamson & Hoggart, 2005). To allow for comparison between groups in this study, mean pain scores were calculated and reported for each group.

**3.2.7.6 Satisfaction and Net Promoter Score (NPS)**

Patient satisfaction was measured on an 11-point Likert scale from 0 (dissatisfied) to 10 (extremely satisfied). Patients were asked a single question four weeks after discharge from acute care (Overall how satisfied were you with your stay at the health service?). Results were presented as a mean overall score and compared between groups.

The Net Promoter Score (NPS) is used by many commercial companies as an indicator of customer loyalty (Krol, Boer, Delnoij, & Rademakers, 2015) and has more recently, gained popularity in health care as a measure of satisfaction. The NPS stems from management research and was introduced in 2003 by Fred Reichheld (Reichheld, 2003) for the business sector. It is a single item question (How likely is it that you would recommend [the health service] to family or a friend?) that aims to elicit patients’ willingness to
recommend the health service to family or friends on a scale of 0 (not likely at all) to 10 (extremely likely). The underpinning principle is that individuals who provide a score of 9 or 10 will give positive “word-of-mouth” feedback about a particular service and are referred to as ‘promoters’. Individuals who provide a score of 7 or 8 are considered to be indifferent and are labelled ‘passives’. However, individuals who provide a score of 0 to 6 are likely to be dissatisfied and are referred to as ‘detractors’. The final or net promoter score is calculated as the percentage of ‘promoters’ minus the percentage of ‘detractors’ (Figure 3.8).

Hamilton (2014) used the net promoter score in a study of over 6000 patients who underwent joint replacement in the United Kingdom (UK). The findings indicated that a high percentage of both knee and hip replacement patients would recommend that family or friends have similar surgery if required and concluded that these scores were comparable with other large product/service providers in the county. Hamilton (2014) also concluded that while the NPS is being used as a measure of satisfaction, it is in fact, a different measure and although related, it is not the same as satisfaction. Satisfaction specifically asks how ‘happy’ someone is with the service they receive, the NPS asks if they would recommend this service to a family or friend and is based upon the assumption that ‘happy customers’ are more likely to recommend a company/health service to others. Although there is limited evidence for the use of the net promoter in evaluation of acute care, the UK National Health Service (NHS) has adopted a ‘family and friends test’ similar to the NPS as a measure patients preparedness to recommend the NHS (Greaves et al., 2012; Kleefstra, 2016).
3.2.7.7 Oxford Knee Score

The Oxford Knee Score (OKS) is a self-completed patient-based outcome score consisting of a 12-item patient-reported questionnaire. The questionnaire is specifically designed and developed to assess levels of, and changes in, pain and function of the knee solely from the patient’s viewpoint after TKR surgery. It is short, reproducible, valid and sensitive to clinically important changes (Dawson, Fitzpatrick, Murray, & Carr, 1998; Murray et al., 2007). The tool has been reported widely in the research literature and adapted and validated in several languages (Cronbach’s $\alpha = 0.94$) (Dunbar, Robertsson, Ryd, & Lidgren, 2000; Takeuchi et al., 2011; Williams et al., 2013). The OKS provides a single summed score that reflects the severity of problems that respondents are experiencing with their knee joint. The recommended method of scoring for each item is 0–4 where 4 represents best/least problems, with all item scores summed to produce a scale total of 0–48 (48 = best/least problems). The OKS has been used by surgeons prior to admission to determine the extent to which the knee pain interferes with patient’s daily life, as a tool to determine eligibility for surgery (Xie et al., 2011). In addition, the OKS has been used to determine pain and function following TKR surgery (Murray et al., 2007; Williams et al., 2013). The maximum postoperative OKS was observed at two years whilst the majority of
patients were surveyed at 1 year post TKR (Williams et al., 2013). Rothwell (2005) examined the postoperative OKS at both six months and five years.

### 3.2.8 Statistical analyses

#### 3.2.8.1 Sample size calculation

In this study, the null hypotheses ($H_0$) was that no difference existed between the intervention group and control groups in terms of the primary outcomes of worst pain scores on Day 3 post TKR surgery. Sample size calculations were conducted to determine the number of patients required to ensure a high chance of detecting a statistically significant and clinically significant effect (Schulz & Grimes, 2005). If these effects existed, rejection of the $H_0$ would equate to correct detection of the effects.

Numerical Rating Scale pain intensity scores were analysed by the fitting of a linear mixed model with random effects for clusters, cohorts within clusters, and, patients within cohorts, and, fixed effects for the intervention and the periods. The F-test, conducted at the 5 percent significance level, was used to compare average pain scores for the two conditions (intervention versus control).

The number of clusters was essentially fixed (i.e. three wards) but the number of periods, or cohorts per ward, (2, 3 or 4) and the number of patients in each cohort (24 or 30) was selected in order to achieve 80 percent power when there are at least two wards and the difference (delta) between the average pain scores for the two conditions is 1.65 and at least 70 percent power when delta is 1.5. Preliminary (unpublished) data obtained via point prevalence audit of 398 patients within the institution in which this study was conducted, indicated that pain scores declined by 1 to 1.5 units from Day 3 to Day 4 post
TKR surgery and so a delta of 1.5 to 1.65 at 3 days was considered a similar but enhanced improvement.

The point prevalence data results indicated a between-patient (i.e. within-cohort) standard deviation equal to 2 (i.e. between-patient variance component, VP, equals 4) and a grand mean equal to 7. The between-ward variance component (VW) and between-cohorts variance component (VC) were assumed to be equal to 0.025.

As the NRS pain intensity score is a bounded discrete score, the power of the F-test was calculated by simulation. Numerical Rating Scale (NRS) observations were generated by adding normal random variables sampled from three distributions (corresponding to the three sources of variation and their specified variance components) to the conjectured fixed effect means and then rounding the result to the nearest whole number in the range of 0-10. In this way, the bounded and discrete nature of the NRS scores was accounted for in the foreshadowed application of statistical methods (ANOVA and/or REML) that are designed for continuous scale variables. For each scenario (combinations of delta, variance components, cohort sizes and ranges of period effects), 10,000 simulations of each “study” were performed and the type II error rate (β) was calculated. The ANOVA directive and programming language in the GenStat statistical system (Release 14.2) was used to perform the simulations (Payne et al., 2011).

Results of the simulations when period effects were assumed to be equally spaced between -1 and 1 are shown in Table 3.4. When the effect size (delta) is 1.5 and VW, VC and VP were 0.025, 0.025 and 4 respectively, the power (1-β) ranged from 67 percent to 74 percent when the cohort size ranged from 24 to 30. When the range of the period effects
increased, the power decreased and when the range of the period effects decreased the power increased (Table 3.5). Also shown in Table 3.5 are the effect sizes that would be detectable with 80 percent power, when the period effects are in the range from -1 to +1, VW, VC and VP are 0.025, 0.025 and 4 respectively AND when the cohort size was 24, namely delta=1.80, and the cohort size was 30, namely delta=1.65. Consequently, 4 periods and a target of 30 patients per cohort were selected (a total of 240 patients).

<table>
<thead>
<tr>
<th>Delta</th>
<th>VW</th>
<th>VC</th>
<th>VP</th>
<th>NP</th>
<th>Power (1−β)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.50</td>
<td>0.025</td>
<td>0.025</td>
<td>4.0</td>
<td>24</td>
<td>0.670</td>
</tr>
<tr>
<td>1.50</td>
<td>0.100</td>
<td>0.025</td>
<td>4.0</td>
<td>24</td>
<td>0.668</td>
</tr>
<tr>
<td>1.50</td>
<td>0.025</td>
<td>0.100</td>
<td>4.0</td>
<td>24</td>
<td>0.562</td>
</tr>
<tr>
<td>1.50</td>
<td>0.100</td>
<td>0.025</td>
<td>4.0</td>
<td>30</td>
<td>0.741</td>
</tr>
<tr>
<td>1.50</td>
<td>0.025</td>
<td>0.025</td>
<td>4.0</td>
<td>30</td>
<td>0.610</td>
</tr>
</tbody>
</table>

Table 3.6 Sample size calculations

<table>
<thead>
<tr>
<th>Range of period effects</th>
<th>Delta</th>
<th>VW</th>
<th>VC</th>
<th>VP</th>
<th>NP</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1.5, 1.5</td>
<td>1.50</td>
<td>0.025</td>
<td>0.025</td>
<td>4.0</td>
<td>24</td>
<td>0.651</td>
</tr>
<tr>
<td>-1.0, 1.0</td>
<td>1.50</td>
<td>0.025</td>
<td>0.025</td>
<td>4.0</td>
<td>24</td>
<td>0.670</td>
</tr>
<tr>
<td>-0.75, 0.75</td>
<td>1.50</td>
<td>0.025</td>
<td>0.025</td>
<td>4.0</td>
<td>24</td>
<td>0.680</td>
</tr>
<tr>
<td>-1.5, 1.5</td>
<td>1.50</td>
<td>0.025</td>
<td>0.025</td>
<td>4.0</td>
<td>30</td>
<td>0.714</td>
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<tr>
<td>-1.0, 1.0</td>
<td>1.50</td>
<td>0.025</td>
<td>0.025</td>
<td>4.0</td>
<td>30</td>
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</tr>
<tr>
<td>-0.75, 0.75</td>
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<td>0.025</td>
<td>0.025</td>
<td>4.0</td>
<td>30</td>
<td>0.744</td>
</tr>
<tr>
<td>-1.0, 1.0</td>
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<td>0.025</td>
<td>0.025</td>
<td>4.0</td>
<td>24</td>
<td>0.797</td>
</tr>
<tr>
<td>-1.0, 1.0</td>
<td>1.65</td>
<td>0.025</td>
<td>0.025</td>
<td>4.0</td>
<td>30</td>
<td>0.803</td>
</tr>
</tbody>
</table>

Footnote: Power calculations for the F test ($α = 0.05$) for a difference between the intervention and control groups in Day-3 worst pain. Delta is the absolute value of the difference in the mean pain scores. Components of variance in Day-3 pain scores are fixed as follows: between wards (VW = 0.025), between cohorts of patients within the same ward (VC = 0.025) and between patients within a cohort within a ward (VP = 4.0). NP is the number of patients in a cohort. The power (1−β) is the probability that the null hypothesis, of no difference in the mean Day-3 worst pain scores between the control and intervention groups, is rejected when the true, but unknown, difference is delta, the components of variance are as given, there are two wards and four cohorts per ward managed contemporaneously in four time periods, and the F-test is conducted at the 5% significance level ($α = 0.05$). N.B. In these scenarios, three different ranges (in equally spaced steps) for the effects of the four periods on Day-3 worst pain scores are investigated.
3.2.8.2 Quantitative analysis

Quantitative data obtained were analysed using GenStat (Version 17) and verified using the Statistical Package for the Social Science Version 23 (SPSS). Statistical significance was claimed at \( p<0.05 \). Descriptive statistics were used to present the study population, differences between the overall sample and intervention sample and environmental characteristics.

The primary endpoint of pain intensity was compared between groups to determine differences between the intervention and control (usual care). A linear mixed model analysis, using the Restricted Maximum Likelihood (REML) method, was used to calculate the F-test to enable comparison of the means of the groups. In a supportive analysis, the REML method was also used to estimate, and if necessary adjust for, carry-over effects from one period to another. Other outcome measures such as length of stay, pain and function following TKR, overall satisfaction, Net promoter, preference for participation, patient activation, complications, readmission to study hospital and return to full time work were compared between the groups and the analyses used a linear mixed model approach and analogous methods developed for binary and categorical data.

3.3 Process Evaluation

The value of conducting detailed process evaluations in conjunction with randomised controlled trials has been advocated increasingly in the past decade in the recognition that effect sizes alone do not provide sufficient guidance on how an intervention may be implemented within specific contexts and whether the findings can be replicated (Moore et al., 2015). Further, in the guidelines for process evaluation of
intervention studies developed by Craig (2011) it was stated that process evaluations “…can be used to assess fidelity and quality of implementation, clarify causal mechanisms and identify contextual factors associated with variation in outcomes” (p. 3). These evaluations have particular relevance when complex interventions are used.

An important consideration in this trial was the necessity to ensure that the MyStay intervention was applied as intended. That is, in its implementation, both nurses and patients needed to engage with the multimedia intervention. Strategies to improve this engagement were instituted pre-implementation (pre-trial). In addition, an embedded process evaluation was designed to be conducted throughout the trial, in order to examine the delivery of the intervention and understand potential effects of the intervention in the context of acute care delivery on the proposed outcomes of the study (Grant, Treweek, Dreischulte, Foy, & Guthrie, 2013; Johnson & Schoonenboom, 2016).

The overall aim of the mixed methods, concurrent process evaluation was to explore ways in which the intervention was implemented, provide valuable insights into why any component of the intervention may have failed or had unexpected consequences, or why the intervention was successful, in order to inform future research studies, implementation of the intervention across other health services and sustainability of the intervention outside of trial conditions if it were found to be effective.

Two clear aims and related objectives guided this stage of the research:

1. To evaluate the processes used in the conduct of the trial of the multimedia intervention
The related objectives were to:

i. Determine the extent to which recruitment procedures were appropriate in enrolling and maintaining patients in the trial;

ii. Determine the extent to which the processes used to implement the multimedia intervention were successful;

iii. Determine the system or environmental factors that may have impacted on the effectiveness of the intervention;

iv. Determine the usability and acceptability of the multimedia intervention in the context of acute recovery after surgery.

2. To explore whether the intervention provided patients with the capability and opportunity to participate in care related to their goals of recovery.

The related objectives were to:

i. Analyse differences in knowledge regarding the goals of recovery after TKR between intervention and control group patients;

ii. Analyse patient-reported personal and clinician behaviours that may have impacted on capability and opportunity for participation in postoperative care;

iii. Measure differences in activation (PAM) between intervention and control group patients.

In line with the two separate aims outlined above, the process evaluation comprised two components. The overall intent and methodological approach of the evaluations are presented in the following two sections. The specific methods used for each component are detailed further within each of the findings chapters 5 and 6.
3.3.1 Process evaluation procedure to evaluate the conduct of the trial

In order to evaluate the processes used to conduct the trial and to determine the effectiveness of these processes, Baranowski’s (2000) framework for process evaluations model was used. The function of the process evaluation in this study was to measure the following components: 1) pre-implementation processes; 2) recruitment of participants, 3) maintenance of participants; 4) the context in which the program functioned; 5) resources available to participants, 6) implementation of the intervention program, 7) the reach of the program – the extent to which the program was received by the target group, 8) barriers to implementation of the intervention, and 9) dose delivered and dose received by participants.

Both intervention and control group patients participated in the process evaluation across all three wards. Data collection methods included nurse group interview, semi-structured interviews with patients, field notes recorded during ward visits, and patient self-reported questionnaires. During the pre-implementation phase, a group interview with nurses provided insight into how best to implement the intervention and the potential barriers to successful implementation. This component of the evaluation considered the processes during three main phases of the trial: planning (pre-trial), implementation (during trial) and evaluation. The phases, the processes measured and data collection methods, are summarised in Figure 3.9.
Table 3.7 provides a summary of the measures and methods used to address each of the components of this phase of the process evaluation. The process evaluation was ongoing throughout the trial and occurred for each cohort in each period in each cluster (ward) regardless of treatment allocated to that cohort.

3.3.1.1 Data analysis

Quantitative data obtained were analysed using the Statistical Package for the Social Science Version 23 (SPSS). Statistical significance was claimed at p<0.05. As the process evaluation phase was descriptive and exploratory in nature data from patient reported
intervention questionnaire were analysed using analogous methods developed for binary and categorical data.

Qualitative data obtained from the pre-implementation nurse group interview data were analysed using qualitative content analysis to provide a description of themes of concerns identified by nurses relating to the intervention (Guest, MacQueen, & Namey, 2011).
### Table 3.7 Implementation and process evaluation components and methods used

<table>
<thead>
<tr>
<th>Concept</th>
<th>Methodology used</th>
</tr>
</thead>
</table>
| **Pre-implementation** | Before implementation of the trial the nurse researcher held:  
  - Nurse group interview \((n = 1)\)  
  - Attended regular ward meetings  
  - Presented the wards with information and flyers  
  - Sent emails to all ward nursing staff regarding the trial  
  - Met with nurses in one-to-one meetings  
  - Was present on the wards 2-3 times a week for a period of 1-2 hours. |
| **Recruitment**  | Procedures used to approach and enroll patients for the trial are outlined in detail in section 3.2.2.3. Where possible, patients were enrolled via pre admission clinic.  
  - Nurses - ward meetings; group interviews, one to one discussions to explain project and nurse engagement;  
  - Surgeons – letter to surgeons to inform them of the project |
| **Maintenance**  | How nurses and patients were kept involved in the program.  
  - Nurses – regular meetings (ward and one-to-one meetings with nurses);  
  - Patients - daily ward visits, observations of practice and use of the intervention. |
| **Context**      | The context of the program in terms of the environment that either directly or indirectly affects the intervention program. Understanding the context is necessary to determine which system or process factors might influence the program implementation.  
  - Ward – description of the ward layout and model and processes of care delivery  
  - Nurses – Regular liaison with nurse managers and nurses  
  - Patients – previous hospital experience, intervention (iPad) issues  
  - Researcher field notes of ward processes and routines. |
| **Resources**    | The resources used to attain project goals.  
  - Patients – written handout on how to use iPad program  
  - Nurses – meetings; nursing staff handouts; patient notes; white boards |
<table>
<thead>
<tr>
<th>Concept</th>
<th>Methodology used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation</td>
<td>To what extent the intervention was implemented and received by the intended audience.</td>
</tr>
<tr>
<td></td>
<td>• Patients – daily visits and patient interviews</td>
</tr>
<tr>
<td></td>
<td>• Nurses – observations and conversations with staff</td>
</tr>
<tr>
<td></td>
<td>• Quantify the number of patients who should have, and did not receive the intervention</td>
</tr>
<tr>
<td></td>
<td>• Unexpected factors that affected the implementation of the program – field notes by researcher</td>
</tr>
<tr>
<td>Reach</td>
<td>The proportion of the intended target audience that participated in the intervention; to what extent was it reached by target patients?</td>
</tr>
<tr>
<td></td>
<td>• Patients - how many times patients interacted with the iPad™ (questionnaire)</td>
</tr>
<tr>
<td>Barriers</td>
<td>Problems encountered with reaching patients</td>
</tr>
<tr>
<td></td>
<td>• Patient related</td>
</tr>
<tr>
<td></td>
<td>• Intervention related</td>
</tr>
<tr>
<td></td>
<td>• Nurse related</td>
</tr>
<tr>
<td>Dose delivered and</td>
<td>To what extent did patients view or read the materials given to them?</td>
</tr>
<tr>
<td>dose received</td>
<td>• Patients - Number of times patients watched with the MyStay program; to what extent did patients follow the recommendations of the intervention (interviews to capture their knowledge of goals of care)</td>
</tr>
<tr>
<td></td>
<td>• Evidence of control/intervention group contamination</td>
</tr>
</tbody>
</table>

*Adapted from (Baranowski & Stables, 2000)*
3.3.2 Process evaluation of the effect of the intervention on capability and opportunity for participation

In this component of the process evaluation, semi-structured interviews were used to collect data related to the primary and secondary outcomes as a priority, but also, in these interviews, topics included the knowledge of goals of care, what processes were used to achieve the goals, perceptions of participation in care and patient related barriers and facilitators to participation in care (Appendix 5). Specifically the interviews were conducted to determine if the intervention changed the way patients understood their goals of recovery or if they were more activated to achieve those goals. In addition, all patients on Day 3 after surgery were asked to respond to a self-reported questionnaire (Appendix 4) regarding their level of activation (using the PAM). Patients who had received the intervention were invited to respond to specific questions (via a self-reported questionnaire) related to the intervention to determine its acceptability, usability and satisfaction.

Medication chart and medical record audits were conducted on Day 3 to elicit information regarding analgesic prescribing and administration directly related to the primary outcome measure of pain intensity in the previous 24 hours. Documentation of pain scores in medical records was recorded for the 24 hour period prior to the outcome interview on Day 3 in order to evaluate the recording of patients’ postoperative pain. A full description of the data collected via this audit is provided in Appendix 6.

Interventions designed to be applied by nurses in the clinical setting have particular challenges and are often difficult to implement and evaluate due to the complex nature of
the environment, the variability in nursing experience and the characteristics of the patients themselves (Grant et al., 2013). The process evaluation conducted concurrently added value to the analysis of outcomes of the cluster randomised, crossover trial by documenting characteristics of the environment, application of the intervention and eliciting information about barriers and facilitators to participation in care from the patients’ perspective.

This mixed methods study involved both qualitative and quantitative data analysis techniques. Integrating two different methods and modes of analysis can overcome any weakness of a single approach (Polit & Beck, 2004). Analysis methods used for the process evaluation are discussed below.

3.3.2.1 Quantitative content analysis

Quantitative data obtained were analysed using the Statistical Package for the Social Science Version 23 (SPSS). Statistical significance was claimed at p<0.05. Outcome variables such as preference for participation, patient activation, medical record audit data, medication prescription and administration were analysed using analogous methods developed for binary and categorical data.

A critical step in this study related to the evaluation of the intervention, i.e. whether the multimedia intervention changed patients’ level of activation and/or the way patients interacted with clinicians to achieve their goals of recovery. This was a fundamental aspect of the process evaluation. Quantitative content analysis processes were applied to the interview data (Pope, Ziebland, & Mays, 2000).
As there were no specific tools available to analyse the interview transcripts, a structured, systematic coding scheme was developed and applied to the textual data in order to compare the content of self-reported data derived from patients in the intervention and control groups.

The four goals of recovery were:

1. Maintaining pain intensity scores below 4 out of 10 on the NRS
2. Performance of specific knee exercises at least four times per day
3. Participation in mobility related activities as guided by the intervention or Physiotherapist
4. Participation in activities related to daily goals necessary for recovery

Patients’ knowledge and understanding of, and strategies used to achieve a particular goal were coded from qualitative responses to specific questions asked during the Day 3 interviews. The unit of analysis was specific text in the transcripts that referred to one of the four goals of recovery. The final coding scheme is presented in Tables 3.8 – 3.11.
### Table 3.8 Structured coding scheme for Goal 1: participation in pain management

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Categories</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Patient stated that pain intensity scores should be less than 4/10 (NRS)</td>
<td>1 Yes&lt;br&gt;0 No</td>
</tr>
<tr>
<td></td>
<td>Patient articulates necessity of managing pain in order meet recovery goals</td>
<td>0 No (patients would state that they restricted activity due to pain intensity)&lt;br&gt;1 Yes (patient is aware of the need to manage pain in order to meet the goals of recovery)&lt;br&gt;Unable to infer</td>
</tr>
<tr>
<td>Participation</td>
<td>Patient articulates engagement with pain management strategies</td>
<td>0 No (unable to identify analgesic and/non analgesic management plan)&lt;br&gt;1 Yes (Can name breakthrough analgesics and non-analgesic strategies)&lt;br&gt;Unable to infer</td>
</tr>
<tr>
<td></td>
<td>Informs clinicians about pain intensity when pain interfered with goals of recovery</td>
<td>0 No (Didn’t tell anyone)&lt;br&gt;1 Yes (Disclosed when asked)&lt;br&gt;2 Yes (initiated alert about pain)&lt;br&gt;3 Yes (initiated specific management for pain)&lt;br&gt;Unable to infer</td>
</tr>
</tbody>
</table>
Table 3.9 Structured coding scheme for Goal 2: participation in exercises

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Categories</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Patient stated they had performed all six exercises at least four times a day</td>
<td>1 Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 No</td>
</tr>
<tr>
<td>Patient articulates necessity of performing exercises in order meet recovery goals</td>
<td>0 No (patient does not perform all exercises and/or not aware of all six)</td>
<td>1 Yes (patient is aware of the need to perform all six exercises four times a day in order to meet the goals of recovery)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unable to infer</td>
</tr>
<tr>
<td>Participation</td>
<td>Patient articulates engagement with strategies to ensure exercises can be completed</td>
<td>0 No (patient does not complete all exercises or seek assistance to perform all exercises)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Yes (can perform all exercises and gets assistance if required)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unable to infer</td>
</tr>
<tr>
<td>Informs clinicians about the need for assistance with exercises</td>
<td>0 No (Didn’t tell anyone)</td>
<td>1 Yes (Disclosed when asked)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Yes (initiated alert about the need for help to perform exercises)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Yes (initiated specific action to overcome difficulties with exercises)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unable to infer</td>
</tr>
</tbody>
</table>
### Table 3.10 Structured coding scheme for Goal 3: participation in mobility

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Categories</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Patient stated they are walking with or without aide</td>
<td>1 Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 No</td>
</tr>
<tr>
<td>Patient articulates mobility/walking is necessary in order meet recovery goals</td>
<td>0 No (patients state that they restrict walking or does not walk with or without an aide)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Yes (walks with or without assistance and articulates the need to mobilise in order to meet the goals of recovery)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unable to infer</td>
</tr>
<tr>
<td>Participation</td>
<td>Patient articulates engagement with strategies to improve mobility</td>
<td>0 No (does not offer any strategies to improve mobility)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Yes (patient articulates strategies to improve mobility)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unable to infer</td>
</tr>
<tr>
<td>Informs clinicians about the need for mobility</td>
<td>0 No (Didn't tell anyone)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Yes (Disclosed when asked)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Yes (initiated alert about mobility)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Yes (initiated specific action to overcome difficulties with mobility)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 Not relevant (patient actively mobile)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unable to infer</td>
</tr>
</tbody>
</table>
Table 3.11 Structured coding scheme for Goal 4: participating in daily goals necessary for recovery

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Categories</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Patient able to articulate one (1) daily goal of recovery</td>
<td>1 Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 No</td>
</tr>
<tr>
<td></td>
<td>Patient articulates necessity of achieving specific goals in order to recover</td>
<td>0 No (patients unable to articulate or achieve goal due to factors such as pain or did not see as significant)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Yes (patient is aware of the need to either sit out of bed; deep breathe and cough; ankle exercises; TED stockings)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unable to infer</td>
</tr>
<tr>
<td>Participation</td>
<td>Patient articulates engagement with strategies to achieve goal</td>
<td>0 No (does not volunteer strategies)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Yes (discusses strategies to achieve goal)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unable to infer</td>
</tr>
<tr>
<td></td>
<td>Informs clinicians about pain intensity when pain interfered with goals of recovery</td>
<td>0 No (Didn’t tell anyone)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Yes (Disclosed when asked)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Yes (initiated alert to e.g. sit out of bed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Yes (initiated specific action to overcome)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unable to infer</td>
</tr>
</tbody>
</table>
Each patient received a final score that indicated whether their overall participation in relation to a particular goal was ‘Active’, ‘Passive’, ‘Inconsistent’ or ‘Cannot Infer’ according to the following decision rules:

- **Active**: Patients’ self-reports of knowledge and participation were coded as ‘active’ in 3 of the 4 categories indicating active codings in both knowledge and participation.
- **Passive**: Patients’ self-reports of knowledge and participation were coded as ‘passive’ in 3 of the 4 categories indicating passive codings in both knowledge and participation.
- **Inconsistent**: Patients’ self-reports of knowledge and participation were coded as ‘active’ in 2 or less of the 4 categories irrespective of where they occurred in the knowledge or participation concepts.
- **Cannot infer**: there was insufficient information in the transcripts to make a reliable assessment.

### 3.3.2.1.1 Development of the coding scheme

Since the content analysis was specific to the goals of recovery after TKR, the coding scheme developed was tailored to this project. While it was not possible for the primary coder (PhD candidate) to be blinded to the intervention or control groups because she had conducted the interviews and was familiar with the transcripts, any information pertaining to the intervention was, where possible, removed from the transcripts before independent coders reviewed them. Several steps were taken to develop, validate and test the reliability of the coding scheme and are outlined below.
Step 1

- The researcher and supervision team \((n = 3)\) reviewed 14 randomly selected interview transcripts (7 intervention and 7 control transcripts) to determine if the narrative could be relied on to provide sufficient information to conduct the intended analyses and to identify coding rules for the four goals of recovery.
- Preliminary coding rules were developed in this process.
- These coding rules were applied independently by all the investigators to assess the usability, ease and inclusiveness of the coding rules.

Step 2

- Another 10 transcripts were randomly selected (5 intervention and 5 control transcripts), and the inter-rater reliability of the coding rules was tested.
  - Raters \((n = 4)\) coded the same 10 transcripts independently, the scores were collated on a spreadsheet and examined for discordance.
  - Coding ambiguities were discussed and amended.
  - Once there was agreement about the coding process, a coding book was developed in readiness for coding of the remaining transcripts.

Step 3

- Coding was conducted by the researcher and an independent coder
- Regular, sequential coding meetings were held after the first 10, 10, 10 and 10 transcripts were coded, then after every 50 transcripts until all transcripts had been coded.
- Minor discrepancies between coders were resolved by examining the data together and reaching a consensus.
Major discrepancies were resolved by independent review by two additional members of the supervision team.

Inter-rater reliability measures greater than 80 percent are considered acceptable in quantitative content analysis (Neuendorf, 2002). Using the processes outlined above, 100 percent agreement was achieved.

3.3.2.2 Qualitative analyses

In order to analyse patient-reported personal and clinician behaviours that may have impacted on capability and opportunity for participation in postoperative care, transcripts were analysed using the established complementary techniques of thematic and content analysis (Elo & Kyngäs, 2008). Content analysis techniques combine deductive and inductive techniques to identify themes. The deductive analysis involved the systematic categorisation of the interview data to classify data into barriers and facilitators to participation in accordance with the conceptual framework for this study. Inductive analyses were then be used to identify themes within these classifications.

3.4 Ethical Considerations

Approval to conduct this research was received from the Human Research and Ethics Committees of Deakin University (Approval No: 2013-195 Appendix 7) and the hospital where the data were collected (Approval No: 598-13 Appendix 8). The main ethical issues raised by this research project related to patient privacy, confidentiality of patient information and security of data, patient anonymity in publications and presentations, obtaining informed consent for participation, and the potential burden of patient participant in the research.
3.4.1 Privacy

The issue of privacy in the context of this study arose when identifying potential patient participants for the study. In order to protect the privacy of patients, the pre-admission clinic coordinator who was contacting patients in relation to their pre-surgery preparation asked patients to provide permission to either 1) be approached by the researcher at the clinic prior to surgery in order to receive information about the study or, 2) provide their contact details so that information could be sent to them. At the preadmission clinic, patients who had given permission to be contacted were asked to wear a coloured name tag so they were identifiable to the researcher.

3.4.2 Confidentiality of patient information

The ethical principle of confidentiality requires that information relating to individual patients collected in the process of research is not disclosed to any person not directly involved with the research. Confidentiality of participant information was maintained by ensuring that all data were stored in accordance with the data security policies of the hospital and Deakin University and the principles outlined in the Information Privacy Act 2001 and the Victorian Health Records Act 2001.

During the trial and analysis of data, paper files were kept in a locked facility at the hospital. Electronic data were stored in a password protected file. Only the PhD candidate and her primary supervisor had access to identifiable patient data, and all computers containing information related to patients were password protected. Once data are ready to be archived, this will occur according to university policy for the duration of seven years after the final publication of the findings.
3.4.3 Anonymity

Anonymity relates to whether information provided for the purpose of research can be traced back to the person who provided it (Polit & Beck, 2004). Total anonymity during the data collection period was not possible because the interviews, surveys and observations took place on the ward. It was possible therefore to know who may or may not have been participating in the research. However, care was taken to maintain patient anonymity outside of data collection by ensuring that individual patients were not identifiable in stored or reported data. Each participant was allocated a numeric identification that was recorded on the data collection tools. Identification numbers together with all identifying details were stored in a locked filing cabinet in locked office facilities at the hospital and separate to patient data. Findings of the study are reported as combined data only, no individual patients will be able to be identified in presentations or publications.

3.4.4 Informed consent

Information about the intent of the study and the implications of participation was provided to all participants via written plain language information sheets and further explanations were given verbally by the researcher during recruitment processes. Written consent was obtained from patients if they were willing to participate in the randomisation, use the intervention, and contribute to interviews and questionnaires. Surgeons, nurses, allied health and multidisciplinary team members who interacted with patients during the trial and were incidentally observed during field observations were made aware of the study taking place and verbal consent was obtained.
3.4.5 Patient burden

There was a potential for additional burden for patients who participated in the intervention, the survey questionnaires or interviews although this was not expected to be high. A full explanation of the burden associated with the study was in the plain language statement provided to potential participants. Any inconvenience for patients related to data collection was reduced by using a combination of data collection methods (questionnaires, interview) at the one time. Patients had time to complete the questionnaires both pre admission and following discharge at their own convenience. At the time of the Day 3 interview, patients were informed that they could interrupt the interview at any time if they felt unable to continue and another time would be scheduled that was mutually convenient.

3.4.6 Limited disclosure

This study was a cluster randomised, crossover trial that involved the use of a multimedia intervention experienced by approximately half of the patients in the study. Exposure to the intervention depended entirely on the ward to which patients were admitted and the period in which they were admitted. Patients who did not experience the intervention received usual care, based on existing clinical pathways for patient recovery. In the Participant Information and Consent Form and patient explanation, patients received limited information about the intended outcomes of the multimedia intervention delivered via iPad™ in order to reduce the possibility that full disclosure may have biased patients' responses to outcome measures. It was felt that limited disclosure was justified in terms of ensuring the rigour of the trial and in view of the low risk nature of the intervention.
3.5 Summary

The research program was designed to develop, implement and evaluate a nurse-facilitated multimedia, education intervention to improve postoperative outcomes for patients undergoing TKR surgery. The study design was a cluster randomised, crossover trial and simultaneous process evaluation. Data collection occurred at three time points: pre admission, Day 3 after TKR surgery and at 4 weeks after discharge from acute care. The trial used sound pre implementation procedures along with detailed process evaluation methodology. Ethical issues were associated with the principles of privacy and confidentiality, burden, informed consent and limited disclosure.

The research findings are presented in the following three chapters. Analyses and discussion of the results related to the cluster randomised, crossover trial are described in Chapter Four. The findings from the detailed concurrent process evaluation are presented over two chapters. The findings related to the implementation process used to conduct the trial are presented in Chapter Five. The findings related to the effect of the intervention on patients’ capability and opportunity for participation and the outcomes of that participation are presented in Chapter Six.
Chapter 4

Results of Cluster Randomised, Crossover Trial

The outcomes of the cluster randomised, crossover trial are presented in two main sections of this chapter. The description of patient characteristics, in both intervention and control groups is presented in Section 4.2. These descriptions allow assessment of the generalisability of the study findings to the wider population of patients undergoing TKR surgery. The findings of the analysis of the primary and secondary outcomes are presented in Section 4.3 together with the relevant statistical considerations. A discussion of the trial findings in terms of the objectives, the significance of the results and the extent to which new knowledge has been generated follows the analyses. The chapter begins with a description of the recruitment process and the flow of patients throughout the trial.

The specific aims and objectives for this section of the research program were:

1. To determine the primary outcome of the intervention in relation to patients’ pain intensity on Day 3 following Total Knee Replacement surgery

2. To determine the secondary outcomes of the intervention in relation to:
   
i. Interference of pain on activities of daily living
   
   ii. Length of stay in hospital
   
   iii. Function and pain following surgery four weeks after discharge from acute care
   
   iv. Patients’ satisfaction with care received
v. Postoperative complications – Deep Vein Thrombosis (DVT) within 28 days of surgery

vi. Readmission to hospital within 28 days of discharge from acute care.

4.1 Patient Recruitment Outcomes

Between March 2014 and June 2015, 529 adult patients were scheduled for primary total knee replacement surgery at the data collection site. Of these, 272 patients were under the care of surgeons who were not participating in the trial. Of the 257 patients who were eligible to participate in the trial, 5 declined to participate. A further 11 patients had their surgery cancelled or postponed consequently did not return preadmission questionnaires. Figure 4.1 outlines the flow of patients through the trial. The final number of patients recruited prior to hospital admission was 241. One patient who was allocated to an intervention cohort did not receive the intervention because he had a cerebrovascular accident (CVA) in the early postoperative period. Four patients were lost to follow-up on Day 3 because of postoperative complications (data retrieved from medical records only) and 11 patients (4.6%) were unable to be interviewed. After discharge, 86.7 percent (n = 209) of patients returned follow-up questionnaires.
Chapter 4 Results of Cluster Randomised, Crossover Trial

Assessed for eligibility (N=257)

Excluded (n=16)
- Surgery cancelled/postponed (n=11)
- Declined to participate (n=5)

Allocated to wards (N=241)

Allocated to intervention (n=104)
- Received allocated intervention (n=103)
- Did not receive allocated intervention (n=1)

Allocated to control (n=137)
- Received allocated control (n=137)

Follow-Up

Lost to follow-up at Day 3 (n=1)
Lost to follow-up – post-discharge (n=13)

Lost to follow-up Day 3 (n=3)
Lost to follow-up – post-discharge (n=19)

Analysis

Analysed Pre Op (n=104)
Analysed Day 3 (n=103)
Analysed at follow up (n=91)
- Excluded from analysis (n=0)

Analysed Pre op (n=137)
Analysed Day 3 (n=134)
Analysed at follow up (n=118)
- Excluded from analysis (n=0)

Figure 4.1 Patient participant flow through each stage
4.1.1 Method of recruitment

Patients were recruited at the pre-admission clinic \((n = 192, 79.6\%)\) or via mail out invitations \((n = 49, 20.4\%)\) (Figure 4.2).

![Figure 4.2](image)

**Figure 4.2** Recruitment method of patients to the trial \((N = 241)\)

There was no difference in allocation to intervention or control cohorts for patients recruited via either method. (Figure 4.3).

![Figure 4.3](image)

**Figure 4.3** Percentage of patients allocated to intervention or control cohort by method of recruitment
4.1.1.1 Allocation to treatment sequence

The final assignments of patients to clusters and periods, and, conditions to wards and periods are presented in Figure 4.4. As discussed in Section 3.2.1, treatment sequences were randomised to two wards and a third ward was an “overflow” ward. Patients were allocated to wards via usual allocation procedures in place in the hospital.

![Diagram showing allocation of patients to clusters and periods](image)

**Figure 4.4** Final assignment of patients to clusters and periods (N = 241)

*Legend*
- Indicates Intervention period (B)
- Indicates control period (A)
4.2 Baseline Data

The demographic characteristics of patients (N = 241) are presented in Table 4.1. The youngest patient was aged 33 years, and the oldest 95 years. Mean age was 67.42 (SD 8.69) years in the control group and 65.25 (SD 9.77) years in the intervention group (p = 0.201). There were slightly more females (n = 133, 55.2%) than males (n = 108, 44.8%) in the sample overall. There were slightly more males in the control group (n = 68, 49.6%) than the intervention group (n = 40, 38.5%) however this was not found to be statistically significant (χ²; (1; N = 241) = 2.98, p = 0.091). The majority of patients were born in Australia (n = 177, 73.4%) and spoke English (n = 232, 96.3%) as their primary language at home. Only 18.3 percent (n = 44) of patients were living alone, the remaining 81.7 percent (n = 197) lived with either family, friends or a partner. The majority of patients were retired (n = 128, 53.1%); patients working full time accounted for 21.6 percent (n = 52) of patients overall. Between groups, employment status was similar; 55.5 percent of the control group and 50 percent of the intervention group were retired (χ² (6, N = 241) = 4.43, p = 0.618).
Table 4.1 Baseline characteristics of patients overall, intervention patients and control patients, in the MIME study (*N = 241*)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>All Patients (<em>N = 241</em>)</th>
<th>Control Group (<em>n = 137</em>)</th>
<th>Intervention Group (<em>n = 104</em>)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Age (years)</td>
<td>66.5</td>
<td>9.20</td>
<td>67.42</td>
</tr>
<tr>
<td>Sex</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Male</td>
<td>108</td>
<td>44.8</td>
<td>68</td>
</tr>
<tr>
<td>Female</td>
<td>133</td>
<td>55.2</td>
<td>69</td>
</tr>
<tr>
<td>Living arrangements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living communally</td>
<td>197</td>
<td>81.7</td>
<td>109</td>
</tr>
<tr>
<td>Living alone</td>
<td>44</td>
<td>18.3</td>
<td>28</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partnered</td>
<td>190</td>
<td>78.8</td>
<td>106</td>
</tr>
<tr>
<td>Not partnered</td>
<td>28</td>
<td>11.6</td>
<td>18</td>
</tr>
<tr>
<td>Widowed</td>
<td>23</td>
<td>9.5</td>
<td>13</td>
</tr>
<tr>
<td>Country of birth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>177</td>
<td>73.4</td>
<td>101</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>21</td>
<td>8.7</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>19</td>
<td>7.9</td>
<td>11</td>
</tr>
<tr>
<td>Europe</td>
<td>16</td>
<td>6.6</td>
<td>10</td>
</tr>
<tr>
<td>Asia</td>
<td>5</td>
<td>2.1</td>
<td>3</td>
</tr>
<tr>
<td>New Zealand</td>
<td>3</td>
<td>2.1</td>
<td>2</td>
</tr>
<tr>
<td>Language spoken at home (primary)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>232</td>
<td>96.3</td>
<td>130</td>
</tr>
<tr>
<td>Italian</td>
<td>3</td>
<td>1.2</td>
<td>2</td>
</tr>
<tr>
<td>Mandarin</td>
<td>1</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>Greek</td>
<td>1</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>1.7</td>
<td>3</td>
</tr>
<tr>
<td>Employment Status pre - admission</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retired</td>
<td>128</td>
<td>53.1</td>
<td>76</td>
</tr>
<tr>
<td>Full time</td>
<td>52</td>
<td>21.6</td>
<td>28</td>
</tr>
<tr>
<td>Part time/Casual</td>
<td>41</td>
<td>17.0</td>
<td>25</td>
</tr>
<tr>
<td>Unemployed</td>
<td>10</td>
<td>4.1</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
<td>4.1</td>
<td>5</td>
</tr>
</tbody>
</table>

* There were no significant between group differences in the characteristics at baseline. Age was compared using t-test, other variables compared using Chi Squared for significance.
4.2.1 Previous hospital experience

In the intervention group, 72.1 percent \((n = 75)\) of patients had had an acute care hospital admission in the previous 5 years compared with 66.4 percent \((n = 91)\) in the control group \(\chi^2, (1, N = 241) = 0.894, p = 0.400\) (Figure 4.5).

![Figure 4.5](image)

**Figure 4.5** Previous hospital admission in acute care in the past five (5) years \((N = 241)\)

4.2.2 Pain beliefs and attitudes

The Pain Barriers Questionnaire (BQ) was completed prior to admission by all patients. Table 4.4 presents the findings of the BQ according to intervention or control group. There were no statistically significant differences in the mean scores for the BQ of patients in the intervention \((M = 16.1, SD = 4.9)\) and control \((M = 15.6, SD = 5.3)\) conditions \(t(239) = 0.707, p = 0.480\).

Eighty-four patients \((34.9\%)\) believed that pain medication cannot really control their pain and 23 \((9.5\%)\) neither agreed nor disagreed. A large number \((n = 102, 42.3\%)\) of patients agreed with the notion that you can get addicted to pain medication easily, with 68 \((28.2\%)\) neither agreeing nor disagreeing. More than half of the patients 63.5 percent \((n = 153)\) disagreed with the notion that “good patients avoid talking about their pain” and a larger proportion disagreed that pain medication should be saved.
(80.5%, n = 194). Table 4.2 provides the results of the pain barriers questionnaire (BQ) according to intervention and control group.
### Table 4.2 Perceived barriers to pain management (BQ) at baseline (N = 241)

<table>
<thead>
<tr>
<th>Q</th>
<th>Do not agree at all</th>
<th>Somewhat Disagree</th>
<th>Neither agree or disagree</th>
<th>Somewhat agree</th>
<th>Agree very much</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Int* (%)</td>
<td>Con* (%)</td>
<td>Int* (%)</td>
<td>Con* (%)</td>
<td>Int* (%)</td>
</tr>
<tr>
<td>Q1. Pain medication cannot really control pain</td>
<td>10.8</td>
<td>20.3</td>
<td>11.6</td>
<td>12.9</td>
<td>3.7</td>
</tr>
<tr>
<td>Q2. People get addicted to pain medication easily</td>
<td>6.2</td>
<td>7.5</td>
<td>6.2</td>
<td>9.5</td>
<td>10.8</td>
</tr>
<tr>
<td>Q3. Good patients avoid talking about their pain</td>
<td>17.0</td>
<td>26.6</td>
<td>9.1</td>
<td>10.8</td>
<td>10.0</td>
</tr>
<tr>
<td>Q4. It is easier to put up with pain than with the side effects that come with pain treatment</td>
<td>17.0</td>
<td>24.1</td>
<td>10.4</td>
<td>14.5</td>
<td>6.2</td>
</tr>
<tr>
<td>Q5. Complaints of pain could distract the doctor from treating my underlying illness</td>
<td>19.9</td>
<td>30.7</td>
<td>12.0</td>
<td>12.0</td>
<td>6.6</td>
</tr>
<tr>
<td>Q6. Pain medication should be 'saved' in case the pain gets worse</td>
<td>23.7</td>
<td>34.9</td>
<td>12.0</td>
<td>10.0</td>
<td>3.7</td>
</tr>
<tr>
<td>Q7. The experience of pain is a sign that the illness has gotten worse</td>
<td>15.8</td>
<td>18.7</td>
<td>9.1</td>
<td>12.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>

* Int = Intervention (n = 104) Con = Control (n = 137) * Note the tests of association were based on collapsing the number of categories into 3 (agree/neither agree or disagree/disagree)
4.2.3 Patient activation

The Patient Activation Measure (PAM) was also completed prior to admission by all patients. Pre admission, patients in both groups were found to have a high level of activation (level 3 & 4) indicating an understanding of their role in their health, and perceived capability to fulfil that role. A high proportion of patients (74% of the control group and 79% of the intervention group) had either level 3 or 4 activation pre admission (Figure 4.6). There was no statistically significant difference between groups in activation before admission to hospital for surgery ($\chi^2(3, N = 240) = 6.41, p = 0.093$).

![Patient Activation Measure (PAM) Pre-Admission (N = 240)](image)

**Figure 4.6** Patient Activation Measure (PAM) Pre-Admission ($N = 240$)

4.2.4 Control preference

The control preference scale (CPS) was used to measure patients’ preference for participation. Patients could rank five statements in the CPS according to their preference for participation. The distribution of first ranked control preferences is shown in Figure 4.7 grouped according to active, collaborative or passive preference and, according to intervention or control group (grouping discussed in Chapter 3.2.7.2). In total, 90 patients (37.7%) indicated they would prefer an active role; 86 (36%)
wanted a shared or collaborative role with their clinicians and 63 (26.4%) preferred to be passive. There was not a statistically different between intervention or control groups pre-admission ($\chi^2 (2, N = 239) = 0.589, p = 0.745$).

![Distribution of Control Preferences (CPS) pre-admission (N = 239)](image)

**Figure 4.7** Distribution of Control Preferences (CPS) pre-admission (N = 239)

### 4.3 Outcomes of the Cluster Randomised, Crossover Trial

#### 4.3.1 Primary outcome

The mixed model analysis of the primary end-point (the 11-point NRS pain score), using REML, calculated the between-ward, between-cohort within-ward and between-patient within-cohort components of variance and the predicted main effect means of the treatments and these are presented in Table 4.5 (page 151-152). All analysis of primary endpoint was calculated on the intention to treat principle (ITT) and restricted to the full analysis set (FAS – the set of all patients who consented to participate in the study and who were admitted to a postoperative ward). The ITT principle mandates that all patients are analysed according to the groups to which they were randomly assigned, regardless of their adherence with the entry criteria, regardless of the treatment they actually received, and regardless of subsequent
withdrawal from treatment or deviation from the protocol were included in the analysis.

**4.3.1.1 Pain Day 3 - Numerical Rating Scale**

The mean worst pain scores, measured on Day 3 using the NRS, were 6.05 (intervention group) and 7.05 (control group) (mean difference (I-C) = -1.012, 95% CI -1.94 to -0.08, \( p = 0.037 \)). The median and quartile ranges are displayed in Figure 4.8.

![Figure 4.8](image)

**Figure 4.8** Median pain scores by condition at Day 3 post-surgery (n = 237)

**4.3.2 Secondary outcomes**

Apart from binary endpoints for which a chi-squared test was used, all secondary endpoints were calculated using the same statistical method specified for the primary end-point and the analyses (Table 4.5, see page 151-152) were also restricted to the full analysis set (FAS).
4.3.2.1 Interference of pain on activities of daily living (APSOQ-R) on Day 3

The American pain society outcome questionnaire (APSOQ-R) was used to measure pain experience on Day 3. Results using the mixed model analysis are presented below in Table 4.5 and discussed in the text for items where statistical significance was found, or nearly so (p < 0.10). Analyses of specific symptom related questions were as follows:

Have you had any of the following side effects – nausea D3Q2.20.A

There was not a statistically significant difference between the intervention and control groups in the prevalence of nausea (see Table 4.5, $p = 0.051$). Patients in the intervention group had lower mean nausea (mean = 3.12, standard error mean (SEM) = 0.501) ratings than those in the control group (mean 4.01).

In the last 24 hours how much pain relief have you received? D3Q2.21

Again, there was not a statistically significant difference in perceived pain relief in the previous 24 hours between intervention and control group patients (see Table 4.5, $p = 0.051$) however patients in the intervention group had higher mean scores, indicating higher perceived pain relief, (mean = 7.67, SEM = 0.229) than patients in the control group (mean = 7.07, SEM = 0.200).

Did you use non-medicine methods to relieve pain – deep breathing D3Q2.25

A total of 82.2 percent ($n = 74$) of the intervention group and 67.8 percent ($n = 80$) control group used deep breathing as a method to relieve pain. There was a significant difference between groups in terms of deep breathing as a non-pharmacological method used to relieve pain (see Table 4.5) ($X^2 (1, N = 208) 5.53, p = 0.025$).
4.3.2.2 Length of hospital stay (days)

Length of stay (LOS) was defined as day of surgery (Day0) to the day of discharge from acute care. Results indicate a significant reduction in LOS in the intervention group by 1.0 day. The mean LOS was 6.29 days for the control group and 5.29 days for the intervention group (see Table 4.5) (mean difference (I-C) = -0.99, 95% CI -0.05 to -1.94, \( p = 0.041 \)). Median and interquartile ranges are displayed in Figure 4.9.

![Figure 4.9](image)

**Figure 4.9** Median length of stay in days for each condition (\( n = 241 \))

4.3.2.3 Function and pain following TKR surgery (Oxford Knee Score)

Scores for pain and function following TKR were measured four weeks after surgery and the possible response range was between 0 (least difficulty) to 48 (most difficulty). Overall the intervention group had a mean score of 19.94 and the control group, 21.43 showing a slight mean difference between groups indicating that the control group were slightly more restricted at home due to pain in their knee than the intervention group. However there was no statistically significant difference in pain
and functioning (OKS) following TKR at four weeks post discharge from acute care between intervention and control groups (mean difference (I-C), -1.489, 95% CI -5.78 to 2.80, \( p = 0.440 \)).

The post-operation employment status of participants was similar between groups with 57.6 percent (68) of the control group and 50.5 percent (46) of the intervention group retired at follow up (Table 4.3). The percentage who were in full time work (all participants) had fallen to 12.4 percent four weeks after discharge, from pre admission (21.6%), and may be attributed to patients still being on leave from their employment four weeks after discharge. Of those who were in full time work, before admission, 28 (20%) in the intervention group and 24 (23%) control group, significantly more intervention group patients, 17.6 percent (\( n = 16 \)) had returned to full time work compared to 8.5 percent (\( n = 10 \)) of the control group patients at follow up, four weeks after discharge from hospital (\( \chi^2 (1, N = 33) = 5.47, p = 0.039 \)).
Table 4.3 Patients’ employment status at follow up

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>All Patients (N = 209)</th>
<th>Control Group (n = 118)</th>
<th>Intervention Group (n = 91)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Employment Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full time</td>
<td>26</td>
<td>12.4</td>
<td>10</td>
</tr>
<tr>
<td>Part time</td>
<td>25</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>Casual</td>
<td>5</td>
<td>2.4</td>
<td>4</td>
</tr>
<tr>
<td>Volunteer</td>
<td>1</td>
<td>0.5</td>
<td>0</td>
</tr>
<tr>
<td>Unemployed</td>
<td>6</td>
<td>2.9</td>
<td>2</td>
</tr>
<tr>
<td>Retired</td>
<td>114</td>
<td>54.5</td>
<td>68</td>
</tr>
<tr>
<td>Other</td>
<td>23</td>
<td>11.0</td>
<td>13</td>
</tr>
<tr>
<td>Missing</td>
<td>9</td>
<td>4.3</td>
<td>3</td>
</tr>
</tbody>
</table>

4.3.2.4 Patient overall satisfaction and Net Promoter

Patient Satisfaction

A significant difference in overall satisfaction scores was found between groups. The intervention group had a higher mean satisfaction score of 9.26 than the control group 8.58 (mean difference (I-C) = 0.656, 95% CI 1.09 to 0.219, p= 0.013).

Figure 4.10 Mean satisfaction scores at 4 weeks after discharge between groups (n = 209)
Figure 4.10 Mean satisfaction scores at 4 weeks after discharge between groups \((n = 209)\).

Net promoter score

There was a statistically significant difference between intervention and control group responses to the question “would you recommend *the health service* to a family or friend” (Net promoter score) with a mean score 9.27 (intervention) and 8.67 (control) (mean difference (I-C) = 0.6, 95% CI 1.07 to 0.13, \(p = 0.021\)). The intervention group had a higher percentage of promoters (81.32%) compared to the control group (66.95%). This finding was also significant \(\chi^2(2, N = 209) = 8.80, p = 0.012\). Table 4.4 presents the final scores and percentages of the net promoter score.

<table>
<thead>
<tr>
<th></th>
<th>Intervention Group ((n = 91))</th>
<th>Control Group ((n = 118))</th>
<th>All patients ((N = 209))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Promoter Score</td>
<td>78</td>
<td>57</td>
<td>66</td>
</tr>
<tr>
<td>Detractors</td>
<td>3.3%</td>
<td>12.7%</td>
<td>8.6%</td>
</tr>
<tr>
<td>Passive - Neutral</td>
<td>15.4%</td>
<td>22.9%</td>
<td>19.6%</td>
</tr>
<tr>
<td>Promoters</td>
<td>81.3%</td>
<td>64.4%</td>
<td>71.8%</td>
</tr>
</tbody>
</table>

4.3.2.5 Postoperative complications – Deep Vein Thrombosis

Eight (3.3%) patients had developed a deep venous thrombosis (DVT) while an inpatient at the hospital. Of the 8, 6 patients were in the intervention group and 2 were in the control group \(\chi^2 (1, N = 241) = 3.42, p = 0.064\).
4.3.2.6 Readmissions to hospital (within 28 days)

Six (2.5%) patients were readmitted to hospital within 28 days of discharge from acute care; 3 in the intervention and 3 in the control group. \( X^2 (1, N = 241) 0.118, p = 0.732 \).

Reasons for readmission were:

<table>
<thead>
<tr>
<th>Intervention group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Trial of void for urinary retention</td>
<td>• Infection in Hospital in the Home (HITH)</td>
</tr>
<tr>
<td>• Revision TKR</td>
<td>• Manipulation under Anesthetic (MUA)</td>
</tr>
<tr>
<td>• For other TKR</td>
<td>• Infection - wash out of wound.</td>
</tr>
</tbody>
</table>
Table 4.5 Primary and secondary outcomes: Treatment means, standard errors of the means (SEM), 95% confidence intervals (CI) for the differences between the means and P-values from the F-tests for the treatment main effect (FAS).

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Control Mean</th>
<th>Control SEM</th>
<th>Intervention Mean</th>
<th>Intervention SEM</th>
<th>Difference (I – C)</th>
<th>95% CI LL</th>
<th>95% CI UL</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Outcome</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worst pain in last 24 hours – D3Q2.16</td>
<td>7.059</td>
<td>0.279</td>
<td>6.047</td>
<td>0.334</td>
<td>-1.012</td>
<td>-1.943</td>
<td>-0.081</td>
<td>0.037</td>
</tr>
<tr>
<td>Secondary Outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APSOQ Least pain in last 24 hours – D3Q2.15</td>
<td>2.401</td>
<td>0.240</td>
<td>2.675</td>
<td>0.291</td>
<td>0.274</td>
<td>-0.569</td>
<td>1.118</td>
<td>0.485</td>
</tr>
<tr>
<td>APSOQ How often were you in severe pain in the last 24 hours? D3Q2.17</td>
<td>31.716</td>
<td>2.867</td>
<td>25.598</td>
<td>3.521</td>
<td>-6.118</td>
<td>-16.462</td>
<td>4.227</td>
<td>0.212</td>
</tr>
<tr>
<td>APSOQ How much did pain interfere or prevent you from doing activities in bed such as turning, sitting up, repositioning – D3Q2.18.A</td>
<td>5.964</td>
<td>0.332</td>
<td>5.022</td>
<td>0.410</td>
<td>-0.942</td>
<td>-2.135</td>
<td>0.250</td>
<td>0.108</td>
</tr>
<tr>
<td>APSOQ How much did pain interfere or prevent you from doing activities out of bed such as walking, sitting in chair, standing at the sink – D3Q2.18.B</td>
<td>5.322</td>
<td>0.432</td>
<td>4.736</td>
<td>0.510</td>
<td>-0.586</td>
<td>-1.820</td>
<td>0.648</td>
<td>0.303</td>
</tr>
<tr>
<td>APSOQ How much did pain interfere or prevent you from falling asleep – D3Q2.18.C</td>
<td>3.633</td>
<td>0.265</td>
<td>3.718</td>
<td>0.305</td>
<td>0.085</td>
<td>-0.837</td>
<td>1.008</td>
<td>0.837</td>
</tr>
<tr>
<td>APSOQ How much did pain interfere or prevent you from staying asleep – D3Q2.18.D</td>
<td>3.747</td>
<td>0.321</td>
<td>3.866</td>
<td>0.386</td>
<td>0.119</td>
<td>-1.041</td>
<td>1.279</td>
<td>0.818</td>
</tr>
<tr>
<td>APSOQ How much did pain cause you to feel anxious – D3Q2.19.A</td>
<td>3.953</td>
<td>0.357</td>
<td>3.397</td>
<td>0.441</td>
<td>-0.556</td>
<td>-1.905</td>
<td>0.794</td>
<td>0.361</td>
</tr>
<tr>
<td>APSOQ How much did pain cause you to feel depressed – D3Q2.19.B</td>
<td>2.485</td>
<td>0.235</td>
<td>2.311</td>
<td>0.268</td>
<td>-0.174</td>
<td>-0.878</td>
<td>0.529</td>
<td>0.626</td>
</tr>
<tr>
<td>APSOQ How much did pain cause you to feel frightened – D3Q2.19.C</td>
<td>2.470</td>
<td>0.285</td>
<td>2.112</td>
<td>0.325</td>
<td>-0.358</td>
<td>-1.064</td>
<td>0.347</td>
<td>0.318</td>
</tr>
<tr>
<td>APSOQ How much did pain cause you to feel helpless – D3Q2.19.D</td>
<td>3.647</td>
<td>0.270</td>
<td>3.136</td>
<td>0.308</td>
<td>-0.521</td>
<td>-1.327</td>
<td>0.286</td>
<td>0.205</td>
</tr>
<tr>
<td>Outcome</td>
<td>Control Mean</td>
<td>Control SEM</td>
<td>Intervention Mean</td>
<td>Intervention SEM</td>
<td>Difference (I - C)</td>
<td>95% CI LL</td>
<td>95% CI UL</td>
<td>P-value</td>
</tr>
<tr>
<td>---------</td>
<td>--------------</td>
<td>-------------</td>
<td>------------------</td>
<td>------------------</td>
<td>-------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td>APSOQ Have you had any of the following side effects – nausea D3Q2.20.A</td>
<td>4.015</td>
<td>0.450</td>
<td>3.127</td>
<td>0.501</td>
<td>-0.888</td>
<td>-1.780</td>
<td>0.004</td>
<td><strong>0.051</strong></td>
</tr>
<tr>
<td>APSOQ Have you had any of the following side effects – drowsiness D3Q2.20.B</td>
<td>4.803</td>
<td>0.267</td>
<td>4.551</td>
<td>0.311</td>
<td>-0.252</td>
<td>-1.197</td>
<td>0.693</td>
<td>0.556</td>
</tr>
<tr>
<td>APSOQ Have you had any of the following side effects – itching D3Q2.20.C</td>
<td>1.866</td>
<td>0.348</td>
<td>2.165</td>
<td>0.390</td>
<td>0.299</td>
<td>-0.431</td>
<td>1.029</td>
<td>0.421</td>
</tr>
<tr>
<td>APSOQ Have you had any of the following side effects – dizziness D3Q2.20.D</td>
<td>2.924</td>
<td>0.307</td>
<td>2.728</td>
<td>0.370</td>
<td>-0.196</td>
<td>-1.290</td>
<td>0.898</td>
<td>0.694</td>
</tr>
<tr>
<td>APSOQ Have you had any of the following side effects</td>
<td>7.075</td>
<td>0.200</td>
<td>7.670</td>
<td>0.229</td>
<td>0.595</td>
<td>-0.003</td>
<td>1.194</td>
<td><strong>0.051</strong></td>
</tr>
<tr>
<td>APSOQ Have you had any of the following side effects – dizziness D3Q2.20.D</td>
<td>6.647</td>
<td>0.398</td>
<td>6.557</td>
<td>0.496</td>
<td>-0.090</td>
<td>-1.542</td>
<td>1.361</td>
<td>0.890</td>
</tr>
<tr>
<td>APSOQ Have you had any of the following side effects – dizziness D3Q2.20.D</td>
<td>8.232</td>
<td>0.213</td>
<td>8.513</td>
<td>0.258</td>
<td>0.281</td>
<td>-0.495</td>
<td>1.057</td>
<td>0.427</td>
</tr>
<tr>
<td>APSOQ Have you had any of the following side effects – dizziness D3Q2.20.D</td>
<td>7.925</td>
<td>0.213</td>
<td>7.306</td>
<td>0.242</td>
<td>-0.619</td>
<td>-1.257</td>
<td>0.018</td>
<td>0.057</td>
</tr>
<tr>
<td>APSOQ How often did the nurse encourage you to use non-medicine methods [for pain treatment]? D3Q2.26</td>
<td>1.731</td>
<td>0.101</td>
<td>1.855</td>
<td>0.127</td>
<td>0.124</td>
<td>-0.261</td>
<td>0.509</td>
<td>0.469</td>
</tr>
<tr>
<td>Length of stay in acute care – LOS (days)</td>
<td>6.292</td>
<td>0.228</td>
<td>5.297</td>
<td>0.279</td>
<td>-0.995</td>
<td>-0.052</td>
<td>-1.939</td>
<td><strong>0.041</strong></td>
</tr>
<tr>
<td>Oxford Knee Score - 4 weeks after acute care discharge</td>
<td>21.426</td>
<td>1.428</td>
<td>19.937</td>
<td>1.127</td>
<td>-1.489</td>
<td>-5.782</td>
<td>2.804</td>
<td>0.440</td>
</tr>
<tr>
<td>How satisfied were you with the Health Care Facility? PDQ2.52</td>
<td>8.600</td>
<td>0.109</td>
<td>9.227</td>
<td>0.121</td>
<td>0.656</td>
<td>1.094</td>
<td>0.219</td>
<td><strong>0.013</strong></td>
</tr>
<tr>
<td>How likely is it that you would recommend the Health Care facility to a family or friend? PDQ2.51</td>
<td>8.672</td>
<td>0.127</td>
<td>9.272</td>
<td>0.142</td>
<td>0.600</td>
<td>1.070</td>
<td>0.131</td>
<td><strong>0.021</strong></td>
</tr>
</tbody>
</table>
4.4 Discussion

In this cluster randomised, crossover trial, a facilitated, multimedia, goals of care intervention, delivered to patients in the acute postoperative context was effective in reducing patients’ reported pain intensity on Day 3 after TKR surgery. The intervention also resulted in reduced length of stay in acute care, higher overall satisfaction and Net promoter score after discharge. There were no observed differences in interference of pain on activities of daily living (APSOQ-R), knee pain and functioning (OKS) four weeks after discharge, or postoperative complications or readmission to hospital. An incidental finding was that patients in the intervention group had returned to full time work within the four week follow-up period and were more likely to use non pharmacological methods for pain relief than those who received usual care.

Recruitment of patients into the study was very high however it should be acknowledged that not all surgeons at the hospital where the study was undertaken contributed to this research project. Their patients were already participating in research studies at the hospital, and therefore not approached for participation in this study for fear of over burden.

Analysis of patients’ baseline characteristics indicated that patients randomised to the intervention and control groups were similar in relation to characteristics that may have impacted on the outcomes of the trial. The mean age of patients was 66.5 (SD 9.2) years and this is consistent with the average age of patients undergoing primary TKR surgery in Victoria where the mean age is 67.8 (SD 9.8) years (*Hip and Knee Arthroplasty: Annual Report, 2015*). The sex distribution of patients was also similar to other hospitals in Australia in that the majority of patients were female (*Hip and Knee Arthroplasty: Annual Report, 2015*). Females accounted for 55.2 percent of all patients...

Patients’ beliefs about pain and attitudes towards treatment can act as barriers to optimal management of pain (Ward et al., 1993) and may have been an important potential confounder in relation to the primary outcome of pain intensity at Day 3 because the intent of the intervention was that patients would participate in their pain management by recognising unacceptable pain scores and negotiating additional analgesia. Pain beliefs and attitudes were measured prior to admission to hospital, at baseline. Results indicate there were no statistically significant differences between groups in terms of perceived barriers to pain management. However, although not different between groups, patients’ responses to the barriers questionnaire indicate important potential barriers to pain management. A relatively high proportion of patients (34.9%) did not believe that pain medicines can control their pain and 42.3 percent of all patients believed that it is easy to get addicted to pain medication. These beliefs may have influenced their decisions to request additional pain treatment options and may be a factor in the overall high worst pain scores reported at Day 3 after surgery.

4.4.1 Primary outcome

Numerical Rating Score - Pain

The primary outcome of patient reported worst pain intensity was measured on Day 3 following TKR surgery. When compared to usual care, the intervention group, exposed to the multimedia intervention, reported lower worst pain scores. There was a
significant difference in pain scores between the groups ($p = 0.037$). The mean recorded pain scores were 6.0 (intervention) and 7.0 (control). Worst pain scores indicate dynamic pain, that is, pain that is generally associated with movement or exercise and, in the postsurgical context, breaks through analgesic management. The findings suggest that patients who were exposed to the intervention experienced lower levels of dynamic pain. It should be noted however, that both groups had considerably high levels of dynamic pain on Day 3 following TKR surgery indicative of moderate pain intensity on movement and this suggests that pain management overall was not optimal. The high reported pain scores in this trial are similar to the findings reported in a number of studies. Wilson (2016) in a RCT investigating the impact of an individualised pre-operative education intervention on pain related interference and symptoms after TKR surgery. In the trial conducted by Wilson (2016) where pain intensity was also measured on Day 3, a mean pain score of 7 was reported in both groups. They found no difference in pain scores between groups who were given a tailored pre surgery education package with specific information related to pain management and those who received usual care. Carli (2010), in a study investigating the effect of two analgesic techniques in 40 TKR patients, reported patients’ pain on Day 2 was a median of 8 (range 6-9) in the periarticular injection group, and 7 (range 5.5-8) in the femoral nerve block group. Ensuring that patients who undergo orthopaedic surgery receive adequate pain management is critical to their ability to participate in early mobilisation, knee flexion exercises and rehabilitation (Sandika, Sandika Gunnapana Gedara, Kauppinen, & Le Louarn, 2015).

The facilitated multimedia intervention provided patients with information relating to their goals of pain management where the explicit goal each day was to
maintain pain intensity levels at less than 4 out of 10 on the numerical rating scale. In addition, a specific module provided information about pain control that included available analgesic medicines used to treat pain. This provided patients with information related to pain treatment, management and a specified goal to aim for with regard to pain intensity. An incidental finding from this trial was the intervention group patients were significantly more likely to use non-pharmacological methods to reduce their pain intensity, such as deep breathing exercises \( (p = 0.025) \).

A study by McTier (2014) found patients had limited opportunity to participate in their pain management primarily due to the lack of time clinicians spent with patients. The findings from the study suggest that on occasions in which clinicians did involve patients, the involvement appeared to be focused on reporting pain intensity rather than treatment (McTier et al., 2014). A critical step in adequate pain management involves the interaction between the nurse and the patient. While the trial outcomes provide evidence that a facilitated multimedia intervention can reduce pain intensity, further work is needed to lower pain scores to a level to ensure patients can indeed participate in mobility activities comfortably.

### 4.4.2 Secondary outcomes

#### Length of Stay

The secondary outcome of length of stay (LOS) was defined in this study as day of surgery (Day 0) to day of discharge from acute care irrespective of the time of discharge on the day. The intervention group had a significant reduction in LOS by 1 day \( (p = 0.041) \) compared to the control group.
Patient LOS in acute care is a well-accepted indicator of hospital efficiency (Frost, 2016). LOS is a key driver of hospitals costs and affects health service capacity. Reduced LOS not only reduces cost to the heath service, it also frees up valuable acute hospital beds enabling care for more patients (Frost, 2016). Prolonged stay can negatively impact patients by increasing risk of complications, decrease patients’ quality of life and may lead to functional decline (Admi, Shadmi, Baruch, & Zisberg, 2015).

There is a variation in reported LOS with regard to TKR surgery. In the United Kingdom, the mean LOS for primary TKR is 6.4 days (Carter & Potts, 2014). Australian data from 2014-2015 suggest, on average, people who had a primary TKR spent 5.5 days in hospital (Australian Institute of Health and Welfare. Admitted patient care 2014–15: Australian hospital statistics AIHW, 2016). At major metropolitan hospitals in Australia, average length of stay for TKR ranged from 3.3 to 8.7 days. In regional hospitals, average length of stay ranged from 2.1 to 9.5 days. These data are comparable to our average LOS of 5.29 days for the intervention group and 6.29 days for the control group.

Reasons for prolonged LOS can be multidimensional and may include availability of beds in rehabilitation facilities, the age and demographic characteristics of the patient population and the readiness of the patient for discharge (Frost, 2016). The findings in the trial reported in this thesis indicate that a relatively low cost, nurse facilitated multimedia intervention at the bedside that provided patients with the necessary information and the opportunity to engage with clinicians to facilitate early mobilisation can have an impact on patients’ ‘readiness’ for discharge.
Oxford knee score

Approximately four weeks after discharge from acute care patients competed the OKS survey. The OKS survey is a patient-reported outcome measure, specifically developed and validated for measuring outcomes of knee replacement surgery (Dawson et al., 1998). Some studies have reported ceiling effects with the OKS (Marx et al., 2005). Ceiling or bottom effects occur when a considerable proportion of respondents score the maximum or minimum score, rendering the measure unable to discriminate between the top (or bottom) end of the scale (Stucki, Liang, Stucki, Katz, & Lew, 1999). In a recent study by Harris (2015) that aimed to examine if there was indeed a ceiling effect associated with the OKS, scores from over 74,000 patients were evaluated postoperatively. The results suggested that the OKS does not exhibit a ceiling or floor effect overall, for both its pain and function subscales, and remains a valid measure of outcomes for patients undergoing TKR (Harris et al., 2015). However, scores were elicited from patients 6 months after surgery, making it difficult to compare with the results from our study were patients completed the OKS 4 weeks post discharge from acute care. The results indicated there was no statistically significant differences ($p = 0.440$) between groups at this time. The mean OKS in our cohort was 19.9 (intervention) and 21.4 (control). These results are somewhat lower than previously reported results at 6 months post-surgery where Dawson (1998) reported a mean score of 29.3 indicating pain interference was higher. One study where the OKS was measured at 6 weeks after surgery, and hence most comparative to our study, found patients reported a mean score of 28 (SD 7.6) (Isaac et al., 2005). However, the majority of studies that measured the pain and function of the knee post-surgery using the OKS did so at 6 months to 1 or 2 years post-surgery (Clement, MacDonald, Patton, & Burnett, 2015; Harris et al., 2015; Murray et al., 2007; Williams et al., 2013).
A review of the literature by Clement (2013) highlighted factors known to influence OKS after TKR surgery included pre-operative expectations of function. The outcome of the OKS is not particularly influenced by age, socioeconomic status and mental wellbeing, but is influenced by perceived fulfilment of patients’ pre-operative expectations and their post-operative general physical health (Clement, 2013). One of the limitations in this cluster crossover trial is the OKS was not measured pre-operatively and therefore it was difficult to make comparisons in terms of what patients expected verses what they achieved. The OKS is similar to the measurement of patient satisfaction in that the survey is essentially obtaining patients reports on whether they received what they expected. The final score is determined by responses such as “I got what I expected” or the outcome “exceeded my expectations” (high OKS) or “I did not receive what I expected” (lower OKS) and it is likely that four weeks is too early to determine whether expectations were met (Clement et al., 2015).

The ability to return to work or continue to work is an important goal for patients who undergo a TKR and is usually determined by pain and function of the knee (Mancuso, Ranawat, Esdaile, Johanson, & Charlson, 1996). In total, 21.6 percent of patients were in full time employment prior to hospitalisation, and at four weeks after discharge, a significant proportion of the intervention group 17.6 percent \( (n = 16) \) had returned to full time work compared to 8.5 percent \( (n = 10) \) of the control group \( (p = 0.039) \). A key patient characteristic that is known to be predictive of return to work following TKR surgery is the motivation to return to work (Styron, 2011). For example, patients who are self-employed may be more motivated to return to work than those who receive a salary which has included within it entitlements for sick leave. Unfortunately, this information was not captured in the pre admission phase of this
study. Other factors known to impact on returning to work after joint replacement surgery include knee function, pain and mobility scores (Williams et al., 2013). A study in 2009 (Lombardi Jr, Berend, Walter, Aziz-Jacobo, & Cheney, 2009) investigating working status prior to and after TKR surgery found that a large majority (98%) of 494 patients who were working during the 3 months before their TKR surgery returned to work at some point after recovery from surgery. In the study by (Lombardi Jr et al., 2009) for patients who returned to work, the length of time for recovery after surgery averaged 8.9 weeks (SD, 9.1; range, 0–104 weeks), and, in addition their cohort was much younger with a mean age of 54 years. This makes it very difficult to compare our findings as the mean age of our cohort was 66.5 years and patients were asked this question at follow up, 4 weeks post discharge from acute care.

In this cohort there was no statistically significant relationship between those who had returned to work and their Oxford Knee Scores (OKS). The mean OKS of those who had returned to work was slightly lower (18.88) than those who had not (20.67) suggesting that those who had returned to work may have had less interference from pain in terms of mobility.

**Patient overall satisfaction and net promoter score**

Patients exposed to the intervention had higher overall satisfaction with their acute care experience ($p = 0.013$) and higher net promoter score ($p = 0.021$) indicating that intervention patients were more likely than the control group to recommend the health service to family or friends. Patient satisfaction is essentially a subjective concept determined by patients’ own expectations and experiences and is generally recognised as multi-dimensional in nature (Crow et al., 2002; Schoenfelder, Klewer, & Kugler, 2011). The difficulty is in the measurement of a concept that is relatively ill-
defined, subjective and predetermined by individual expectations. If patients are satisfied, the hospital stay either met their expectations or exceeded them therefore satisfaction ratings tend to only measure a patient’s happiness with certain aspects of their hospitalisation. How an individual rates their overall satisfaction on a continuum will depend on their values, beliefs and expectations of what the encounter or experience should have been (Drain & Clark, 2004).

Patient satisfaction ratings almost never present as normally distributed. Self-reported measures of patient satisfaction are consistently negatively skewed with the majority of patients reporting high levels of satisfaction (Coulter & Fitzpatrick, 2009; Crow et al., 2002). For example, a systematic review of the literature by Crow (2002) concluded that almost always, satisfaction ratings were skewed to the left, with most responses occurring on the positive end of the scale (highly satisfied). In other words, responses to satisfaction surveys have a ceiling effect, and a criticism is that the scales used to measure patient satisfaction do not have a sufficient number of categories to permit survey respondents to make fine discriminations between levels of satisfaction especially at the higher end (Labarère & François, 1999). Although there were limitations using an upper bounded discrete scale, the mixed methods approach to analysis used for this study and the outcomes of other variables such as the net promoter gives us confidence that there was an intervention effect.

There is a growing emphasis on patients’ willingness to return to the organisation and recommend the health service to others as a strong indicator of overall satisfaction with their hospital stay and hence the perceived quality of care received (Drain & Clark, 2004; Press, 2007). This study used the net promoter score for this outcome measure. The results, irrespective of patient expectations, found a significant
difference between groups in both the satisfaction scores and the net promoter score indicating that the multimedia intervention had a positive impact.

Readmission to acute care and complications post operatively

The number of readmissions \( (n = 6) \) and complication of DVT \( (n = 8) \) obtained through the hospital information systems revealed low numbers of both complications. There was not a significant difference in incidence between groups. Recent multicentre retrospective cohort study in Australian hospitals looking at the rates of DVT amongst surgical patients (Assareh et al., 2014) found the incidence amongst knee surgical patients to be 9.44 percent, this is significantly more than our 3.3 percent however, the number of DVTs may have been underestimated in this study because data were only available if patients developed a DVT whilst in hospital or were readmitted to the same hospital within the 28 days with a diagnosis of DVT. In addition, data for readmission to hospital needs to be interpreted with caution as it is not known whether patients were readmitted by another health service or were treated by their local doctor.

4.5 Conclusions

The results provide evidence that the MyStay facilitated multimedia intervention tailored specifically for patient undergoing TKR can influence patient related outcomes, patient satisfaction and length of stay in acute care however they these results do not provide the causal links or the evidence as to why patients had better outcomes after TKR surgery. In order to determine why the intervention had the impact it did on patient outcomes the results from the concurrent process evaluation will be presented. The process evaluation aimed to examine the delivery of the intervention and to provide evidence of the effects of the intervention in activating patient participation in the context of acute care delivery. The findings from this detailed evaluation are
presented over the following two chapters (Chapter 5 and 6). Chapter 5 presents the findings related to processes used in the conduct of the trial of the multimedia intervention. Chapter 6 presents the outcomes of analyses exploring whether the intervention provided patients with the capability and opportunity to participate in care related to their goals of recovery.
Chapter 5

Process Evaluation: Implementation, Usability and Sustainability

In this and the chapter to follow, the findings of the process evaluation conducted parallel to the trial are reported and discussed. The first part of the process evaluation evaluated implementation of the intervention, contextual factors that may have affected implementation and how the intervention was received. Simply assessing program impact without a clear understanding of the degree to which a program was implemented provides a superficial interpretation of findings (Oakley, Strange, Bonell, Allen, & Stephenson, 2006). Evaluation of the processes needed to successfully implement an intervention also provides a basis for future implementation guidelines for practice and research. The process evaluation had two overarching aims. The first aim, reported in this chapter, was to evaluate the processes used in the conduct of the trial. The specific objectives were to determine:

1. The extent to which recruitment procedures were appropriate in enrolling and maintaining patients in the trial;
2. The extent to which the processes used to implement the multimedia intervention were successful;
3. What system or environmental factors may have impacted on the effectiveness of the intervention;
4. The usability and acceptability of the multimedia intervention in the context of acute recovery after surgery.
5.1 Methods

An overview of the methods and tools used for the process evaluation overall is presented in Chapter 3. The methods used to collect data and conduct three phases of the process evaluation are summarised in Table 5.1.

Table 5.1 Methods used in the trial implementation and data collection

<table>
<thead>
<tr>
<th>Trial phase</th>
<th>Methods and resources used</th>
<th>Evaluation methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-implementation</td>
<td>Nurses</td>
<td>Analysis of interview and meeting data</td>
</tr>
<tr>
<td></td>
<td>• Purposive group interview</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ward and in-service meetings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Flyers/handouts</td>
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<tr>
<td></td>
<td>• Email correspondence</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation</td>
<td>Daily ward visits (intervention and control</td>
<td>Analysis of meeting notes and observation data</td>
</tr>
<tr>
<td></td>
<td>wards)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Daily field observations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• One-to-one and ward meetings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Handouts/flyers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Correspondence via patients’ bedside white boards</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation phase</td>
<td>Patient self-reported questionnaires</td>
<td>Descriptive statistics using SPSS</td>
</tr>
<tr>
<td></td>
<td>• Observations of practice and incidental staff feedback</td>
<td></td>
</tr>
</tbody>
</table>

Data collection for this phase of the process evaluation involved multiple methods that included: group interviews with nurses; in-service meetings; field observations of practice and patient self-reported questionnaires.

5.1.1 Pre-implementation phase

In order to introduce and embed interventions into clinical practice, multiple strategies are needed specifically targeting a range of aspects including the individuals involved, the organisation, and its culture (Brown & McCormack, 2005). In the context of this study, it was important that the perceived barriers and enablers to the uptake of the intervention from the perspectives of the nurses was understood, as well as
accounting for the environment in which it was to be applied. Ward-based pre-implementation tasks included:

- Informing nurses about the study and their involvement;
- Determining how best to embed the intervention into everyday practice;
- Identifying and mitigating nurses’ perceived barriers to implementing the intervention into every day practice;
- Ensuring nurses were exposed to the content of the intervention and familiar with navigating the program on the iPads™;

The methods used in each step of the pre-implementation phase are discussed below.

5.1.1.1 Nurse group interview

Nurses \( n = 4 \) were purposively sampled to participate in a group interview prior to commencement of the trial. Nurses chosen were permanent staff employed on the orthopaedic wards of the hospital and included one educator and three registered nurses (two senior nurses and one graduate nurse). The focus of the discussion was how best to embed the multimedia intervention into every day practice on the study wards. One (1) pre-implementation group interview was conducted and 45 minutes was allocated during ‘double staffing’ time on the ward (2-3pm) to ensure nurse-patient cover on the ward. The group interview was audiotaped and was complemented with written notes collected by an observer. Data were transcribed verbatim and then analysed using qualitative content analysis techniques.

5.1.1.2 Ward and in-service meetings

Ward in-service and one-to-one nurse meetings were used to disseminate information about the implementation processes for the trial. Notes of identified barriers and suggested strategies were recorded following each of these encounters.
Three formal ward meetings prior to implementing the program were attended on each ward. An additional three in-service meetings held on each ward captured >80 percent of nursing staff; multiple meetings were required to inform part time and casual staff about the study. In addition to the daily meetings one ‘night’ meeting was held on each ward to ensure the permanent night staff were also well informed about the study.

At the ward and in-service meetings the project was described in detail along with a demonstration of the animation intervention designed for patients and any questions were addressed.

5.1.1.3 Flyers/handouts

Handouts and flyers (see Appendix 9) were developed and placed in the nurses’ stations and tea rooms to engage nurses and inform them of the study. On each flyer the researcher’s contact details were provided to invite questions, comments or suggestions.

5.1.1.4 Email correspondence

Nurse unit managers, physiotherapists and ward nursing staff were sent regular emails to provide updates on the stages of the study throughout the trial period.

5.1.2 Implementation phase

Daily, for the duration of the trial, both the intervention and control wards were visited by the researcher in order to facilitate the procedures for the trial.

The intent of the Intervention ward visits was to:

- Apply the intervention to recruited patients Day 1 after their surgery;
- Ensure any casual staff were familiar with the trial;
• Place flyers in patients’ notes (Appendix 10) and on bedside white boards to alert staff that a patient was enrolled in the trial;
• Conduct outcome interviews with patients on Day 3;
• Capture barriers to implementation through observation and incidental feedback from patients or staff;
• Observe practices related to implementation and usability of the intervention (patients’ and nurses’ engagement).

The intent of the Control ward visits was to:

• Remind patients Day 1 after their surgery of their participation in the trial;
• Conduct outcome interviews with patients on Day 3;
• Observe incidental practices that may act as a barrier to participation (patients and nurses).

5.1.3 Evaluation phase

All patients who were randomised to an intervention ward were given the MyStay Evaluation Questionnaire, an 8-item self-report tool specific to the intervention (See Appendix 11). The intervention questionnaire was designed to uncover the ease of use, satisfaction with, and effectiveness of, the multimedia program. Barriers and facilitators to the intervention were identified via the questionnaire and the patient interviews. Field notes of these communications and any observations made by the researcher related to implementation of the intervention were transcribed in a field diary. These notes were coded for recurring themes in terms of barriers and facilitators.
5.2 Findings and strategies

The discussion in this section details the findings from the analysis of the three stages of implementation and implications for the conduct of the trial. In the first part, findings from the pre-implementation nurse group interview and subsequent ward meetings are presented. This is followed by findings in relation to evaluation of recruitment, integrity of the intervention, context and resources. The final part of this section highlights the identified barriers and strategies used to overcome the barriers to implementation of the multimedia intervention.

5.2.1 Findings from pre-implementation phase

Several themes were derived from the analysis of the transcripts of the group interview, ward meetings and one-on-one communications with nurses and these were used to inform how to embed the intervention into everyday practice on the wards. The themes were: the potential burden of introducing the intervention for staff; perceived difficulties associated with the age of patients and ease of use of technology; and concerns about safety and security of the iPad within the ward.

Potential burden of introducing the intervention for nursing staff

Nurses expressed concern that the need to facilitate the use of the iPad™ and assist patients to navigate the system the first time they were exposed to the program would take a significant amount of time, in particular during the busy morning period that includes clinical handover and patient assessment. Nurses suggested that this process could be undertaken by someone other than the nurses caring for patients.

Can you guarantee this [iPad intervention] will not increase our already busy workload? I mean if we have to spend time going through this iPad [intervention] then it’s going to make it harder for us isn’t it...I mean, we just don’t have the time Nurse ID 2
I don’t know I think there’s a lot going on in the morning...we are [the nurses] are busy and flat out. First thing is probably easier if someone else does it [goes through the program with the patient] and not leave it up to the nurses? Nurse ID 1

The age of patients and ease of use of technology

There were mixed attitudes regarding the age of the patients and their ability (physically and mentally) to use the iPad™ device. Some nurses were concerned that older patients would be unfamiliar with portable devices or unable to use them and this would increase the demands on nurses.

With the older patients we may have to teach them how to use the iPad [intervention] or they may not be able to use it at all. Do you think this is very realistic, I mean for them to use it? Nurse Id 3

Yes some of them have other co morbidities you know such as arthritis, it may be harder for them...we will have to push it for them? If that’s the case I don’t think we will have the time. Nurse ID 4

This view of age and use of technology was not shared by all nurses.

I don’t think it should be an issue, my grandparents have one and they use it ok. Nurse ID 1

Security and safety of the equipment

Nurses were concerned about the physical location of the iPad™ in patients’ rooms. Their concerns were that the iPad™ would get in the way and add to existing clutter, be removed or stolen or dropped and broken. The potential for cross contamination and risk of infection was also raised.

So where are you going to put it [iPad intervention]? You don’t want it to get in the way. There’s not much room anyway with all their [patients] stuff. Perhaps it could be put on the bedside tables so we can get it out of the way if we need to? ...what about keeping it clean, what do you think? ...have you thought about the cross contamination? Nurse ID 1
Yes you have to make sure it doesn’t walk either...if it’s not secure, things walk here, how will you make sure it stays with the patient? And what about if it gets dropped they are very sensitive these iPads...what will happen there...do you have lots of replacements?
Nurse ID 3

5.2.1.1 Strategies for implementation of the intervention

To ensure successful implementation of the program, an iPad™ with the MyStay TKR program was made available to staff in the wards immediately before they were scheduled for an intervention period. The iPad™ was secured to the staff room table during the washout period following a control period and provided ward staff the opportunity to become familiar with the content of the program and how to use it. Instructions on how to use the program was provided in both informal meetings, structured staff meetings and on laminated cards attached to the iPad™ itself (Appendix 12). Fortnightly ward meetings were attended to answer questions from nursing staff regarding the program and its implementation during intervention periods.

Workload implications

Workload implications was a factor consistently identified by nursing staff in both the group and ward meetings. Strategies implemented on recommendation by the nursing staff to decrease their workload in relation to the trial included:

- Implementation of the intervention on Day 1 of patients’ recovery by the researcher to ensure that patients could use the iPad™ and could navigate the program;
- Patients who were postoperative Day 1 received an explanation of the iPad™ and navigation after handover and before breakfast, at approximately 0800hrs each morning.
• A flyer (Figure 3.6) to assist patients to navigate the program themselves was provided to all patients.

Once patients were familiar with the iPad™ the nurses felt they were able to focus on the content of the program.

Safety and security of the iPad

To address security concerns, the iPad™ was secured to each patient’s movable bedside table with a locked cable.

Eight iPads™ were available. Each iPad™ was secured inside a locked tough case that was drop, smash and splash proof. No damage to any of the iPads occurred throughout the period of the trial.

Infection control concerns

To ensure infection control practices were satisfactory, the infection control nurse of the organisation was contacted to approve the cleaning protocol for each iPad™ prior to transfer to another patient. Wiping the iPad™ and all associated material (cords, case etc) with an alcohol impregnated cloth was approved as sufficient cleaning between patients. Cleaning occurred on collection of the iPad™ when a participating patient was discharged from hospital.

5.2.1.2 Recruitment

The effectiveness of the recruitment procedures used to enroll and maintain patients in the trial and detailed in Chapter 3 are presented here. Of the 257 patients invited, 98 percent agreed to participate in the study and 93.7 percent actually participated. The majority of patients were recruited via the preadmission clinic (80%)
and there was no difference in the proportion of patients recruited via the clinic between the intervention and control groups.

The number and flow of patients throughout the trial wards are presented in Figure 5.1. Overall the recruitment processes were very successful. When interviewed on Day 3 after surgery, patients were often tired from physical therapy and recovery. As a consequence, most patients requested that the outcome questionnaires be left with them and these were collected the following day. Only four participants (1.7%) did not return the Day 3 questionnaire.

At follow up, 32 (13.3%) patients did not return the discharge questionnaire resulting in a response rate of 86.9 percent. This high response rate was attributed to reminder phone calls to patients who had not returned the questionnaire 2 weeks after the mail out to either remind them to complete and post it back, or to arrange another questionnaire to be sent if it was lost or misplaced.
Figure 5.1 Flow of participants through each stage of the trial: preadmission to follow up 4 weeks post discharge
5.2.2 Findings from the implementation phase

The findings reported in this section relate to the effectiveness of the procedures used to implement the intervention into practice.

Application of the intervention involved a structured process and is outlined in Table 5.2. The processes used in each stage of the procedure are discussed further below.

**Table 5.2 Application of the intervention procedure**

<table>
<thead>
<tr>
<th>Key process</th>
<th>Procedure</th>
</tr>
</thead>
</table>
| Identification of patients enrolled in the trial | At the beginning of each shift (AM) NUM/ANUM were informed of:  
  • The researcher presence on the ward  
  • A list of patients enrolled in the trial on their ward identifying the ‘Day’ after surgery  
  • The exact number of iPads™ required per ward per day and ensure they were charged and ready for use. |
| Application of intervention                      | • Identify the nurse responsible for the care of patient participants  
  • Confirm with the nurse that the patient is enrolled in the study and will need to view the iPad™ animation  
  • Identify Day 1 patients and provide and secure the iPad™ and explain how to use the device and navigate the program  
  • Patients instructed to watch the animation via iPad™ and call their nurse once they have finished to discuss the content  
  • The nurse will confirm and clarify any questions the patients may have regarding the information  
  • The iPads™ remain with the patient for the duration of their stay. Patients’ nurses are responsible for ensuring the iPad™ is charged overnight. |

5.2.2.1 Identification of patients post-surgery enrolled in the study

At the beginning of each morning shift at approximately 0800hrs (after nursing handover), the researcher approached the nurse unit manager (NUM) or assistant nurse unit manager (ANUM) to inform them of the researcher’s presence on the ward, provide the list of patients enrolled in the study and to identify patients who were Day 1 after
surgery. Patients were provided with the iPad™ and the nurses responsible for the patients’ care were reminded of the study and their role.

5.2.2.2 Application of the intervention

Patients together with the researcher navigated the MyStay animation via iPad™, each section of the program was explained until patients were comfortable with access and could follow the program. This introduction to the program took approximately 5 to 10 minutes depending on the patient’s familiarity with the iPad™ device. Patients were then left with the device and informed that they could use the program as often as they wished.

Patients were also instructed to call their nurse to inform them that they had finished watching the program. The nurse would then clarify any questions the patient may have regarding the information provided and it was anticipated that a discussion regarding the goals of the day would ensue.

A laminated card “patient flyer notes” (Appendix 10) was placed in each patient’s medical record folder, as well as a note on the patient’s white board and on the pin board outside the patient’s room to remind staff that s/he was enrolled in the study. The cards also reminded nursing staff to charge the iPads™ overnight as the battery life was limited. A phone call to the wards at approximately 2200hrs each night was made in the initial phase of the trial to remind the staff to charge the devices by applying the chargers at the patients’ bedside.

5.2.2.3 Maintenance of the intervention and participants

Daily visits to the intervention wards each day at different times for the duration of the trial ensured the iPad™ program was functioning and the iPads™ were
adequately charged. During this daily visit the nurse researcher reminded participants to engage with the multimedia intervention and also encouraged them to inform nurses of their pain intensity, call nurses to seek clarification or to answer questions related to their care. These visits by the nurse researcher ranged from two to five minutes in duration each day.

Strategies used throughout the trial, to maintain engagement by nursing staff included:

- One-to-one discussions between ward nurses and the nurse researcher;
- Phone calls to associate nurse unit managers on afternoon shifts at 2000hrs each day, to ask that they remind staff to charge iPads™ overnight;
- Regular attendance at ward meetings by the nurse researcher where questions could be answered and strategies discussed to assist with the implementation;
- Laminated cards were placed in patient notes; and a sign on the white board and above the patient bed area;
- Patients themselves reminded staff to attend to the iPad™ for example, to plug in the iPad™ overnight.

Physiotherapists were also engaged with implementation of the intervention. They had been consulted on the design of the animation during the design phase and referred patients with iPads™ to the exercise component of the multimedia program following their initial visit on Day 1.

As the intervention was designed to be nurse-facilitated, where nurses and patients would interact after watching each day’s presentation, patients were asked on Day 3 if the nurses responsible for their care had discussed the program with them in
the previous 24 hours. Only 21.4 percent ($n = 22$) of the patients reported that nurses had discussed the program with them in the previous 24 hours (Figure 5.2).

![Figure 5.2 Number of patients who indicated that nurses discussed information in the MyStay TKR program with them in the previous 24 hours ($N = 103$)](image)

5.2.3 Findings from evaluation phase

5.2.3.1 Reach, usability and acceptability

On Day 3, patients were asked a range of questions related to the intervention to examine the reach, usability and acceptability of the multimedia intervention in the context of acute recovery after surgery. Reach refers to the extent to which the multimedia intervention was successful in terms of reaching the target audience, measured here as the extent to which patients interacted with the intervention. Usability was defined as the degree to which the multimedia intervention was easy to use for patients in the acute care context and was measured by patient reports of ease of use via a questionnaire. Acceptability is the willingness to use the program for the purpose it was designed to support and was measured in this study by net promoter and patient satisfaction ratings.
Only one (1) patient was unable to receive the multimedia intervention in the trial. This deviation was due to factors outside the control of the study whereby the patient had a serious complication (cerebrovascular accident (CVA)) post operatively and therefore was unable to receive the intervention.

The findings of the usability of the iPad™ program are presented in Figure 5.3. Almost all patients, (94, 91.2%) found the program easy to use.

![Pie chart showing ease of use of the MyStay TKR program via the iPad™ (N = 103)](image)

**Figure 5.3** Reported ease of use of the MyStay TKR program via the iPad™ (N = 103)

During the interview on Day 3, 68 (66%) patients reported they had viewed the iPad™ program more than once in the previous 24 hours (Figure 5.4), and five (5) patients reported they had not viewed the program in the previous 24 hours. The reasons for not viewing the iPad™ program were: watched the entire program on Days one and two; unable to view due to illness; too tired to watch at the time, planned to watch the program later in the day.
When asked if they were able to view the program as often as they wanted, 62 percent of patients reported they felt they could view the program as often as they wanted to (Figure 5.5).

Figure 5.4 Number of times the iPad™ program was viewed in the previous 24 hours ($N = 103$)

Figure 5.5 Number of patients able to view the iPad™ program as often as they wanted to ($N = 103$)

Reasons for not being able to view the program as often as would have liked are presented in Table 5.3, with the majority indicating they felt too tired or too unwell to view the program (24, 41.4%), 11 patients (19.1%) indicated that the iPad™ was not
working properly when they had the chance to watch it due to a flat battery and one patient found the sound was too low, so was difficult to hear. This patient was given a set of headphones that could be plugged into the iPad™ so they could modify the sound without disturbing others. Patients in the four-bed rooms were also given headphones so as not to disturb other patients.

Table 5.3 Reasons patients indicated for not viewing iPad™ Program as often as they wanted (n = 39)

<table>
<thead>
<tr>
<th>Reason stated for not viewing as often as wanted</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too tired (including visitors)</td>
<td>12</td>
<td>20.7</td>
</tr>
<tr>
<td>Too unwell (predominately nausea)</td>
<td>12</td>
<td>20.7</td>
</tr>
<tr>
<td>iPad™ did not work properly when I had the opportunity to watch (battery flat)</td>
<td>11</td>
<td>19.1</td>
</tr>
<tr>
<td>No time (patient) too busy</td>
<td>7</td>
<td>12.1</td>
</tr>
<tr>
<td>Pain too severe</td>
<td>6</td>
<td>10.4</td>
</tr>
<tr>
<td>iPad™ not available when I had the opportunity (not in reach)</td>
<td>4</td>
<td>6.8</td>
</tr>
<tr>
<td>Forgot about watching it</td>
<td>4</td>
<td>6.8</td>
</tr>
<tr>
<td>Didn’t understand the content</td>
<td>2</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Note: Some patients indicated multiple reasons

Acceptability of the intervention was measured using patient satisfaction ratings and net promoter score. The mean score of patients’ overall satisfaction (0 not satisfied – 10 extremely satisfied) with the iPad™ program was high ($M = 8.63$, SD 2.05). When asked how likely it was that they would recommend the MyStay program to a family or friend who was having TKR surgery on a scale from 0 (not likely) to 10 (extremely likely), patients’ reported a mean score of 8.62 (SD 1.74).
All patients \((n = 103)\) had viewed the program each day. Some patients viewed the information about the entire five days on the first day then only viewed what they felt important for subsequent days.

Nine patients indicated it was difficult to use the program, most often stating reasons related to technical issues with the iPad\(^\text{TM}\) itself such as flat battery (Fig 5.6). No problems with navigation of the program on the iPad\(^\text{TM}\) were reported.

**Figure 5.6** Patient reported reasons for difficulty viewing “MyStay” program

### 5.2.3.2 Barriers to implementation

Assessment of the barriers in regard to particular environmental factors that might influence program implementation, was enabled through the researcher observations and conversations with nurses and patients on daily visits to the wards. The factors that had an impact on the implementation and effect of the intervention can be categorised as structural, clinician- and patient–related.
5.2.3.2.1 Structural factors

The physical location of iPads™ presented a problem when trying to ensure that the program was always available for patients when they wanted to access it. Due to physical constraints of space, several options were tested until agreement about the ideal location was reached. Initially the iPads™ were secured to the patients’ bedside trolleys to enable the iPad™ to be moved around if patients decided to sit out of bed, however this caused problems for the food services staff who found it difficult to find room to place patients’ food trays. The decision to move the iPads™ to the patient’s bedside locker was made in consultation with the patients, food services and nursing staff. The cord that tethered the iPad™ to the bedside table was long enough to place the iPad™ on the bed should patients decide to sit out of bed and view the presentations.

On several occasions nurses and other staff (services staff) moved the patients’ iPads™ to the back wall to ‘keep it out of the way’. This then prohibited patients from watching the iPad™ as they could not reach it. On a few occasions, the iPads™ were found on a shelf behind the patient’s bed.

5.2.3.2.2 Clinician related factors

Nurses’ attitudes toward the program was critical to its successful implementation. In week three, during the first period, three patients commented that two nurses had stated they were “sick of these iPads™” and “these iPads™ just get in the way”. These comments can influence patients to question the use of the program and can negatively impact on their confidence to ask nurses questions related to the
program. To address these issues, discussions were held with the nursing staff to determine what strategies might be implemented to overcome these perceptions.

Field notes revealed 17 (16.5%) instances of iPads™ with flat batteries, the majority however, (n=13, 76.4%) were in period one. Reasons for the flat batteries outlined by nursing staff were: “forgot to put on charge”; “no charger available” – “needed the charging plug for another appliance” and “unable to charge” (two iPads™ were ‘missing’ the charging adapter). Throughout the trial period this practice improved with only four instances of flat batteries noted after period one.

5.2.3.2.3 Patient related factors

Difficulties encountered by patients in using the iPad™ by patients included:

- Unable to watch the entire program due to sleepiness/tiredness
- Difficulty remembering to watch the program
- Too unwell to watch due to pain or other complications

Strategies were discussed with each patient, and their nurse, during the daily visit and methods to overcome were agreed. For example the patients who were too tired to watch all of the program were directed to watch only small clips at a time and nurses would remind them to watch more throughout the day. If patients were in pain, they were reminded by nurses to watch the program later in the day. No barriers were identified by patients in relation to the information delivery using the iPad™.

5.3 Discussion

This element of the process evaluation provided evidence that a multimedia intervention delivered via iPad™ that facilitates patient participation in their recovery
after TKR surgery was implemented, was easy for patients to use, had high satisfaction and required minimal time for orientation. The purpose of the analyses presented in this chapter were to evaluate the processes and methods used to implement the MyStay multimedia intervention, recruit and maintain the trial participants before and throughout the trial and determine barriers to successful implementation.

5.3.1 Recruitment and maintenance

The recruitment procedures were successful in the ethical recruitment of eligible patients to the trial. Of the 257 patients invited, 98 percent agreed to participate in the study and 93.7 percent actually participated. The majority of patients were recruited via the preadmission clinic and there was no difference in the proportion of patients recruited via the clinic between the intervention and control groups. This is an important outcome because reception of preadmission education could have been a significant potential confounder in the outcomes of this trial. Maintenance of participants in the study was also high, again indicating that the processes used were successful in retaining participation and also that the intervention was not a burden for participants.

5.3.2 Implementation of the intervention

Collaboration with nurses and patients prior to and during implementation to identify potential barriers to successful implementation of the intervention was essential in order to develop timely strategies to overcome these barriers. If the intervention were poorly applied, it would not be possible to determine whether the outcomes of the trial were associated with the effectiveness (or not) of the intervention itself or the processes used to implement it. Further, the ease with which an
intervention can be implemented has implications for its future translation into everyday practice.

Careful consideration was given to the views of the nurses who were responsible for facilitating this intervention. Several methods were adopted to ensure that nursing staff had the opportunity to discuss concerns and express their opinions about implementing this intervention into their everyday clinical practice. The effects on nursing staff workload, the physical location of the iPad™ and the safety and security of the device were identified as key areas of concern and were addressed in the implementation plan.

The intervention was implemented using a structured standardised approach with boundaries put in place to limit variation (Craig et al., 2013). Consistent implementation processes were used in each ward and involved multiple methods. However, what did emerge in the evaluation was the moderate to low patient reported engagement of nurses with the intervention on Day 3. When patients were asked whether nurses discussed the information in the MyStay program with them, only 22 percent stated that this had occurred. There are several possible explanations for this. Given that this question was asked on Day 3, it is also possible that nurses were satisfied that patients were engaging with the intervention and there had been higher levels of interaction in the previous postoperative days. This was not measured. It is possible that nurses were not engaging with the MyStay program and did not see it as a tool to set goals of care with patients to assist them with their recovery.

The intervention was designed to be delivered in the context of usual care delivery, however nurses were reluctant to perform the initial orientation of the
program with patients because of concerns that instructing patients on the use of the iPads™ and how to navigate the system would be time consuming and would interfere with their patient care. In addition, there was concern that older patients would find the iPad™ difficult and would take even longer to learn how to navigate it. For the purpose of the trial, the nurse researcher applied the MyStay intervention on Day 1. The challenge for future studies is to demonstrate to nurses that these types of interventions will not impact on their workloads (Craig et al., 2013). In fact, the time needed to explain the program was very brief and could easily be incorporated into every day clinical practice.

Embedding interventions into clinical practice has been reported to be challenging, particularly in the acute care setting, where work is often fast paced and nurses are caring for acutely ill patients after surgery (Foster & Delitto, 2011). Factors that impact nurses’ potential engagement with patients include the limited time available to spend with each patient due to the nature of their work (multiple tasks, multi-tasking, interruptions, demanding tasks, priorities of care). Variability in patients’ response to surgery and the acuity of the patients in the postoperative context also means that some patients are allocated more time than others (Blackman et al., 2015).

Implementation of the intervention in this study required nurses to facilitate interactions between themselves, the multimedia program and patients in order to create opportunities for patients to discuss their goals of recovery and negotiate pain management. This element required a patient-centred approach (Bolster & Manias, 2010; Jangland, Carlsson, Lundgren, & Gunningberg, 2012; Taylor & Rutherford, 2010) that is difficult to achieve in practice when nurses perceive their workload is high.
Several studies have reported that nurses actually spend only a small amount of time with each patient (McTier et al., 2013, 2014, 2015; Westbrook, Duffield, Li, & Creswick, 2011). In a study by Westbrook, nurses spent around 37 percent of their time involved in direct patient care. Similarly, McTier (2014) found that nurses spent on average, only two minutes out of a two hour period with a patient (post cardiac surgery) when discussing one treatment goal of care.

5.3.3 Usability and acceptability

As with any new technology designed for patients in the clinical setting, ease of use is a primary design consideration. Usability was determined by the ease in which patients used the intervention, the frequency of engaging with it and the circumstances that prevented its use and was measured using patient reported methods (questionnaire and interviews). Acceptability was assessed by the extent to which patients were satisfied with the intervention and how likely they would recommend the intervention to family or friends.

Usability

Most patients reported that they were able to view the program as often as they liked without restriction. These findings are consistent with those of other studies that have evaluated the implementation of a multimedia intervention in acute care (Cook et al., 2014; O’Leary, Lohman, et al., 2015). Patients also successfully navigated the program independently, and all 103 patients interacted with the program at least once a day. However, the patients’ acuity did limit their level of interaction.

When patients felt tired or experienced symptoms such as nausea or pain, their ability to engage with the program was affected however because the program was
available 24 hours a day for the duration of their stay, patients could access the program when it suited them. In previous studies where patients had limited access to interventions, usability was compromised (Cook et al., 2013). A study by Chu (2008) reported 71 percent of patient time in hospital was considered ‘down time’, that is, patients were not occupied with diagnostic tests or other activities. This suggests there is ample opportunity for patients to engage with an intervention program throughout the day if there is flexibility in availability; in addition patients’ families can also view these programs during their visits to help to reinforce the goals of recovery.

The nature of the MyStay multimedia intervention delivered via chapters or modules, which included brief summaries or animation, facilitated brief interactions as the time needed to watch a specific aspect of the daily activities was minimal. The MyStay intervention was not burdensome for patients and given the continuous availability, potential barriers such as the fast paced environment and patient acuity were overcome.

Reasons stated by patients for not interacting with the MyStay program were predominately related to the acuity of their illness rather than the program itself, suggesting that usability was not a problem. The major barriers from the patients’ perspectives were tiredness and nausea (42%) and these findings are consistent with those of (Cook et al., 2014) who also found associations with patients’ health status and engagement with a multimedia intervention in their study.

Nurses’ concerns that older age may hinder patients’ ability to use the iPad™ technology was not identified as a limiting factor in this study. Only two of the 103 patients stated that being ‘computer illiterate’ was for them, the reason why the
program was not easy to use, and none of the enrolled patients withdrew from the trial. Therefore, age was not identified as factor impacting usability. Indeed, one patient who was 95 years of age found the iPad™ so useable that he indicated he would purchase one when he was discharged. Our findings are similar to those of Cook et al. (2014) who found that patients can in fact interact with a multimedia device, regardless of age. In Cook’s et al (2014) study, the mean age of patients was 68 years. Measurement of the ease of use of the MyStay on Day 3 found 91 percent of patients reported it easy to use; reasons for the nine patients that indicated difficulty included flat battery, lack of concentration due to health, or the sound was poor. The majority of these factors were rectified during the trial.

Creating an opportunity for patient participation, without placing an additional burden on clinicians and patients in this context was considered critical because implementing a shared tool, where it is not possible to ensure that the tool will be engaged with by all concerned, has the risk of adding to the burden of care rather than facilitating it. The risk is however that patient expectations are raised and if not fulfilled, can reduce patients’ satisfaction with the care they receive. The MyStay intervention was designed to be easily navigated by patients and nurses in the acute care environment. Time spent by the researcher orientating patients to the technology was approximately five to ten minutes initially, then two to five minutes per day with individual patients. It is concluded therefore that the MyStay intervention can be incorporated into every day routine care, despite the acuity of the environment, and the time required for nurses to allocate in applying (not facilitating) the program is low and feasible.
The *MyStay* program provides patients with an alternative to complement information related to their recovery that is usually highly reliant on nurses and often limited to ‘what is important now’ rather than what the patient wants to know.

**Acceptability**

Acceptability is the willingness of a user to use a technology for the purpose it was designed to support (Dillon, 2001). Patients’ reported satisfaction with the intervention was high, as reflected in a mean score of 8.63 (SD 2.05) out of 10. A similarly high mean score of 8.62 (SD 1.74) on the net promoter, indicated the majority would recommend the intervention to a family or friend who was contemplating TKR surgery. These findings are consistent with those of other studies that have implemented multimedia interventions for patients in hospital (Greysen et al., 2014; O’Leary, Lohman, et al., 2015; Vardoulakis et al., 2012). For example Greysen (2014) reported that patients were highly satisfied with the use of tablets to undertake health education modules and access their personal health record.

**5.4 Conclusions**

It can be concluded that use, acceptability and feasibility of the *MyStay* multimedia program was high from patients’ perspective although it was difficult to assess the level of engagement by clinicians with the program in terms of facilitation. This was a limitation of the design of the study that relied on observation of one-point of nurse-patient interactions on Day 3. Data of nurses’ engagement with patients was derived from patients’ reports on the third day and this may not have been sensitive to other less tangible engagement throughout patients’ recovery, however, it does indicate an important area for consideration about patients’ perceptions of nurses’ engagement.
and the need to make this more explicit. The findings do demonstrate that the implementation of the multimedia intervention was robust and structured and successful in terms of patient participant recruitment and application. Further, the findings indicate that a multimedia program designed as a platform to promote patient participation within acute care environments that can present challenges to engagement, is feasible and is associated with high patient satisfaction.

The findings in relation to the second part of this process evaluation that sought to uncover the relationships between the intervention and the observed outcomes are presented in the following chapter.
Chapter 6

Process Evaluation: Capability and Opportunity for Participation

In this chapter, the research findings related to the second aim of the process evaluation are presented and discussed. The second aim of the process evaluation was to explore whether the intervention provided patients with both the capability and opportunity to participate in care related to their goals of recovery.

The objectives were to:

- Analyse differences in knowledge regarding the goals of recovery after TKR between intervention and control group patients;
- Analyse patient-reported personal and clinician behaviours that may have impacted on opportunity for participation in postoperative care;
- Measure differences in activation (PAM) between intervention and control group patients.

6.1 Methods

The full description of the methods and tools used for the process evaluation are presented in Chapter 3. The methods and specific analyses for this phase of the evaluation are summarised in Table 6.1.
Table 6.1 Concepts measured, methods used and analysis of the process evaluation

<table>
<thead>
<tr>
<th>Concept measured</th>
<th>Methods used</th>
<th>Data analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of goals, participation in, barriers and facilitators to participating in recovery after TKR</td>
<td>Semi-structured interviews Day 3 (all patients)</td>
<td>Quantitative content analysis (knowledge and participation level) and qualitative thematic (barriers and facilitators) analysis (see Chapter 3, section 3.3.2.1 and 3.3.2.2)</td>
</tr>
<tr>
<td>Pain assessment and analgesic management of pain.</td>
<td>Medical record audit Day 3 (all patients) of documented assessments, analgesics prescribed and administered in 24 hours prior to primary outcome assessment - pain intensity score.</td>
<td>Descriptive statistical analysis: analogous methods for binary and categorical data. Statistical comparison of means (parametric) for independent samples.</td>
</tr>
<tr>
<td>Patient activation and control preference</td>
<td>Patient self-reported questionnaire Day 3 and follow up (all patients)</td>
<td>Descriptive statistical analysis: analogous methods for binary and categorical data. Statistical comparison of means (parametric) for independent samples.</td>
</tr>
<tr>
<td></td>
<td>• Activation (PAM)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Preference for participation (CPS)</td>
<td></td>
</tr>
</tbody>
</table>

Semi structured interviews Day 3

On Day 3 after TKR surgery all participant patients were interviewed using a semi-structured interview guide (Appendix 5). The interviews were audio recorded for later transcription. Written notes complemented the transcriptions.

Interviewing all patients (intervention and control) enrolled in this study allowed for comparison between groups to determine the impact of the intervention on patients’ knowledge about their goals of recovery and level of participation experienced. The interviews were also critical to understanding the barriers and facilitators of participation in the context of acute postoperative recovery from the perspective of patients; in other words, to explore the opportunity patients had to participate in their care. The semi structured interviews focused on uncovering descriptions to assist in
explaining the outcomes of the trial but also to inform the design of future replication studies.

In total, 230 (95%) patients were interviewed between March 2014 and July 2015 on Day 3 following TKR surgery; 133 (98%) were in the control group and 97 (94%) were in the intervention group.

Eleven patients were not able to be interviewed due to the following factors:

- Too unwell (either stated by patient or nurses) \( (n=5) \)
- Not available (off ward having procedures/in ICU/discharged early) \( (n=3) \)
- Declined to be interviewed (no reason specified) \( (n=3) \).

Interview duration ranged between 12 minutes and 75 minutes. The majority of the interviews were conducted between 0900 to 1400 hours at patients' bedside; five interviews were conducted later on Day 3 (after 1700hrs) at the patient's request.

Analysis of the interview transcripts for the purpose of determining differences in knowledge of recovery goals was performed using quantitative content analysis. The development, validation and reliability of the structured coding scheme applied to the data were described in detail in Chapter 3, section 3.3.2.1. The interviews elicited information about patients' self-reported knowledge and participation in four key areas: 1) pain management, 2) knee exercises, 3) mobility, and 4) daily goals of recovery.

In order to analyse patient-reported personal and clinician behaviours that may have impacted on capability and opportunity for participation in postoperative care,
transcripts were analysed using the established techniques of thematic and content analysis see Chapter 3, section 3.3.2.2 for a full description.

**Questionnaires Day 3**

Immediately following the interview, patients were asked to complete a self-reported paper-based questionnaire to elicit information related to pain intensity (NRS), pain quality and interference of pain on activities of daily living (APSOQ-R), patient activation (PAM) and control preference (CPS). Patients in the intervention cluster were also given a self-report questionnaire related specifically to the intervention (Appendix 11). The data presented in this chapter from the Day 3 patient-reported questionnaire relate only to the PAM and CPS. Other data have been reported in Chapters four and five.

**Medical record audit**

In addition to the interview and questionnaires, data related to the pain management that patients received were collected from their medical records. Data extracted from the medication chart included the type, dose and frequency of all analgesic, and adjuvant medications prescribed at regular intervals (fixed) and/or PRN (*Pro re nata*, as required) and administered in the 24 hour period prior to the interview, providing a treatment summary that could be linked to worse pain intensity over the past 24 hours, the primary outcome measure for the RCT.

In order to capture all treatments of pain in the previous 24-hour period, patients’ notes were audited for any pain related documentation including documentation of patient reports of pain and observations of pain documented by clinicians. The audit captured pain intensity recorded on any chart (including
observation charts; rounding charts; neurovascular charts, clinician notes); the frequency of pain documentation and the lowest and highest recorded pain intensity scores in the time period. The exact wording used in the notes was recorded along with the discipline of who documented the note (i.e. doctor; nurse; allied health).

### 6.2 Knowledge and Participation in Relation to TKR Goals of Recovery

The semi-structured interview transcripts were coded as either passive, active or inconsistent in terms of each patient’s self-reported level of knowledge and participation in each of the four goals of recovery. A structured coding scheme, derived from the conceptual framework presented in Chapter two, was used to guide content analysis to capture capability, opportunity and activation (see Table 6.3). A further category of ‘Cannot infer’ was added for when the transcribed data were too ambiguous to make a final decision on the level of participation. For further detailed information related to the coding strategy and coding criteria please refer to Chapter 3, section 3.3.2.1 and Tables 6.3 to 6.9.

#### 6.2.1 Knowledge and participation in pain management strategies

The participation ratings for patients in the intervention and control groups, and patients overall are reported in Table 6.2. Overall 46.1 percent (n = 106) of patients were rated as active in the pain management strategies they reported. There was a significant difference in the number of ‘active’ patients in the intervention group (61.4%, n = 62) compared to the control group (34.1%, n = 44), (χ² (2, N = 226) 20.53, p = <0.001).

Patients were considered active in terms of their knowledge and participation of pain management if they could state the aim of achieving pain intensity scores less than
4/10, name their prescribed analgesic medications to manage breakthrough pain (typically oral Endone), describe the importance of adequate pain relief in order to attain goals of recovery and/or inform clinicians of pain that interfered with achieving mobility and exercise goals. Table 6.3 provides a description of the coding framework and illustrative quotes that support the findings.

<table>
<thead>
<tr>
<th>Rating of participation in pain management</th>
<th>Intervention Group</th>
<th>Control Group</th>
<th>All patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Active</td>
<td>62</td>
<td>61.4</td>
<td>44</td>
</tr>
<tr>
<td>Passive</td>
<td>15</td>
<td>14.9</td>
<td>49</td>
</tr>
<tr>
<td>Inconsistent</td>
<td>22</td>
<td>21.8</td>
<td>34</td>
</tr>
<tr>
<td>Cannot Infer</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

*Note the tests of association excluded the ‘cannot infer’ category.
### Table 6.3 Structured coding scheme for Goal 1: participation in pain management

<table>
<thead>
<tr>
<th>Category</th>
<th>Description - Behaviours</th>
<th>Coding</th>
<th>Illustrative Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient able to articulate that pain intensity scores should be less than 4/10 NRS</td>
<td>States pain intensity score should be &lt;4</td>
<td>Active</td>
<td>“My pain level should be round about three to four; sort of thing. I’ve had to ask on some occasions for pain relief... if I’ve got pain before I go for a walk, you know, I won’t go. I’ll ask for pain relief and then go and do it” (ID 238, intervention)</td>
</tr>
<tr>
<td></td>
<td>Did not offer pain intensity score</td>
<td>Passive</td>
<td>“I mean if I knew what my pain [intensity] should be, I would have got onto things quicker...the nurses’ never tell you anything. I think you should explain the pain rating score thing at the start so you know what you should say to the nurses about your pain” (ID 85, control)</td>
</tr>
<tr>
<td>Patient articulated necessity of managing pain in order to meet recovery goals</td>
<td>Patient linked adequate pain management with goals of recovery; Demonstrated knowledge of pain medications</td>
<td>Active</td>
<td>“Well I just making sure that I’ve had some Panadol or Endone, half an hour before, I’m trying to time my exercises for half an hour after I’ve had the Panadol at least” (ID 181, intervention)</td>
</tr>
<tr>
<td></td>
<td>Patients stated they were restricted from performing activities due to pain</td>
<td>Passive</td>
<td>“When the pain is bad...I just stop the exercises really. I tell the nurses and they give me tablets ...I don’t really know what my pain should be [told it should be &lt;3 or 4] oh well it’s not that low...I guess it’s a bit higher than that, I guess I have a higher pain level than perhaps some others” (ID, 134, control)</td>
</tr>
<tr>
<td>Patient articulated engagement with pain management strategies</td>
<td>Able to articulate analgesic medications and non-analgesic management of pain; Evidence of pain self-monitoring; Negotiation of strategies for pain management; Has permission to request assistance</td>
<td>Active</td>
<td>“I did ask the nursing staff to give me an extra Endone tablet when it [pain intensity] started to go up, because I should be controlling the pain, you know keeping my pain under control. So they [nurses] did when I asked, they gave me another pain tablet” (ID 234, intervention)</td>
</tr>
<tr>
<td></td>
<td>Did not offer any knowledge about analgesics or non-analgesics; Waited for assistance; Not aware of specific analgesia</td>
<td>Passive</td>
<td>“When I had pain I just waited for the nurses to come in and I said it's very sore, they [nurses] asked me what number out of 10 and I said it was eight, they went away and came back with some tablets and that was that” (ID 15, control)</td>
</tr>
<tr>
<td>Informs clinician about pain intensity when pain interfered with goals of recovery</td>
<td>Initiated alert to manage pain; Questioned clinicians and voiced opinion; Negotiated strategies for pain management</td>
<td>Active</td>
<td>“I buzz [call for] the nurses and ask for more pain relief, I’m not going to just sit there with pain, I will ask. They [nurses] are trying everything, I don’t want the morphine because it makes me sleepy but I know I need it to recover” (ID 88, intervention)</td>
</tr>
<tr>
<td></td>
<td>Waited; Did not tell anyone about pain</td>
<td>Passive</td>
<td>“I waited a bit to see if it [the pain] would go away, I guess it was more than eight by the time I saw the nurse. I mean she [nurse] came in and asked if I was in pain and I said yes I am. I just waited to see if it [the pain] would go away and it didn’t. When she [the nurse] came in to see me about something else, I think it was my blood pressure, I told her [nurse] then I had pain and she went away and came back with tablets. They worked after a while but took a bit to get under control” (ID 19, control)</td>
</tr>
</tbody>
</table>
6.2.2 Participation in knee exercises

The aim for all patients after TKR is to perform six specific knee exercises four times a day, commencing on the day of surgery and continuing until discharge. In terms of awareness of the need to carry out knee exercises and their importance in relation to recovery, there was no significant difference between groups ($\chi^2 (2, N = 226) = 4.60, p = 0.10$). While the intervention group were slightly more active (50.5%, $n = 51$) than the control group (37.2%, $n = 48$), the proportion of patients whose responses were inconsistent was similar in both groups (Table 6.4). Most patients in both groups reported their awareness of specific knee exercises as the physiotherapist had visited them to provide explanation. In addition, all patients had a poster on the wall displaying the exercises required.

In both groups, content analysis showed most patients understood the importance of the exercises to their overall recovery. Patients were considered active in terms of their knowledge and participation in exercises if they could state they were able to perform all six exercises four times a day, describe the importance of exercises in order to attain goals of recovery and/or inform clinicians of the need to perform the exercises or to overcome difficulties that interfered with achieving exercise goals (Table 6.5).

<table>
<thead>
<tr>
<th>Participation knee exercises</th>
<th>Interventio n Group</th>
<th>Control Group</th>
<th>All patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Active</td>
<td>51</td>
<td>50.5</td>
<td>48</td>
</tr>
<tr>
<td>Passive</td>
<td>24</td>
<td>23.8</td>
<td>45</td>
</tr>
<tr>
<td>Inconsistent</td>
<td>26</td>
<td>25.7</td>
<td>32</td>
</tr>
<tr>
<td>Cannot Infer</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

*Note the tests of association excluded the ‘cannot infer’ category.
Table 6.5 Structured coding scheme for Goal 2: participation in exercises

<table>
<thead>
<tr>
<th>Category</th>
<th>Description - Behaviours</th>
<th>Coding</th>
<th>Illustrative Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient stated they had performed all six exercises at least four times per day</td>
<td>Able to name all six exercises and stated they needed to be performed four times a day</td>
<td>Active</td>
<td>&quot;Well by initiating the exercises myself and getting them done, making sure the pain relief was up and um just feeling positive. Good, I’m doing them all six, I actually feel like I’ve make and improvement. The straight leg raise that’s the one I wanted to concur, that leg has the sore thigh that’s made it hard but I’m doing them all four time at least. If I need help with the towel and I get whoever is in here really to help. The nurse or visitor whoever” (ID 70, intervention)</td>
</tr>
<tr>
<td></td>
<td>Not able to articulate all 6 exercises or timing</td>
<td>Passive</td>
<td>“I don’t really know what I’m supposed to be aiming for but I try.”(ID 49, control)</td>
</tr>
<tr>
<td>Patient articulates necessity of performing exercises in order to meet recovery goals</td>
<td>Patient able to link exercises to goal of recovery; Knowledge of exercises; Confidence in performing exercises; expressed sense of independence</td>
<td>Active</td>
<td>“I’ve been doing the six exercises and getting myself up as much as I can. It’s important to do as much as you can for yourself really. It’s your knee isn’t it, I mean, if you want it to get better you have to do the recovery and the rehabilitation of the knee to get better, you just have to do it” (ID 128, intervention)</td>
</tr>
<tr>
<td></td>
<td>Patient restricted in performing exercises; Did not link to recovery; Waited rather than initiated exercises; Stopped exercising due to pain; Did not interact with clinicians</td>
<td>Passive</td>
<td>“I was sore and wanted to do the exercises but I couldn’t have anything so I just waited...The pain settled down a bit and I started to try the exercises again” (ID 136, control)</td>
</tr>
<tr>
<td>Patient articulates engagement with strategies to ensure exercises can be completed</td>
<td>Can performs all exercises and seeks assistance if required; Negotiates ways to perform strategies; Permission to request assistance is evident; Demonstrates confidence</td>
<td>Active</td>
<td>“I just make sure that I’ve had some Panadol half an hour before [I exercise], trying to time my exercises for half an hour after I’ve had the Panadol” (ID 181, intervention)</td>
</tr>
<tr>
<td></td>
<td>Does not complete exercises; Does not seek assistance; Waited until pain improved before exercising</td>
<td>Passive</td>
<td>“It’s really sore [doing the exercise], it hurts a lot to do the leg raise...I just stop doing them [exercises] so much. I just do them to what I can until it hurts” (ID 35, control)</td>
</tr>
<tr>
<td>Informs clinician about the need for assistance with exercises</td>
<td>Initiated or seeks assistance; Alerted clinicians for assistance; Able to articulate specific strategies to overcome barriers; Negotiated strategies to perform exercises; Facilitated interaction with clinicians</td>
<td>Active</td>
<td>“I’m trying them all, the last few [exercises] are hard like straight leg raising. I’m finding I can’t bend the knee very well, I’m looking at the iPadTM and trying to get the knee like that. If find it’s easier out in the chair. When the physiotherapist comes in, he helps me bend a bit more, but I’m just trying by myself especially when I’m out in the chair or I will ask the nurse she helps too” (ID 33, intervention)</td>
</tr>
<tr>
<td></td>
<td>Did not ask for assistance or initiate any action</td>
<td>Passive</td>
<td>“I haven’t seen the physio to ask them for help over the weekend and the nurses don’t seem to know much about the exercises, so I don’t do them really very much at all” (ID 43, control)</td>
</tr>
</tbody>
</table>
6.2.3 Participation in mobility

Mobility is an important factor in recovery after TKR surgery and over half of the patients (56.1%, $n = 129$) were active in this area overall. However, a significantly higher proportion of patients in the intervention group were active (71.3%, $n = 72$) compared to the control group (44.2%, $n = 57$) (Table 6.6) ($\chi^2 (2, N = 229) = 17.79, p < 0.001$). Patients in the intervention group more frequently reported independence and performance of mobilisation activities on Day 3 than patients in the control group.

<table>
<thead>
<tr>
<th>Participation in mobility</th>
<th>Intervention Group</th>
<th>Control Group</th>
<th>All patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Active</td>
<td>72</td>
<td>71.3</td>
<td>57</td>
</tr>
<tr>
<td>Passive</td>
<td>13</td>
<td>12.9</td>
<td>31</td>
</tr>
<tr>
<td>Inconsistent</td>
<td>15</td>
<td>14.9</td>
<td>43</td>
</tr>
<tr>
<td>Cannot Infer</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

* Note the tests of association excluded the ‘cannot infer’ category.

Patients were considered active in terms of their knowledge and participation in mobility if they could state they were walking with or without an aide, they could describe the importance of mobility in order to attain goals of recovery, and/or inform clinicians of the need to mobilise or to overcome difficulties that interfered with achieving mobility goals (Table 6.7).
**Table 6.7 Structured coding scheme for Goal 3: participation in mobility**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description – Behaviours</th>
<th>Coding</th>
<th>Illustrative Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient stated they are walking with or without aide</td>
<td>Patient articulated the amount (distance) they are walking and aid used</td>
<td>Active</td>
<td>“I’m walking with the crutches. I get in and out of bed up to the toilet by myself and get around the room no problems. If the water is over there I will get the crutches and shuffle around there and get it. I went down and got a coffee at Hudson’s [café] today and came back with it - that was good to get out” (ID 108, intervention)</td>
</tr>
<tr>
<td>No not yet mobilising/walking</td>
<td>Patient articulated the amount (distance) they are walking and aid used</td>
<td>Passive</td>
<td>“I thought I’d be walking quite well by now, limping but walking. So apart from a little walk to and from the bathroom the other day, I haven’t really been walking at all. I don’t think anyone has really told me whether I can walk or not or if I should be walking a bit more. I guess I’m a bit confused about that but I didn’t want to ask as I’m sure they will tell me in due course” (ID 78, control)</td>
</tr>
<tr>
<td>Patient articulates mobility/walking is necessary in order to meet goals of recovery</td>
<td>Walls with or without assistance; Independence in mobilising; Links walking and being mobile to recovery</td>
<td>Active</td>
<td>“I’ve been doing the exercises and getting myself up walking as much as I can. It’s important to do as much as you can for yourself really. It’s your knee isn’t it, I mean if you want it to get better you have to do the recovery and the rehabilitation of the knee to get better so you just have to do it” (ID 128, intervention)</td>
</tr>
<tr>
<td>Restricted when walking; Does not walk with or without aide; unsure about mobilising; lacks confidence</td>
<td>Patient articulates mobility/walking is necessary in order to meet goals of recovery</td>
<td>Passive</td>
<td>“I am walking, but I don’t know if I’m putting enough weight on it [knee]. I’m not sure if I should be putting more [weight]. I haven’t talked to anyone about that”. (ID 13, control)</td>
</tr>
<tr>
<td>Patient articulates engagement with strategies to improve mobility</td>
<td>Patient articulates strategies to improve their mobility; Demonstrates confidence; Seeks assistance for mobility; Evidence of initiating interactions with clinicians for mobility</td>
<td>Active</td>
<td>“I’m walking with the crutches today, so that’s terrific. I feel like I’m ticking off those goals. I walk further with the walker frame but I feel confident with the crutches now. I’m going around the ward with the frame, today I just went to the end and back with the crutches they [physiotherapists] said not to go on my own, to use the frame if I do. I ask [physiotherapists] when I need help, they are terrific” (ID 138, intervention)</td>
</tr>
<tr>
<td>Does not offer any strategies for mobilising; Unsure about mobilising; Lacks confidence initiating mobility; No strategies to address barriers provided</td>
<td>Patient articulates engagement with strategies to improve mobility</td>
<td>Passive</td>
<td>“I walked with the frame with the physio today, I walked but it’s very sore. I screamed at the physio when they tried to bend my knee it was so sore. They just stopped [bending it] and told me I will need to do them, but I might need pain killers first” (ID 38, Control)</td>
</tr>
<tr>
<td>Informs clinician about the need for mobility</td>
<td>Initiated alert to clinician in order to mobilise; Request permission</td>
<td>Active</td>
<td>“I could possibly put a bit more into it if I knew when they [physiotherapists] were coming. I could then take the ‘pain killers’ half an hour before to get the most out of the session. But you ask and no one tells you when they [physiotherapists] are coming the nurses just say oh they will be around when they are in” (ID 50, intervention)</td>
</tr>
<tr>
<td>Did not disclose information about mobility when asked; Lacks confidence in mobilising; No initiation of interaction with clinicians to mobilise</td>
<td>Informs clinician about the need for mobility</td>
<td>Passive</td>
<td>“Well I was worried if I do something, it’s going to crack and there will be metal bits sticking out somewhere. Well once you get over that then you can get moving. But I did ask the physio and she said it was really hard to do the wrong thing and the surgeon said if you kneel or twist it that way then you might do some damage, so I guess I need to know what I can’t do. I think being in the room on my own has made it really comfortable. Because I can move around as much as I like” (ID 56, control)</td>
</tr>
</tbody>
</table>
6.2.4 Participation in daily goals of recovery

Patients were asked if they understood their daily goals to achieve recovery while in acute care. These goals represented the composite of goals and included sitting out of bed for meals, mobility, knee exercises and specific exercises to reduce the risk of complications such as deep venous thrombosis (DVT) or pneumonia. There was a clear distinction between the intervention and control groups in terms of the specificity of their knowledge about recovery goals over all. Patients were considered active if they demonstrated they were aware of all their goals and they initiated any actions to overcome barriers in order to achieve these goals.

Nearly half the patients in the intervention group \((n = 50, 49.5\%)\), but only 26.4 percent \((n = 34)\) of the control group, reported knowledge and participation in achieving their goals of recovery (Table 6.8) \(\chi^2(2, N = 211) = 14.96, p < 0.001\).

Participants in the intervention group linked the MyStay multimedia program to their level of knowledge about the goals of recovery.

<table>
<thead>
<tr>
<th>Participation in goals of recovery</th>
<th>Intervention Group ((n = 101))</th>
<th>Control Group ((n = 129))</th>
<th>All patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>N = 50, 49.5%</td>
<td>N = 34, 26.4%</td>
<td>N = 84, 36.5%</td>
</tr>
<tr>
<td>Passive</td>
<td>N = 17, 16.8%</td>
<td>N = 45, 34.9%</td>
<td>N = 62, 27.0%</td>
</tr>
<tr>
<td>Inconsistent</td>
<td>N = 32, 31.7%</td>
<td>N = 33, 25.6%</td>
<td>N = 65, 28.3%</td>
</tr>
<tr>
<td>Cannot Infer</td>
<td>N = 2, 2%</td>
<td>N = 17, 13.2%</td>
<td>N = 19, 8.3%</td>
</tr>
</tbody>
</table>

* Note the tests of association excluded the ‘cannot infer’ category.
### Table 6.9 Structured coding scheme for Goal 4: participating in daily goals necessary for recovery

<table>
<thead>
<tr>
<th>Category</th>
<th>Description – Behaviours</th>
<th>Coding</th>
<th>Illustrative Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient able to articulate one method to prevent complications</td>
<td>Can name at least one strategy to reduce complications; (e.g. sit out of bed, deep breathing and coughing, ankle exercises, TED stockings)</td>
<td>Active</td>
<td>“Yesterday I was sitting in the chair for about two hours and I bent the knee probably to about 80 degrees and I looked at the iPad™. I’ve only looked at each day I’m up too and I’m doing everything and probably more than that” (ID 110, intervention)</td>
</tr>
<tr>
<td></td>
<td>Not able to articulate any goal; No evidence of understanding of goals of recovery</td>
<td>Passive</td>
<td>“No I don’t really know my goals. No one discussed them with me, I just do what I’m told. I guess I’m going okay” (ID 39, control)</td>
</tr>
<tr>
<td>Patient articulates the need to achieve goals in order to recover</td>
<td>Patient aware of the need to achieve goals; Confidence in goals; Independence in goals</td>
<td>Active</td>
<td>“I’m doing my exercises, walking around and sitting out of bed bending the knee as much as I can, doing what I can you know making sure the pain is okay too, I don’t want a clot” (ID 127, intervention)</td>
</tr>
<tr>
<td></td>
<td>Does not offer any strategies to prevent complications</td>
<td>Passive</td>
<td>“That’s another think I have been struggling with, I’ve been in bed until now, and it has been awful eating in bed. I would have liked to have been out of bed to eat, you see I get indigestion and eating in bed makes it worse. I didn’t think I could [sit out of bed] the first few days, they never said anything about that, but I guess it would have been too sore anyway” (ID 3, control)</td>
</tr>
<tr>
<td>Patient articulates engagement with strategies to achieve the goal to prevent complications</td>
<td>Discusses strategies to achieve tone or more goals; Negotiates strategies; Facilitates interaction with clinicians</td>
<td>Active</td>
<td>“I did sit in the chair and got out for a walk with the walking frame. Even though I didn’t reach all the goals [yesterday], I feel like I’m reaching them now. I ask the nurse to help me sit out for my meals” (ID 25, intervention)</td>
</tr>
<tr>
<td></td>
<td>Does not articulate any strategies to achieve goals; No confidence or opportunity to engage</td>
<td>Passive</td>
<td>“I sit in bed [for meals] but I want to get out. I guess they will get me out when I should be” (ID 4, control)</td>
</tr>
<tr>
<td>Informs clinicians about necessity to achieve the goal</td>
<td>Initiated alerts to clinicians e.g. Sit out of bed; Negotiated strategies; Questioned staff; Facilitated interaction</td>
<td>Active</td>
<td>“I sit out in the chair for my meals, like it says on the [MyStay] program. I do the exercises, walk around and sit out, oh I do the breathing exercises too every day and ankle pumps I do them all the time, I know what I need to do and I’m doing it” (ID 71, Intervention)</td>
</tr>
<tr>
<td></td>
<td>Did not tell anyone about not meeting goal; Lacks confidence</td>
<td>Passive</td>
<td>“I sit in bed which I don’t like but it’s been hard to get out. Maybe today I can sit out of bed now I can get out. I haven’t troubled the nurse to help me, it’s just been too painful to get out by myself” (ID 15, control)</td>
</tr>
</tbody>
</table>
6.2.5 Summary

The findings from the analyses of the interview data reveal intervention group patients were significantly more active than control group patients in three key goals of recovery: pain management, mobility and meeting daily goals of care. Evidence provided in the interview transcripts about behaviours such as questioning, initiating actions, negotiating strategies, and self-monitoring by intervention group patients support these findings. In addition, behaviours to negotiate strategies to overcome barriers, and alert nursing staff of pain intensity and interference with performing recovery exercises were more common among the intervention group patients.

There was evidence that some patients attributed their achievement of goals to the facilitated multimedia intervention. Intervention group patients reported more confidence and knowledge to initiate actions to overcome barriers to meeting goals of care, for example symptoms such as pain intensity.

6.3 Analysis of Facilitated Opportunities for Patient Participation

The facilitated component of the MyStay intervention was designed to provide opportunities for patients to engage with their nurses about daily goals and plans of care for each day of recovery after TKR surgery and in particular, provide an opening for patients to discuss their pain management.

Although direct observation of patient-nurse interactions was not possible, evaluation of facilitated opportunities for patient participation was achieved through the analysis of pain assessment and treatment and outcomes through the audit of patients’ medical records and qualitative analysis of patient reported barriers and facilitators in achieving their goals of recovery.
Patients’ medical records were audited on Day 3 to capture all documentation related to pain during the 24 hour period prior to the Day 3 patient interviews which was the data collection point for the primary endpoint of pain intensity. These data provide insights into the processes of care associated with the assessment and management of patients’ pain following TKR surgery. There are also insights into the way pain is assessed and managed by clinicians and patient roles in pain management.

6.3.1 Pain assessment and management

The primary outcome of the cluster randomised crossover trial was a predicted difference in pain intensity scores between the intervention and control group patients Day 3 after surgery. The process evaluation was designed to determine whether differences (or not) in the predicted outcome could be attributed to the MyStay intervention (i.e. that patients were requesting and receiving analgesics appropriate to their needs) or the adequacy of available pain management.

6.3.1.1 Pain assessment

Assessment of patients’ pain following TKR surgery is fundamental to their treatment. Nurses need to involve patients in pain assessment in order to determine the level and nature of pain, treat pain appropriately and evaluate the outcomes of pain treatment. Documentation of pain assessments in patients’ medical records is an important routine task required of all clinicians directly involved in patient care.

The objectives of the analyses of documented pain assessments were to:

1. Determine any differences in the frequency and nature of pain assessment documentation between the control and intervention group patients, and
2. Determine the agreement between pain intensity assessments documented in patient records with pain intensity assessments derived through patient interviews.
6.3.1.1.1 Frequency of pain score documentation in medical records

The organisation in which data were collected had implemented hourly rounding that includes questioning about pain as a component of the rounding procedure. Almost all patients ($n = 240, 99.6\%$) had a pain score documented at least once in their care records in the 24 hour period examined. Pain assessments were documented in a patient’s care record on average 9.69 (SD 6.16) times in 24 hours (Figure 6.1); this was similar across both the intervention and control groups (intervention group $M = 9.09$, SD 5.89 and control group $M = 10.15$, SD 6.34) ($t (239) = -1.33, p = 0.184$).

One patient (0.4%) did not have any pain scores documented in the medical records for the entire 24 hour period. This patient was in the intervention group.

![Figure 6.1](image.png)

**Figure 6.1** Mean frequency of pain score documentation in 24 hours

6.3.1.1.2 Documentation of pain scores assessed ‘at rest’

Of the documented pain scores, 98.8 percent ($n = 238$) were documented to have been assessed ‘at rest’ (Intervention $n = 101$, 97.1% and control $n = 137$, 100%: ($\chi^2_{(1)} = 1.32, N = 241, p = 0.432$).
The mean frequency of ‘at rest’ pain scores documented in the 24 hour period was similar for the intervention ($M = 8.10$, SD $5.536$) and control groups ($M = 9.37$, SD $6.052$) ($t(239) = -1.68$, $p = 0.116$).

The frequency of documented pain scores that were less than 4 was similar across intervention ($M = 5.65$, SD $5.004$) and control groups ($M = 6.99$, SD $5.446$) ($t(239) = -1.95$, $p = 0.189$).

6.3.1.1.3 Documentation of pain scores assessed ‘on movement’

Less than half ($n = 111$, 46.1%) of the pain scores were documented as being assessed on movement and this was similar for both intervention ($n = 52$, 50%) and control groups ($59$, 43.1%) ($\chi^2; (1; N = 241) = 1.14$, $p = 0.174$).

Half ($n = 52$, 50%) of the intervention group did not have any pain scores on movement documented; of the 50 percent who did, 26.9 percent ($n = 28$) had this score documented only once, and 14.4 percent ($n = 15$) had a pain score on movement documented twice in the 24 hour period. Similarly, in the control group, 56.9 percent ($n = 78$) did not have pain scores on movement documented and 21.9 percent ($n = 30$) had this documented once in the previous 24 hours. Analysis showed no difference in the frequency of ‘pain on movement’ documentation between groups; intervention group mean of 0.42 (SD $1.766$) and control group mean of 0.22 (SD $1.603$) ($t(239) = 0.937$, $p = 0.766$).

6.3.1.1.4 Agreement between documented worse pain scores and interview derived scores

Overall, the highest documented pain score for 70.1 percent of patients was less than 4/10 ($n = 169$); the mean documented pain score was 3.56 (SD $1.936$). Differences
in the mean for ‘highest documented pain score’ between the intervention group (3.73, SD 2.08) and control group (3.44, SD 1.81) were not statistically significant ($t (239) = 1.16, p = 0.473$). The highest possible pain score of 10/10 was documented twice (0.8%) in the intervention group.

Mean worse pain intensity scores derived through patient interviews on Day 3 were 6.05 (intervention group) and 7.05 (control group), (mean difference (I-C) = -1.012, 95% CI -1.94 to -0.08, $p = 0.037$). There was a discrepancy between patients’ self-reported worst pain intensity score during interviews on Day 3 and the mean highest pain score documented by nurses.

6.3.1.1.5 Documentation related to pain in medical progress notes

The number of times pain-related documentation was recorded in patients’ notes was counted. There was no difference between groups in terms of the frequency of pain related documentation; 43.6 percent ($n = 95$) of the intervention group and 56.4 percent ($n = 123$) of the control group had pain related documentation in their progress notes in 24 hours (Day 3 post operatively). Of the 90.5 percent of patients with documentation about pain in their progress notes: 49% ($n = 118$) were notes made by nursing staff; 21.6 percent ($n = 52$) were by a physiotherapist and 14.5 percent ($n = 35$) were by doctors/surgeons. “Others” who also made notes about patients’ pain in the progress notes (Figure 6.2) included an occupational therapist or social worker.

Reasons for documentation about pain in the progress notes included: treatment administered ($n = 149, 61.8\%$); recording patient distress ($n = 32, 13.3\%$); and patient refused analgesic ($n = 13, 5.4\%$). In these documentations, a pain score (NRS) was recorded in only 24 (10\%) of patient records. In 63 percent ($n = 151$) of the patients’ notes, the statement “patient comfortable” or “nil reports of pain” was documented at
least once. Terms such as “pain controlled with regular analgesia” and/or “pain under control” was recorded 251 times.

**Figure 6.2** Person responsible and number of times pain was documented in patients’ progress notes

6.3.1.2 Analgesic management

All patients’ charts (N = 241) were audited to extract information about the prescription and administration of pain related medications for the 24 hours preceding the interview on Day 3.

The objectives of the analyses were to:

1. Determine whether patient outcomes related to pain intensity may have been attributed to differences in available (prescribed) analgesics between the control and intervention groups, and
2. Determine whether patient outcomes related to pain intensity may have been attributed to differences in administered analgesics between the control and intervention groups.

Prescribing of medications was in two forms: fixed and *pro re nata* (PRN). Prescriptions for 'fixed' analgesics required administration according to set intervals and were not modifiable unless there was a contraindication to their administration. It was expected that there would be no difference in the amount of 'fixed' analgesics administered to intervention and control group patients.

Administration of PRN medications is in response to 'breakthrough' pain (i.e. pain that breaks through a fixed analgesic regimen) or in preparation for activities that may exacerbate pain such as physiotherapy or mobilisation. The use of PRN analgesics had the potential to offer insights into patient participation in pain management because administration of PRN medication requires communication about pain intensity, often with nurses. It was expected that there would be a difference in the amount of PRN analgesics administered to intervention and control group patients if intervention group patients were negotiating additional pain relief to achieve recovery goals.

**Patient known allergies**

A total of 43.2 percent (*n* = 104) of patients had an allergy to medications recorded on one or more charts in their patient record (intervention group, *n* = 43, 41.3 percent and control group *n* = 61, 44.5%). Of those with an allergy noted, 26.2 percent (*n* = 63) were antibiotic and food related allergies; 7.5 percent (*n* = 18) were an allergy to opioids; 3.7 percent (*n* = 9) to codeine; 3.3 percent (*n* = 8) were to non-steroidal anti-inflammatory drugs (NSAIDs); 2.5 percent (*n* = 6) had allergy to 'multiple' medications...
including opioids/NSAIDs/codeine (Figure 6.3). All patients with documented allergies to medications were excluded from the analysis of pain treatment using medication. For example if patients had an allergy to NSAIDs then they were not included in the overall denominator for patients administered a NSAID.

**Figure 6.3 Allergies as stated by control and intervention groups**

### 6.3.1.2.1 Regular interval (fixed) multimodal analgesic prescription and administration

Findings related to prescription of regular interval multimodal analgesics are presented in Figure 6.4. All patients (100%) had a prescription for strong opioids. There was a significant difference in the number of available prescriptions for NSAIDs between groups. A higher proportion of the intervention group patients were prescribed regular NSAIDs (80%, \( n = 80 \)) compared to the control group patients (67.7%, \( n = 90 \)) (\( \chi^2; (1; \ N = 233) = 4.39, \ p = 0.038 \)). Paracetamol was prescribed for 98.1 percent (\( n = 102 \)) of the intervention group and 97.1 percent (\( n = 133 \)) of the control group; differences between groups was not statistically significant (\( \chi^2; (1; \ N = 241) = 0.242, \ p = 0.701 \)).
Prescriptions for regular adjuvant medications were similar across groups. Adjuvants were pregabalin (Lyrica) \( (n = 136, 56.4\%) \) or gabapentin \( (n = 2, 0.8\%) \). There was not a statistically significant difference in the number of prescriptions for pregabalin between intervention group patients \( (n = 64, 47.1\%) \) and control group patients \( (n = 72, 52.9\%) \), \( (\chi^2; (1; N = 241) = 2.16, p = 0.149) \).

![Figure 6.4 Proportion of patients prescribed multimodal analgesics by medication class](image)

**Figure 6.4** Proportion of patients prescribed multimodal analgesics by medication class

**Paracetamol**

Paracetamol was prescribed for 235 (97.5\%) patients. Of these, 59.8 percent \( (n = 61) \) of patients in the intervention group and 65.4 percent \( (n = 87) \) in the control group were administered their prescribed total dose of paracetamol over 24 hours. There was no statistically significant difference in the mean daily grams (gm) of paracetamol administered to the intervention \( (M = 3.25, SD = 1.0 \text{ gm}) \) and control \( (M = 3.23, SD = 3.2 \text{ gm}) \) group patients; \( (t (194) = 0.1, p = 0.921) \).
NSAIDs

The most frequently prescribed NSAID was meloxicam \((n = 67, 29.51\%)\) followed by celecoxib \((n = 38, 16.74\%)\) and ibuprofen \((n = 36, 15.85\%)\). Overall, 14 \((5.8\%)\) patients indicated an allergy to NSAIDs and were excluded from these analyses.

In total, 64 \((76.2\%)\) patients in the intervention group and 69 \((75.5\%)\) patients in the control group were administered their prescribed doses of NSAIDs over 24 hours. There was no statistically significant difference between groups in terms of administration of prescribed NSAIDs (Table 6.10).

<table>
<thead>
<tr>
<th>NSAID</th>
<th>Intervention Group ((n = 64))</th>
<th>Control Group ((n = 69))</th>
<th>(p =) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ibuprofen</td>
<td>13 (81.3)</td>
<td>14 (70)</td>
<td>0.397</td>
</tr>
<tr>
<td>celecoxib</td>
<td>16 (88.9)</td>
<td>16 (80)</td>
<td>0.639</td>
</tr>
<tr>
<td>naproxen</td>
<td>9 (56.3)</td>
<td>6 (54.5)</td>
<td>0.630</td>
</tr>
<tr>
<td>meloxicam</td>
<td>26 (81.3)</td>
<td>33 (94.3)</td>
<td>0.071</td>
</tr>
</tbody>
</table>

Strong Opioids

Prescriptions for regular fixed-interval, strong opioids were either for Oxycodone Slow Release (SR) \((n = 122, 50.2\%)\) or Targin (Oxycodone Hydrochloride and Naloxone Hydrochloride) \((n = 110, 46\%)\). One patient was prescribed Oxycodone (Endone) as their regular fixed dose opioid.

There was not a statistically significant difference in the number of Oxycodone SR prescriptions for intervention group \((n = 29, 55.8\%)\) and control group \((n = 23, 44.2\%)\) patients, \(p = 0.504\).
Whist there was a difference in the number of Targin prescriptions for intervention group \((n = 40, 36.3\%)\) and control group \((n = 70, 63.6\%)\) patients, it was not significant \((p = 0.067)\).

There was not a statistically significant difference in the mean daily milligrams (mg) of Oxycodone SR administered between the intervention \((M = 23.8, SD = 13.0\ mg)\) and control \((M = 19.8, SD = 13.9\ mg)\) group patients, \((t (119) = 1.62, p = 0.997)\).

There was not a statistically significant difference in the mean daily milligrams (mg) of Targin administered between the intervention \((M = 21.4, SD = 8.8)\) and control \((M = 19.5, SD = 11.0)\) group patients, \((t (103) = 0.971, p = 0.486)\).

**Adjuvant medications**

Pregabalin (Lyrica) was prescribed for 140 (58.1%) patients. There was not a statistically significant difference in the mean daily milligrams (mg) of Pregabalin administered between the intervention \((M = 159.4, SD = 60.5mg)\) and control \((M = 158.1, SD = 81.7mg)\) group patients, \((t (138) = 0.111, p = 0.523)\).

**Weak opioids**

Prescriptions for regular fixed-interval, weak opioids were either for Tramadol \((n = 11, 4.6\%)\) or Panadeine Forte \((n = 5, 2.1\%).\) Allergy to codeine was documented for nine patients (3.7%).

Panadeine Forte was prescribed for 1 (20%) patient in the intervention group and 4 (80%) patients in the control group as a fixed dose \((p = 0.393)\).

The number of patients administered their regular, fixed-interval analgesics during the 24 hour audit period are presented in Figure 6.5. Nurses are responsible for
administering medications as prescribed on the patients medication chart. There were cases where fixed interval analgesics were not administered to patients. This was an unexpected finding, hence was not explored with patients or nurses during the data collection period of the study.

Figure 6.5 Proportion of patients who received their prescribed regular, fixed-interval multimodal analgesics

6.3.1.2.2 PRN multimodal analgesic prescription and administration

Patients were prescribed different PRN analgesics according to surgeon or anaesthetist preference. PRN analgesics included strong opioids (Morphine or Oxycodone) and/or weak opioids (Panadeine Forte or Tramadol).

Strong Opioids

Morphine

Morphine was prescribed PRN for 109 (45.2%) patients. There was no statistically significant difference in the mean daily milligrams of morphine
administered to the intervention ($M = 1.25, SD = 3.1\text{mg}$) and control ($M = 1.49, SD = 4.1\text{mg}$) group patients over 24 hours, ($t (54) = -0.337, p = 0.397$). The route of Morphine administration was by intramuscular or subcutaneous injection.

**Oxycodone (Endone)**

The most commonly prescribed and administered PRN strong opioid was oxycodone (Endone); 96.3 percent ($n = 232$) of patients were prescribed a PRN order. All patients (100% intervention and control) prescribed PRN doses of oxycodone received at least one dose during the 24 hour audit period. This medication was given as an oral tablet and doses administered over 24 hours ranged from 2.5 to 30 milligrams.

There was a statistically significant difference in the mean daily milligrams (mg) of oxycodone administered during the 24 hour audit period to the intervention ($M = 16.1, SD = 12.9\text{mg}$) and control ($M = 10.8, SD = 12.0\text{mg}$) group patients (Figure 6.6); ($t (239) = 3.23, p = 0.001$).

**Weak opioids**

**Panadeine Forte**

Panadeine Forte was prescribed PRN for 11 patients. There was a significant difference in the total mean grams of Panadeine Forte administered to the intervention ($M = 2.67, SD = 4.61\text{gm}$) and control ($M = 2.25, SD = 1.28\text{gm}$) groups; ($t (11) = -0.251, p = 0.005$).

**Tramadol**

Tramadol was prescribed PRN for 97 (95.4%) patients. There was no significant difference in the mean daily milligrams of Tramadol administered to the intervention
(M = 61.2, SD = 99.67mg) and control (M = 64.7, SD = 97.3mg) group patients, (t (108) = -0.177, p = 0.925).

![Figure 6.6 Total amount of oxycodone administered in 24 hours in milligrams](image)

**Figure 6.6** Total amount of oxycodone administered in 24 hours in milligrams

### 6.3.2 Patient reported barriers and facilitators to participation

The data included in the qualitative analyses were patients’ responses to open ended questions about any factors that might have influenced how they were able to achieve their goals of recovery. In addition, patients, when asked about specific goals of recovery often described barriers and facilitators to achieving goals and these data were included in the analyses. Three themes were identified: 1) patient reported personal influences on capability for participation, 2) clinician behaviours that influenced opportunity for participation and 3) structural factors that impacted on opportunity to participate.

#### 6.3.2.1 Perceived influences on capability for participation

Insufficient and ambiguous information that caused confusion or interfered with patients’ ability to understand their role in their recovery were frequently identified by patients as barriers to participation. In contrast, clear, consistent and actionable
information was perceived to facilitate participation. There were discernible
differences between intervention and control group patients in their perceptions of the
quality and consistency of information provided to them.

Patients reported receiving inadequate or confusing information about what
they should do for their recovery; particularly in relation to mobility (i.e. the quantity,
frequency, intensity). This lack of information meant that patients were uncertain about
how best to manage their pain or exercises.

No I don’t really know my goals. No one discussed them with me, I just do
what I’m told. I guess I’m going okay (ID 39, control)

I mean if I knew what my pain [intensity] should be, I would have got onto
things quicker. The nurses’ never tell you anything. I think you [nurses]
should explain the pain rating score thing at the start [pre-admission
clinic] you know, so you know what you should say to the nurses about your
pain (ID 85, control)

I am walking, but I don’t know if I’m putting enough weight on it [the
knee]. I’m not sure if I should be putting more. I haven’t talked to anyone
about that. (ID 13, control)

Lack of provision of clear, unambiguous information by clinicians was sometimes
compounded by patients’ reluctance to ask questions or clarify information because
they assumed they would be told what they needed to know.

I don’t think anyone has really told me whether I can walk or not or if I
should be walking a bit more, I guess I’m a bit confused about that but I
didn’t want to ask as I’m sure they will tell me in due course... but no one
has really given me any indications that I can [walk]. (ID 78, control)

I waited a bit to see if it [the pain] would go away, I guess it was more
than eight by the time I saw the nurse. I mean she [nurse] came in and
asked if I was in pain and I said yes I am. I just waited to see if it [the
pain] would go away and it didn’t. When she [the nurse] came in to see me
about something else, I think it was my blood pressure, I told her [nurse]
then I had pain and she went away and came back with tablets. They
worked after a while but took a bit to get under control (ID 19, control).
However, even when patients sought clarification or reassurance, information received could be inadequate or inconsistent and meant leaving patients ambivalent. For example, this patient feared causing damage to his knee joint, and was unable to receive unambiguous reassurance and therefore restricted mobility-related activities.

*Well I was worried if I do something, it’s going to crack and there will be metal bits sticking out somewhere. Well once you get over that then you can get moving. But I did ask the physio and she said it was really hard to do the wrong thing and the surgeon said if you kneel or twist it that way then you might do some damage, so I guess I need to know what I can’t do (ID 56, control)*

Intervention group patients also reported poor coordination and inconsistency between clinicians in their explanations of mobility and activities of daily living; this led to feelings of frustration.

*Well really frustrated with the nurses and the lack of communication, yesterday the physiotherapist showed me how to get my knee off the bed safely, today the nurse showed me another way, and another nurse last night used a sheet. I’m really unsure of what to do. Well I think the nurses needed to listen to me and when I said how the physiotherapist told me how to get out they should have listened, why do they all say something different? (ID 11, intervention)*

Patient perceived factors that promoted mobility included having the necessary information and the confidence to exercise and mobilise. When patients felt informed, they described the importance of mobility to their recovery and were initiating actions to be mobile. These patients were explicit about the quantity (how far) of walking they were doing; in addition they also reported the need to be ‘independent’ and ‘confident’ with mobility. There was a noticeable difference between intervention and control groups in terms of how patients described mobility goals and how they initiated actions to overcome barriers.

*I’m walking with the crutches today so that’s terrific, I feel like I’m ticking off those goals. I walk further with the walker frame thing but I feel confident with the crutches now. I’m going around the ward with the
frame but today I just went to the end and back with the crutches they [physiotherapists] said not to go on my own, to use the frame if I do (ID 138, intervention)

I feel like I’m taking more control of my mobility and everything like that. I got out [of bed] this morning and sat myself here [in the chair], I think the more you can do for yourself and that sort of thing the better it is for me (ID 248, intervention)

Patients who used the MyStay intervention talked about using it as a reminder or an action list of daily tasks to achieve goals of recovery.

I do them [exercises], the iPad™ helps me when I forget how to do them. The iPad™ explains that for you, it shows you and tells you what to do really (ID 115, Intervention)

I sit out in the chair for my meals, like it says on the [MyStay] program. I do the exercises, walk around and sit out, oh I do the breathing exercises too every day and ankle pumps I do them all the time, I know what I need to do and I’m doing it (ID 71, Intervention)

The information delivered via the MyStay intervention was perceived as actionable and well-defined even in the absence of specialist staff to assist; the animation provided explicit details to assist patients perform exercises.

Certainly the iPad™ program is very helpful, I like the animation of the person doing them in bed. I have been watching every day. I’m doing what is expected especially around the exercises and I’m doing them. I’m deep breathing and doing the ankle pumps to prevent clots and I know how important it is to do them and try every day (ID 28, intervention)

Yes [I have been achieving goals] in terms of the iPad™ I have, I tick them off. It’s really good to know what you should do, especially when the physio isn’t around (ID 223, Intervention)

Alternatively,

I haven’t seen the physio to ask them for help over the weekend and the nurses don’t seem to know much about the exercises, so I don’t do them really very much at all (ID 43, control)
6.3.2.2 Clinician behaviours and processes of care that influence opportunity to participate

This theme encompassed patients’ perceptions of nurses’ responses to attempts to clarify information or to seek assistance to achieve goals of recovery.

6.3.2.2.1 Clinicians’ responses

How patients perceived clinicians’ responses to concerns or requests for assistance had the potential to cause frustration and tension. Patients described not receiving adequate responses to questions or having to repeatedly ask clinicians for assistance, or having to wait.

You have to ask and keep asking them. One day I did have a problem, I buzzed for the nurses [as I had pain] and I was waiting 45 minutes for a pain killer. Then 45 minutes later I didn’t have painkillers, and I spoke to the nurse about that and she said he was busy with some other patient, and I guess it happens but I was in pain. (ID 104, intervention)

I said to the nurse I have pain and she said “well you have already been given something” I said it’s obviously not working. I’m not one to abuse my medications I know what I can and can’t handle. That was disappointing (ID 20, intervention)

Yes I know them [exercises] all but I’m unable to do them all, probably why I’m a bit frustrated really, I want to do them and get going but I’m very restricted by this frame (Zimmer splint) I ask everyone and no-one can help me with it really, the nurses just say it’s the doctors preference and the physios don’t know either (ID 64, intervention)

Although some patients were relatively resigned to not getting what they needed, others reported feeling undervalued or not listened to. This was particularly the case when patients were describing responses to symptom management. Some patients felt that clinicians were at times dismissive of their pain or symptoms, they felt they (as patients) were not important to clinicians and that their concerns were not valid. For some patients, perceptions of clinicians’ dismissiveness prevented them from participating further; often they would give up trying and put up with their pain.
I was uncomfortable to call her [nurse], she just made me feel I don’t know, she didn’t seem to understand what’s wrong and I just didn’t want to call her in. I felt really uncomfortable with her overnight and I think that’s probably why I let it [pain intensity] get so high because I didn’t really want her to come in. I just felt she was a bit rude and sick of me really, it was a very long night that one. I don’t know she [nurse] really wanted to be here. I also had really bad indigestion and that was really playing up and she didn’t seem to care about that overnight. But this morning the head nurse came in and she said “we will do an ECG and get this looked at so I feel a bit better today, they are listening to me (ID 115, intervention)

In addition, when patients initiated attempts to participate these attempts were not always met with the response they wanted from clinicians.

I asked nurses how I could move better but they didn’t have any answers for me (ID 40, intervention)

The first night, it was getting quite sore and I asked her [nurse] for some ice to put on the knee, the nurse came in and said she doesn’t believe in ice, she doesn’t think it makes a difference and just walked away, so I guess I felt a bit deflated (ID 135, control)

One patient expressed feelings that no flexibility in strategies to achieve recovery goals created a barrier to achieving her goals

I’ve asked for quite a few things that they haven’t been able to help me with because here “one size fits all”. For example I asked for a different size TED stockings as mine weren’t fitting as I have very short legs. They [nurses] said they don’t have any that will fit me, so I miss out. They only have “one size fits all” and if it doesn’t fit you then you don’t get it. So I tried to take part in my recovery by asking for those things but they don’t have them so you just sit back and relax about it, but I’m not putting the nurses down, they do so much and have been so good to me, it’s just the system (ID 147, Intervention)

Clinician behaviours patients perceived as rudeness and abruptness were barriers to initiating actions to participate in their care. Patients were reluctant to call a nurse they felt did not like them or not did not see them as a priority. Both intervention and control group patients frequently reported they perceived that clinicians were too busy or lacked time and this was a barrier to initiating action to overcome symptoms such as high pain intensity that were interfering with recovery.
Patients acknowledged aspects of clinician behaviours made them appear unfriendly and rude, and made them feel like they were a burden to staff. This was most often related to pain intensity, where patients felt nurses did not believe their reports of pain.

*I ask for some help with things like going to the toilet they [nurses] sort of huff and puff around like it’s a hassle. I feel like I’m a bit of trouble to them [nurses] that’s all. I have been in a lot of pain the past few days and they don’t seem to believe me when I tell them, they just say “oh you don’t seem to have that much pain” when I say its 9/10* (ID 12, control)

Alternatively, clinician behaviours frequently described by patients to enable participation included when nurses were happy, responsive and helpful.

*I felt that the pain was getting a bit more severe pain so I just buzzed and she [nurse] came and gave me tablets and I had them, she [nurse] didn’t worry about it, it was good* (ID 238, intervention)

*The nurses are just great, they come around all the time and just give you pain medications, I just take them, my pain is good really, they [nurses] are happy and are on top of it* (ID 245, control)

*I ask for something for the pain, if I need it. They are great [nurses] they come in and sort it out. I know I need to do the exercises at least four times a day so I’m doing my best to do that. I know it’s really important for my recovery to get the knee bending so I’m doing my best* (ID 53, intervention)

Behaviours of nurses contributed to patients’ feelings of being disempowered to ask questions or seek clarification of information. Waiting a prolonged period of time for a response from clinicians made them feel they were not seen as a priority.

*But I can’t seem to get my message across to some of the nurses, they seem very abrupt and see me as a nuisance so it’s hard to tell them or even talk to them. They don’t explain anything they just tell me or give things without explanation. When I ask I’m made to feel annoying. They were giving me tablets and I did not know what they were for they sort of told me short and abruptly they are for my tummy, I asked what it’s for and they just said to go to the toilet. I felt I couldn’t ask anything else. Another time was yesterday, the junior nurse was having an argument with the senior nurse about how to use this machine (CPM), she was telling off the senior nurse. Now to me, you don’t do this in front of the patient do you? It made
me feel a bit uneasy... it's just very hard when you ask the nurse or call them about something then an hour goes by and you haven't seen them again, it's hard, you feel helpless you know (ID 2, control)

The quality of the rapport patients perceived they shared with their nurses was also reported to facilitate recovery as it provided a sense of knowing someone.

You need encouragement, not just bossiness. I had one nurse last night, she was good. She was encouraging, she just encouraged me to get up, and it was good. But then, see, she's off duty this morning. Now this is a major problem, you know. You get to know somebody and they're gone. And then a strange person. I liked her she was nice and she was encouraging. (ID 185, Control)

Some patients reported feeling a sense of collaboration when they worked together with nursing staff and this was a facilitator to their recovery.

You know, the nurses here are wonderful. They ask you. I tell them and, you know, we work on it together (ID 247, intervention)

I get help to get the leg out of bed, and get it on the floor, the nurses are good with helping with that, I just buzz them and let them know I need help (ID 152, Intervention)

6.3.2.2.2 Coordination of care and communication

Patients also reported disjointed care processes related to communication and coordination of care between clinicians was a barrier to their participation in meeting the goals of recovery.

Poor coordination and communication between clinicians as a barrier to participation was most evident in patient descriptions of the timing of physiotherapy visits. Patients found it difficult to coordinate the timing of analgesia with their physiotherapy. There was a discernible difference between intervention and control groups in patient reported challenges when scheduling analgesics. Patients in the intervention group were more likely to identify this as a problem. In addition, patients reported feeling they had no choice about when they saw the physiotherapist.
I don’t know when to expect them [physiotherapists] they just turn up. It’s funny on the iPad™ it talks about getting pain relief 20 minutes before the physio comes, but they just come and you have to do it! (ID 138, intervention)

Well no one talks to anyone else here. The nurses don’t know when or if the physio has been and the physio doesn’t really ask when I have had pain relief...it’s hard when you try to time it all but no one can tell you anything. (ID 71, intervention)

The inability to know the time for their physiotherapist sessions and hence plan for appropriate analgesia was noted by patients in the intervention group as a barrier to being as active as they could and wanted to be.

I could possibly put a bit more into it [exercises] if I knew when they [physiotherapists] were coming. I could then take the ‘pain killers’ half an hour before to get the most out of the session. But you ask and no one tells you when they [physiotherapists] are coming the nurses just say oh they will be around when they are in (ID 50, intervention)

Patients recognised that timing of analgesics before exercises was important however they felt the processes of care did not allow this to occur.

Just making sure that I’ve had some Panadol half an hour before, trying to time my exercises for half an hour after I’ve had the Panadol, which in this situation I can do. That’s not always easy because they’ve sort of got regular times to give you pain relief (ID 181, intervention)

6.3.2.3.3 Clinicians’ availability

Perceptions of limited staff time and busyness were barriers to participation. Nurses seemed too busy to spend time with patients and patients were reluctant to seek assistance from them because they felt this would be an additional burden on nurses.

For example, some patients reported a lack of opportunity to ask their nurses for assistance when pain was interfering with their recovery. Patients also reported feeling that nurses did not want them to use the call bell system.

I don’t like ringing the bell, didn’t want to be a bother, I could see they were all busy and I don’t like bothering, they [nurses] don’t like you to ring the bell much anyway, I get that impression (ID 166, control)
Oh no the nurses are too busy to help out [getting out of bed], I just wait for the physio. I don’t like to bother them [nurses] (ID 82, intervention)

When I had a really sore knee yesterday after the exercises I didn’t tell anyone because I didn’t want to press the bell again, you feel like they [nurses] are really busy, and I know they are here, but you just don’t want to be one of those people. The iPad™ is great, but I think the nurses need to look at it...I asked one of them about sitting out and getting moving and she said no need to yet...I’m confused (ID 40, intervention)

Patients’ reluctance to call for assistance due to fear of overburdening staff often resulted in enduring high pain intensity and inability to perform activities to meet recovery goals. For example, patients may have been aware of the need to do their exercises, but perceived lack of opportunity to notify staff for assistance to treat their pain prevented them from exercising.

Oh I just stop moving when it hurts, that fixes it. I don’t really tell anyone, I just put up with it. You know everyone is very busy. Even the nurses they are too busy to come and help. I know they are busy, or so they tell me, so I try not to bother. My wife comes in every day so I just wait for her to help to do the exercises (ID 26, control)

I don’t like to bother them I know they are really busy so I waited until they came in to see me, I knew they would come and give me something (ID 102, control)

Incorporating patients as participants in their care requires clinicians to be responsive to attempts by patients to engage in their care. Patients acknowledged aspects of clinician behaviours that made it difficult for them to participate, particularly their perception that clinicians were too busy. Patients reported they felt they were not listened to, and not seen as a priority by nurses. Alternatively, patients were more likely to initiate action to seek opportunities to participate in care if they perceived clinicians to be responsive and friendly.
6.3.2.3 Structural factors that impacted on opportunity to participate

Structural factors such as environmental design, specifically the ward/room layout was identified as a barrier to participation in many patients’ discussions of recovery.

Insufficient chairs or space to sit out of bed was reported as a barrier to achieving daily goals and resulted in frustration.

*I have been having all my meals in the bed, which I don’t like but there are no available chairs apparently in the ward and nowhere to really put it in here (four bed room) there is a shortage of chairs, but I would rather sit out (ID 16, control)*

*I can’t sit out of bed and that’s just a logistical problem in this room, you see there is nowhere for a chair...I would like to be out so I meet my goals but it’s just not possible in this room. (ID 83, intervention)*

*I today I’m [feeling] better, but now I can’t sit out because there is a shortage of chairs in this room apparently (four bed room) chairs are a problem here. (ID 10, control)*

Active patients initiated a compromise in strategies and actions to overcome barriers (e.g. no chair available) in order to achieve their goals.

*I can’t really sit out, there is no room for a chair. But I do try to bend it [knee] on the edge of the bed, it’s a bit hard the iPad™ says one thing then you can’t really do it you know. (ID 128, intervention)*

6.4 Patient Activation and Preference for Participation

Patient activation was identified as a potentially important antecedent to patient participation because it is about patients’ perceived knowledge, skill and confidence to participate in care. Control preference for participation was used as a baseline measure to determine any pre-intervention differences in control preference between intervention and control groups. There were no differences in control preference at baseline.
The objectives of the analyses of patient activation and control preference were to:

1. Determine if there were any differences in patient activation measured by the Patient Activation Measure (PAM) between intervention and control group patients Day 3 and four week after discharge from acute care, and

2. Explore differences in control preference outcomes measured by the control preference scale (CPS) Day 3 and four week after discharge from acute care between intervention and control group patients.

The findings reported in this section present data collected Day 3 and four weeks after discharge using patient self-reported surveys to examine their preference for participation (CPS) and their level of activation (PAM).

6.4.1 Patient activation

A significant difference between intervention and control groups in level of activation was detected on Day 3 ($\chi^2 (3, N = 235) = 8.47, p = 0.037$). A significantly higher proportion of patients in the intervention group reported level 4 activation (45.1%, 46) than in the control group (27.1%, 36) (Figure 6.7).

There was no statistically significant difference in activation between groups when measured at baseline ($\chi^2 (3, N = 240) = 6.41, p = 0.093$). However, this difference in activation did not represent an increase in activation in the intervention group patients, but rather a reduction in activation in the control group patients from 74 percent activation at level 3 or 4 at baseline to 53 percent of patients at this level of activation on Day 3. Patient activation in the intervention group patients also declined but not to the same degree, from 79 percent at level 3 or 4 at baseline to 64 percent on Day 3.
Figure 6.7 Patient Activation Measure (PAM) Day 3 (N = 235)

Four weeks after discharge from acute care, patients’ activation levels were similar to those at pre admission (Figure 6.8). In the control group, 74 percent of participants indicated an activation level of 3 or 4 and in the intervention group, 82 percent indicated level 3 or 4. There was not a statistically significant difference between groups in the patient activation measured at follow-up ($\chi^2 (3, N = 207) = 2.05, p = 0.560$).

Figure 6.8 Patient Activation Measure (PAM) 4 weeks post discharge (N = 202)
6.4.2 Control preference

Patients’ preference for participation was measured on Day 3 and at follow-up using the control preference scale (CPS). This tool was used to determine patients’ preference for participation (in decision making about their care). On Day 3, post TKR, 41 percent of patients overall indicated they would prefer a collaborative role (Figure 6.9). There was not a statistically significant difference between groups in control preference measured on Day 3, ($\chi^2(2) = 0.451, N = 236, p = 0.798$).

![Figure 6.9 Control Preference Day 3 (N = 236)](image)

Four weeks after discharge from acute care, 43.3 percent of the intervention group and 40.7 percent of the control group indicated they would prefer a collaborative role in decision making about their care (Figure 6.10). There was not a statistically significant difference between groups in control preference measured at follow-up ($\chi^2(2) = 0.533, N = 203, p = 0.766$).
6.5 Discussion

The findings of the crossover randomised controlled trial demonstrated that the MyStay intervention was effective in reducing pain intensity and length of stay in acute care after TKR surgery. The aim of this component of the process evaluation was to explore whether the intervention provided patients with the capability and opportunity to participate in care related to their goals of recovery. In other words, the process evaluation was conducted to understand how and why the intervention may have been effective. Further, the evaluation provides a process by which to capture important barriers and facilitators to future implementation of the intervention.

Capability to participate in care was expected to be enhanced by the provision of explicit, actionable and specific information related to daily goals of recovery delivered via a multimedia platform to reduce patient burden and heighten usability through animation and other media. Opportunity to participate in care was expected to occur through nurse facilitation as well as through enhanced understanding of role expectations in achieving goals of recovery. It was also expected that patient perceived
capability and opportunity would affect patient activation through heightened confidence and knowledge, although the intervention was not specifically designed to provide particular participatory ‘skills’.

Findings presented in this chapter related directly to patients’ reports of capability and opportunity for participation in their recovery after TKR surgery. Data were obtained from semi-structured interviews on postoperative Day 3 to ascertain patients’ knowledge in relation to their goals of recovery and determine if there was a difference between the intervention group and usual care control group. Data collected from medical records audits enabled analysis of the pain assessment and management that may have impacted on pain intensity outcomes. Analysis of interview transcripts provided data related to clinician behaviours and processes of care that may have affected opportunity for patients to participate. The patient self-reported questionnaire on Day 3 and at follow-up elicited information regarding patients’ preference for participation (CPS) and patients’ level of activation (PAM).

The ability to triangulate findings from multiple components was a strength of the study and has enabled a detailed understanding of the role played by the facilitated multimedia intervention in the observed patient outcomes.

6.5.1 Knowledge of goals of recovery after TKR

The findings from the analyses of the interview data revealed that intervention group patients were significantly more ‘active’ than control group patients in achieving three key goals of recovery: pain management, mobility and meeting daily goals of care. This suggests a clear positive influence of the MyStay intervention on participation behaviours. Identified patient participation behaviours included questioning, initiating actions, negotiating strategies, and self-monitoring and were significantly more likely to
be described by patients in the intervention group. In addition, intervention group patients were also more likely to negotiate strategies to overcome barriers and alert nursing staff of the intensity of their pain and interference of pain with performing rehabilitation exercises.

There was evidence that some patients attributed their achievement of goals to the facilitated multimedia intervention. The information delivered through MyStay resulted in a significant difference in patient-reported knowledge about recovery goals. For example, intervention group patients displayed a greater understanding of their pain intensity goals and were able to describe strategies they had used to overcome high pain intensity by initiating interactions with nurses and requesting more analgesics. Behaviours that provided evidence of activation included self-monitoring of pain and activities, negotiation to achieve goals, seeking clarification and initiating actions to overcome barriers and achieve goals.

Adequate pain management is fundamental to achieving the goals of recovery, especially for patients who have had TKR surgery as recovery involves movement of the knee joint to achieve range of motion (Kehlet et al., 2006; Strauss, 1989; Wylde et al., 2011). Patients in the control group were significantly more likely to endure pain and allow pain to interfere with their exercises and mobility. Patients described behaviours such as stopping their exercises and not mobilising due to pain, and not reporting high pain intensity to their nurses. A common behaviour described by control patients was waiting, i.e. waiting for nurses to come into their room for other purposes and taking the opportunity to then report their pain, waiting to see if the pain would ‘go away’, and waiting for the physiotherapist to visit before they would attempt to exercise and mobilise. In contrast, intervention group patients were more likely to report active
behaviours such as initiating reports of symptoms to clinicians in order to pursue exercises and mobility.

There was no difference between groups in their knowledge and described participation in knee exercises. The effect of MyStay may have been diluted in this respect because of the processes already in place in the study wards to inform patients about knee exercises. Following TKR surgery, an A3 poster is positioned on the wall at the foot of patients’ beds that displays stick figure diagrams and titles for each of the six specific exercises that patients are encouraged to perform at least four times a day. Therefore knowledge about what is expected regarding exercises was explicit and clear for all patients independent of the intervention.

It can be postulated however, that engagement with MyStay may have affected actual performance of the knee exercises in two ways. First, there is an emphasis in MyStay on adequate pain management to ensure that exercises can be carried out effectively. Patients in the intervention group were more likely to describe asking for pain relief during periods of discomfort in order to perform their exercises. Second, the exercise animations in MyStay provide an easily accessible and detailed illustration of how to carry out the exercises. Both factors may impact on the quality of the knee exercises performed. Although the quality of patients’ participation in knee exercises was not measured, differences in the performance of range of motion exercises may have contributed to the observed reduction in length of stay. The criteria for discharge of patients from acute care is achievement of 70° to 90° flexion of the new knee joint. Patients in the intervention group were discharged from acute care one day earlier than control group patients suggesting that intervention group patients reached the knee flexion goal for discharge earlier. A recent systematic review by Artz (2015), evaluating
the effectiveness of interventions such as intensive physiotherapy exercises for patients post primary TKR, concluded that including intensive physiotherapy and exercise leads to short-term improvements in physical function.

Patient reported knowledge and behaviours related to mobility indicated that patients in the intervention group were walking independently sooner, and using less support than patients in the control group. Intervention group patients referred to the need to be independent in meeting mobility goals and identified it as an important indicator of recovery. Alternatively, patients in the control group appeared to be less sure of the distance they should be walking, or indeed if it was possible to do so on their own. These patients voiced concerns about the strength of the new joint, and fear of causing damage and this was a barrier to mobilisation.

Previous research has shown that providing patients with information alone has limited effect on patient participation without clinician-facilitated opportunities (McGuckin et al., 2004; Seale et al., 2015). This is particularly true in the postoperative context, where patients are vulnerable due to illness and lack of familiarity with the environment. Clinician behaviours and actions are likely to have a significant impact on participation (Davis et al., 2008; Duncan & Dealey, 2007). The facilitative aspect of the MyStay intervention was critical. A key proposition of the conceptual framework underpinning this study, was that facilitation affects patients’ perceptions of the acceptability of participation, provides clarity about role expectations and permission to engage with clinicians. There is evidence that patients in the intervention group were more likely to initiate action by calling their nurses to report pain intensity. In addition, these patients reported participatory behaviours such as initiating alternate strategies, questioning, voicing opinions, seeking clarification, negotiation and self-monitoring.
6.5.2 Processes of care and opportunities for participation

Evaluation of the processes of care that provide opportunity for participation involved an audit of documented pain assessments and management, and qualitative analysis of patients’ perceptions of the barriers and facilitators of participation.

6.5.2.1 Assessment, documentation and treatment of pain

Pain intensity was the primary outcome of the crossover randomised controlled trial. The problem of high postsurgical pain intensity, and suboptimal clinical management (Dihle, Helseth, Kongsgaard, Paul, & Miaskowski, 2006; Raschke et al., 2015) where patients receive a fraction of their available analgesics (Dihle et al., 2006) is well-recognised. A consideration in designing the evaluation of the effect of the MyStay intervention was the potential for high pain intensity and poor treatment despite attempts by patients to negotiate pain relief. The implications for the trial were twofold. First, if patient assessments of pain were not comprehensive, there was the risk that pain intensity would be underestimated by clinicians and as a consequence undertreated. Second and not unrelated, was the potential that if pain intensity was underestimated, clinicians would be less likely to collaborate with patients in escalating pain management. In other words, existing clinical barriers to optimal postsurgical pain management had the potential to moderate the effect of the MyStay intervention in terms of the primary outcome measured.

Documentation of pain assessment and management in patients’ medical records was used to provide insights into clinician-patient interactions related to pain management because these interactions were not measured directly. Two gaps in documented pain intensity assessments were identified that may or may not reflect gaps in comprehensive pain assessment. The first gap related to the frequency and
comprehensiveness of pain assessments. Pain intensity scores were documented on average 9.69 (SD 6.16) times in a 24 hour period reflecting the hourly rounding documentation requirements of the organisation. The majority of assessments recorded represented pain at rest. Only 46 percent of patients had documented pain intensity scores assessed on movement; and on average this was documented less than once for each patient over 24 hours. These findings suggest that these albeit frequent assessments are not particularly comprehensive or accurate. Given that management of pain associated with knee exercises and mobilisation is a major goal of recovery this finding was unexpected. Failure to assess and/or record pain on movement can be indicative of or lead to underestimation of pain and under treatment.

The second gap was related to the discrepancy between documented pain scores and pain scores derived by asking patients their worst pain intensity in the previous 24 hours during the Day 3 interviews. The mean documented pain score was 3.6 compared to the mean interview derived score of 6.6. Pain scores derived at interview were based on patients’ worst pain in the previous 24 hours. Worse pain scores represent dynamic pain and most commonly in the postsurgical context this relates to movement and exercises. Given that less than half the patients had a pain score recorded on movement, the lower mean documented scores are not surprising. There were no differences in pain assessment documentation between intervention and control patients. If patients in the intervention group did indeed initiate more pain-related interactions, this was not reflected in medical record documentation.

The problem of incomplete nursing documentation that lacks detail and description, particularly in relation to pain management, is well recognised (Dalton et al., 2001; Stomberg & Öman, 2006; Heikkilä, Peltonen, & Salanterä, 2016; Idvall, 2004; Karlsson,
Lidell, & Johansson, 2013). Factors that impact on nurses’ documentation practices include availability of medical records when needed (Mularski et al., 2006), interruptions (Manias, Bucknall, & Botti, 2004) and workload (Cheevakasemsook, Chapman, Francis, & Davies, 2006; Dalton et al., 2001). These factors need to be considered because documented care is not necessarily reflective of actual care delivery.

Analgesic prescribing and administration were examined for two reasons. First, it was important to establish that all patients had similar available analgesics in terms of multimodal prescribing both for fixed regular analgesia and PRN analgesia for breakthrough pain or in anticipation of breakthrough related to patient activity. Second, the use of PRN analgesics was considered a useful indicator of patient involvement in pain management because in order for PRN analgesics to be administered there is expected to be some form of interaction between patients and clinicians (Ferrell, Pasero, & McCaffery, 2010). This interaction can be and often is, initiated by patients.

Pharmacological multimodal pain management was introduced in the early 1990s (Dahl & Kehlet, 1993) as the standard for postoperative pain management. This approach comprises two or more analgesic agents with different mechanisms of action administered simultaneously (White, 2008) for an enhanced combined effect. Multimodal analgesic strategies have been found to decrease opioid usage, improve pain scores, increase patient satisfaction and enhance early recovery and achievement of treatment goals (Lamplot et al., 2014). However, not all patients have multimodal analgesics available to them. NSAIDs in particular are often under prescribed because of variation between physicians in adherence to best practice guidelines (Pommergaard, Klein, Burcharth, Rosenberg, & Dahl, 2014). In this study, almost all patients were
prescribed a multimodal analgesic regimen; 98 percent of the intervention group and 97 percent of the control group patients were prescribed Paracetamol and all patients were prescribed a strong opioid medication, however unexpectedly, 80 percent \((n = 80)\) of the intervention group and 67.7 percent \((n = 90)\) of the control group patients had a prescription for NSAIDs. There were no differences between groups in allergies or contraindications to NSAIDs.

Generally, the analgesic regimen for patients is prescribed by anaesthetists in the operating theatre prior to transfer of patients to the wards. Anaesthetists and post anaesthetic care unit staff would not have been aware of the intervention allocation of patients when prescriptions were made. It is possible that NSAIDS were prescribed for patients once they were in their wards and the addition of NSAIDS could have been in response to breakthrough pain. If this were the case, it would be further evidence that patients who received MyStay had negotiated better pain relief with clinicians.

Although the intervention group were prescribed significantly more NSAIDs than the control group, the proportion of patients who actually received their full daily dose of NSAIDS was not different between groups. There were also no significant differences in the total amount of fixed dose paracetamol, strong and weak opioid analgesics patients received.

It is of note that intervention group patients received significantly higher doses of PRN Endone and Panadeine Forte. Endone (Oxycodone) was the most frequently prescribed and administered PRN analgesic. It is a strong opioid administered orally in tablet form. The higher dose of PRN analgesics received explains why patients who received the MyStay intervention had lower worst pain scores. It is postulated that given patients' self-reported engagement with knee exercises and mobility and the
lower group mean length of stay, that patients were in fact engaging effectively with their exercises and mobility. An indicator of patients’ readiness for discharge from acute care is the achieved degree of knee flexion and this occurs through specific knee bend exercises. So it is likely that not only were patients exercising and mobilising more effectively, they were also able to negotiate more effective pain management.

6.5.2.2 Barriers and facilitators to participation in recovery

Missed opportunities to engage with patients about their care have been recognised as a barrier to participation in acute care (Cohen, 2012; McTier, 2013). Patients’ perceptions of barriers and facilitators to participation in their recovery were derived from responses to open-ended questioning of patients’ understanding of their goals of recovery and the strategies they used to meet those goals. The qualitative content analysis of patients’ responses yielded three major themes: personal patient-related influences on capability to participate; clinician behaviours and processes that influence opportunity to participate; and structural factors that impacted on opportunity to participate.

6.5.2.2.1 Perceived influences on capability for participation

Personal influences on patients’ perceived capability for participation were patients’ knowledge and know how about meeting recovery goals in particular related to exercises and mobility and the impact of clinicians’ responses on patients’ actual participation.

It was not unexpected that insufficient information would be perceived as a barrier to participation; alternatively, clear consistent information was a facilitator. Many patients reported they were unable to participate in their recovery as they did not have the necessary information specific to their condition. Patients who did not feel
informed also described a lack of confidence with their recovery, feelings of confusion and a lack of access to information. Lack of access to information as a barrier to participation is not unique to this study, with similar findings reported in previous research (Beaver et al., 2007; Larsson, Sahlsten, Segesten, & Plos, 2011a; O’Leary et al., 2010). In this study, the intervention group patients could articulate their goals and the processes they engaged in to meet them. Often patients identified that they had received necessary information from the MyStay intervention. MyStay was reported as a facilitator as it delivered consistent, actionable information for patients to recover. However when initiating actions to overcome barriers such as pain, some patients reported feelings of frustration and that they were not seen as a priority by clinicians.

Patients frequently reported not asking clinicians for assistance or treatments as they felt discouraged by clinician behaviours. This was most evident in data from the intervention group patients who demonstrated a high level of awareness about the need to manage their pain in order to mobilise, however if they informed nurses about their pain intensity, and felt dismissed or were not offered any alternatives for pain relief this created tensions. These data provide evidence of the fundamental links between the concepts of capability and opportunity.

6.5.2.2.2 Clinician behaviours and processes of care that influenced opportunity for participation

Poor coordination between clinicians for care delivery was reported by patients as a barrier to participation that led to frustration. Similar to findings in previous studies (Doherty & Doherty, 2005; Larsson et al., 2011b; Sainio, Eriksson, et al., 2001), patients in this study reported receiving conflicting information, mixed messages and poor continuity of care between clinicians that reduced their confidence, led to
ambivalence about their ability to self-care and perform specific goal related tasks and reduced confidence to participate in decision making. Coordination between different clinicians involved in care delivery, for example timing of nurse administered analgesics and physiotherapy visits, is necessary for patients to actively participate in their recovery. Further, consistent, clear, explicit and incremental information is important for patients in the context of acute care when the burden of surgery is likely to influence their capability to take in information.

In this research, the characteristics of the clinician was reported as both a barrier and facilitator for patient participation. Patients reported their reluctance to call for assistance or report their symptoms if they perceived clinicians behaved in a way that they perceived was rude or dismissive. Similar findings are reported in previous research where clinician verbal and nonverbal behaviours were reported as a barrier to effective interactions by many patients (Beaver et al., 2007; Belcher et al., 2006; Eldh et al., 2006; Larsson et al., 2011b). Alternatively, clinicians perceived to be friendly, who would listen and appeared willing to consider patients’ concerns were reported to facilitate patient participation. Findings that clinicians can facilitate participation through positive behaviours is similar to other studies (Belcher et al., 2006; Eldh et al., 2006). Patients also reported a sense of collaboration with clinicians and a positive environment facilitated their recovery further highlighting the importance of the environment in supporting patients to be active participants in their care (Doherty & Doherty, 2005; Fraenkel & McGraw, 2007).

The perception that the nurses were too busy to respond to their needs was identified by patients as a barrier to participation. Patients stated they did not want to ‘bother’ or ‘burden’ nurses whom they perceived were already busy, and by doing so
would add unnecessary burden to their workload. This had a direct impact on patients’ perceived opportunity for participation. When patients perceived clinicians as too busy, they were less likely to initiate actions to overcome barriers to goals of recovery or report their symptoms. Patient perceptions that clinicians are too busy to provide care has been reported in research as a barrier to the enactment of patient participation for over 10 years (Bolster & Manias, 2010; Eldh et al., 2006; Gravel et al., 2006; McTier et al., 2013; Tobiano et al., 2015). There are repeated findings that clinicians perceive their workload does not allow involvement of patients in decision making and care processes (Gravel et al., 2006). Bolster (2010) found that nurses often cited ‘lack of time’ as a barrier to patient participation in decisions related to medication management. Clinicians’ perceptions were not examined in the context of this study, however, patient perceptions that nurses were too busy and the impact on participation requires further consideration in future research because it has implications for the sustainability of interventions that require facilitation.

6.5.2.2.3 Structural factors that impacted on opportunity to participate in care

Factors in the physical environmental were identified by patients in both the intervention and control groups as barriers to meeting their goals of recovery. Simple structural barriers such as the absence of vital equipment (i.e. chairs) and space were a source of frustration for patients. Poor environmental conditions have similarly been reported as a barrier to participation in a number of studies (Doherty & Doherty, 2005; Fottler, Ford, Roberts, & Ford, 2000; Fraenkel & McGraw, 2007; Kieft, de Brouwer, Francke, & Delnoij, 2014; Whiteneck & Dijkers, 2009).
6.5.3 Patient activation and participation

Patient activation refers to a person’s ability to manage their health and health care needs (Hibbard & Cunningham, 2008). An interesting finding in this study was the apparent change in patients’ level of activation during the admission phase. Prior to admission, the majority of patients had relatively high activation scores indicating that they felt they had the necessary skills and knowledge in order to care for themselves. There was not a significant difference between intervention (79% at level 3 or 4) and control group (74% at level 3 or 4) patients in the activation scores measured pre-admission to hospital.

On Day 3 after surgery however, there was a reduction in the proportion of patients at level 3 and 4 activation in both the intervention and control groups. This reduction was most marked in the control group patients. There was a 20 percent decrease in the number of control group patients with level 3 or 4 activation on Day 3 compared to baseline and the difference between intervention and control group patients at this level was significant. Patient activation measures returned to baseline measures for both groups four weeks after surgery.

These findings suggest that illness and the acute care environment have an effect on a person’s perceived ability to manage their health care needs. Further, the intervention may have moderated the effect of acuity in reducing patients’ perceived activation.

There was no difference in patients’ control preference between baseline, Day 3 and the 4-week measures. The majority of patients overall preferred a collaborative or active role in decision-making.
6.6 Conclusions

It is concluded, that patients who received the *MyStay* intervention had better knowledge of their goals of recovery after TKR surgery than patients in the control group. They articulated specific understanding of goals and actions required. They also described a propensity to report high intensity pain and instigate or negotiate actions to meet their goals of recovery. Control group patients were more likely to tolerate pain, wait for opportunities to disclose pain and showed less participation in meeting their recovery goals overall.

In addition to patient reported increased capability to participate, there was evidence that the intervention did result in differences in the care that patients received. Patients in the intervention group received more PRN opioids than patients in the control group suggesting that patients may have initiated pain treatment and that this was the result of a raised awareness of the need for adequate pain management to achieve goals of recovery. In addition, it appears that the intervention may have had a moderating effect on patient activation in acute care whereby, the effects of illness and acuity on patients’ perceived ability to manage their own health were reduced by participating in the intervention.

Significant patient, clinician and structural barriers to patient participation were identified and these barriers relate to opportunities patients perceive are available to them to enable participation in their goals of recovery. The integrated discussion and conclusions of the research are presented in the chapter to follow.
Chapter 7

Integration and Conclusions

Recognition of patient participation as a significant contributor to patient safety and quality outcomes has led to its integration into health care policy worldwide. This research makes a significant contribution to our current understanding of patient participation in the acute care context. The purpose of the research was to test the effectiveness of a bedside, multimedia, nurse-facilitated intervention in improving patient outcomes after surgery. The nurse-facilitated intervention was designed to increase patients’ capability and facilitate opportunity to participate in achieving the goals of recovery in the immediate postoperative period following TKR surgery.

A cluster randomised crossover trial, with an embedded simultaneous process evaluation design was used to examine the effectiveness of the nurse-facilitated multimedia intervention in enabling patient participation in their recovery after TKR surgery. The MyStay intervention was designed to enable patients to participate in their postoperative care by providing explicit, actionable and consistent information on the goals of recovery after TKR surgery. Opportunity to participate was through nurse-facilitation and daily reminders to interact with MyStay. It was proposed that supporting both opportunity and capability would equip patients with the information, permission and confidence to participate in achieving the goals of recovery after TKR surgery.

To examine this complex intervention, a combination of data collection methods including, semi-structured interviews, patient reported questionnaires, and patient
medical record and medication chart review were used to measure outcomes and the processes associated with the outcomes. The research design represented a unique approach to the study of patient participation as it encompassed the multifactorial influences on participation by studying the effect of the intervention within a real-world, acute care clinical setting.

This final chapter has as its focus, the contribution of the research to knowledge of patient participation. The discussion is in four major sections. In the first section, key findings are integrated and discussed. This is followed by a discussion of the implications of the findings for practice, the strengths and limitations of the research, and finally, suggestions for a future research agenda.

Research evidence gap

The benefits of participation for people with chronic illness are well established. Patients who take an active role in self-management programs designed to improve their understanding and management of their health, have better health and quality of life outcomes (Lorig et al., 1999; Shively et al., 2013). However, the motivation, skills and strategies necessary to manage chronic illness on a long term basis are different to those required of patients experiencing acute illnesses. In chronic illness models, intervention programs are tailored for patients to develop specific skills progressively over time. Such programs usually occur in community or ambulatory care settings, are often long in duration (over several weeks and months), involve multiple components (such as group counselling, written and visual material) and include a coordinated care team that provide patients with one-to-one support.

In the context of acute episodic illness or surgery, the enactment of patient participation is hindered by factors that include the short duration of hospital stay, high
acuity of patients’ illness (including high symptom burden) and care delivery by multiple clinicians who are often unfamiliar to the patient and that occurs in a fast-paced, time poor clinical environment (Barad et al., 2015; Sainio, Lauri, et al., 2001; Sofaer & Schumann, 2013). Sustainable interventions designed to engage patients in their recovery in this context need to increase patients’ capability to participate by delivering information that is actionable, timely, explicit and tailored to specific procedures. In addition, given the high burden of patient symptoms in acute care, the delivery medium must be accessible, require minimal effort, be available when required and when patients feel able to interact with it. Multimedia interventions are emerging as acceptable and feasible ways to deliver information to patients in the context of acute recovery (Cook et al., 2013; Dalal et al., 2015; Greysen et al., 2014; O’Leary, Lohman, et al., 2015; Pinto et al., 2013; Vardoulakis et al., 2012; Vawdrey et al., 2011). There is evidence that multimedia platforms in this context are both useable and acceptable. However evidence of the effectiveness of multimedia interventions in improving patients’ capability and opportunity to participate in their care is lacking.

There is emerging evidence that facilitation of patient participation in acute care is possible, in particular in relation to patient safety. There is also some empirical evidence that participation is associated with less adverse events and higher patient perception of the quality of care received. However, there is little understanding of how participation in meeting the overall goals of recovery after surgery is enacted by hospitalised patients, and what the relationships are between participation and patient outcomes.

The conceptual model informing this investigation of patient participation recognised the multidimensional nature of participation in acute care and the need to
consider the important synergy between providing capability for participation through information that is explicit and accessible, and opportunity through facilitation by clinicians (nurses in particular). These two elements of participation were considered essential if patients were to be activated to participate in care, specifically in meeting the postoperative goals of recovery following TKR surgery.

Summary of key findings

It was hypothesised that by making explicit the goals of pain management, patients would be activated to engage in their management through self-monitoring and interactions with their clinicians in maintaining their pain intensity at a level that would enable them to meet their rehabilitation goals and prevent complications of surgery. The findings of the cluster randomised crossover trial showed that patients who received the MyStay intervention had lower pain intensity than the control group patients. In addition, there was a positive effect on the secondary outcomes of reduced length of hospital stay and higher satisfaction with the care received. Patients in the intervention group were more likely to recommend the health service to family or friends.

There were no observed differences in the degree of interference of pain on activities of daily living (APSOQ-R), knee pain and functioning (OKS) four weeks after discharge, or postoperative complications or readmission to hospital, however patients in the intervention group returned to full time employment earlier than patients in the control group.

Process evaluation data obtained via patient reported surveys and interviews showed effective implementation of the intervention over the acute recovery period following surgery. Implementation (not facilitation) of the multimedia intervention to
ensure that patients interacted with the program, required minimal clinician and patient time and was achieved by a brief daily interaction with patients with either a clinician or researcher. It was concluded that usability, acceptability and feasibility of the MyStay intervention in acute care was established as most patients interacted with the intervention for the duration of the postoperative in-hospital trajectory and that few additional resources were needed to enable patients to navigate MyStay.

The MyStay intervention, by providing clear, explicit, actionable and timely information for patients in the context of acute recovery and providing opportunity for interactions with clinicians that were focused on TKR goals of recovery, contributed to patient activation. Activation meant that patients had the willingness, knowledge and confidence to participate in their recovery after TKR surgery. Patients who received the facilitated multimedia intervention were more cognisant of their goals of recovery and more likely to initiate actions and implement strategies to overcome barriers than patients in the control group and, as a consequence of participation had an improved recovery.

7.1 Integration of Findings

Major findings of the cluster randomised crossover trial and embedded process evaluation are integrated for the purpose of understanding the effectiveness of the MyStay intervention in improving patients’ capability and opportunity to participate in their recovery. Integrating data from the multiple components of this research program provides an in-depth understanding of the role the MyStay intervention had in activating patients to participate in their postoperative care and subsequently, improve patient outcomes. The major contributions of this research to current knowledge are organised and discussed according to two major conclusions. First, that the MyStay intervention
enhanced patient participation in recovery in the acute care context following TKR surgery, and second, that if patients are provided with the capability and opportunity to participate in their recovery this leads to better outcomes of care.

**7.1.1 Outcomes of the research program**

*7.1.1.1 A facilitated multimedia intervention enhances participation in the acute postoperative context*

At the core of patient participation is the clinician-patient relationship that builds patient capability and creates opportunities for patients to actively engage in their recovery. Findings derived from the process evaluation provide some of the first empirical evidence of the effectiveness of a facilitated multimedia intervention in enabling patients to engage in achieving postoperative recovery goals after TKR surgery.

In order to participate, information must address the requirements of the surgical procedure, should make clear the specific recovery goals linked to patients’ health condition or procedure, accommodate different learning styles, and be communicated when patients are prepared and able to receive information (Berman et al., 2012; Larsson, von Essen, & Sjoden, 2007; Sahlsten, Larsson, Sjöström, & Plos, 2009). The information delivered via the *MyStay* intervention was explicit, timely, actionable and non-ambiguous thus overcoming barriers such as pre-existing abilities, acuity of illness and nuances of the environment. The delivery via iPad™ technology allowed patients to navigate the content at any time, ensuring usability and accessibility despite differences in ability and skill, or being encumbered by postoperative symptoms such as fatigue, nausea and pain, providing further evidence to support findings from earlier
research of the utility of multimedia in acute care (Cook et al., 2013; Greysen et al., 2014; O’Leary, Lohman, et al., 2015; Vawdrey et al., 2011).

The *MyStay* program was intuitive; information was consistent and incremental over each postoperative day to reduce cognitive demands. Multiple methods for delivery were used for accessibility over a wide range of skills, providing a strategy to overcome the burden of acute recovery after TKR surgery. The findings contribute to existing literature regarding the benefits of multimedia technology as a tool for patient education that is superior to other forms, especially when patients are burdened by symptoms (Fox, 2009; Wofford et al., 2005).

All patients who received the *MyStay* intervention were able to successfully interact with the program on an iPad™. This included a 95 year old patient who had never previously interacted with an iPad™ or similar technology, several patients who were hearing impaired, and a patient with severe rheumatoid arthritis. All were able to navigate the program and receive information related to the goals of recovery, suggesting usability and acceptability for its use in the acute care context.

Patient reported barriers specific to interacting with the *MyStay* intervention were examined because if patients do not fully engage with the program, or if barriers are not addressed, dissatisfaction and poor adherence can result (Deakin et al., 2005; Guevara et al., 2003; Schafer et al., 2010). Outcomes from this trial indicate illness acuity impacted on patients’ ability to view the intervention as often as they liked (38%); however, it did not impact on patients’ capability to use the program overall with 99 percent of intervention group patients interacting with *MyStay* during the second or third postoperative day. These findings are consistent with other research investigating the use of iPads™ in the postoperative context (Cook et al., 2013). The
MyStay intervention was available 24 hours a day from Day 1 until discharge. Acuity of illness, leaving the ward to have tests or procedures and busyness of the healthcare environment itself did constrain navigation of the program, as has been reported as a barrier in other research (Dalal, Dykes, Schnipper, & Bates, 2014; Kieft et al., 2014). However, patients together with clinicians, initiated actions to overcome barriers by watching the program components incrementally, or at a time when they were feeling well enough to be engaged. These findings provide evidence that facilitated multimedia interventions, delivered via iPad™ technology or similar platforms are feasible to use in an acute care context, and contextual barriers are able to be overcome.

One of the most common perceived barriers to participation identified predominately by control group patients, was the lack of, or inconsistent, information related to the goals of recovery. Control group patients often reported they received information that was mixed or confusing in the context of their own recovery that created a sense of disempowerment and ambiguity. A lack of or inconsistent information has similarly been reported as a barrier to participation in other research (Jerant et al., 2005; Mira et al., 2012; Smith, DuHamel, Egert, & Winkel, 2010). However in contrast, intervention group patients reported that the benefit of MyStay was that the information received was actionable and the animation supported their recovery when preforming knee exercises. The MyStay multimedia intervention was intended to provide explicit, specific information related to important goals of recovery after TKR surgery including physiotherapy, pain management and prevention of complications in a standardised way, which limited variably in the messages that patients received. It was clear that this was achieved and in doing so enhanced capability to participate as
demonstrated by patients’ ability to articulate explicitly and with accuracy pain management, mobility and daily goals of recovery.

In addition, the findings suggest that this enhanced capability activated patients to participate in their recovery as evidenced by the reports of goal directed pain management by the intervention group patients who were more aware of their goals of recovery, reported less pain, greater mobility and were initiating actions to overcome barriers such as notifying clinicians of high pain intensity. These findings support the argument that multimedia interventions can be a useful way to deliver reliable and accurate information to patients in the acute postoperative context (Cook et al., 2013; Greysen et al., 2014; O’Leary, Lohman, et al., 2015; Vawdrey et al., 2011). In addition, the delivery of consistent and timely information via the MyStay intervention appears to have contributed to a sense of confidence amongst intervention group patients who reported they would ask questions, pre-empt strategies or seek advice from clinicians to undertake necessary recovery activities. However, if these attempts at engagement are not responded to positively by clinicians, tensions can occur causing patients’ frustration and dissatisfaction with care received (McGuckin et al., 2004).

The facilitated nature of the MyStay intervention provided a focus for clinician interactions with patients by way of conversations to remind patients to use the program. Although interactions were not observed, it is proposed that the simple act of clinicians reminding patients to engage with the intervention provided implicit support for patients to act on the information and ask questions. Patients reported feeling supported and confident to initiate communication or clarify specific goals and this suggests that patients were activated to participate. Activation is defined as patients
having the knowledge, skills and confidence to actively participate in their care and self-management (Hibbard & Cunningham, 2008).

An important finding from this research was that the intervention appeared to be successful even when patients perceived there was limited engagement by nursing staff, as was evident in responses to the Day 3 questionnaire where only 22 percent of patients reported that a nurse went through the *MyStay* program with them during the previous 24 hours. A number of factors may explain this finding. Patients may have interpreted this particular question to mean that clinicians would go through the program with them daily (and this was indeed the intention), however many nurses and physiotherapists tended to limit facilitation to reminding patients to watch the program or asking patients if they had questions. Given that the question was asked on Day 3 it is possible that clinicians were satisfied that patients had engaged with *MyStay* and were confident using it and therefore by Day 3, stopped viewing the program with patients daily. It is also possible that clinicians did not engage with *MyStay* as they did not see it as a tool to assist with patient recovery. A limitation of this study was not capturing clinicians’ engagement with the intervention and should be considered in future research.

Despite this limitation, at the very least, daily reminders either by clinicians or the researcher appeared to be sufficient to endorse the program as a legitimate component of patients’ treatment plan. This finding demonstrates that implementation of the *MyStay* intervention is not expected to place additional demands on staff time beyond that required for usual care providing further evidence to support the feasibility of implementing this type of intervention in acute care clinical practice settings. Findings also addresses common clinicians’ concerns about balancing workload and
time constraints with introducing new care demands in acute care settings (Bolster & Manias, 2010; Gravel et al., 2006; Larsson et al., 2011b). It is argued that such an intervention can potentially reduce clinicians’ workload by providing a standardised process for communicating daily goals to patients and providing patients the opportunity to become partners in their care delivery by self-monitoring, initiating rehabilitation and preventing complications.

### 7.1.1.2 Patient capability and opportunity to participate leads to better outcomes of care

The crossover cluster randomised controlled trial provided high level evidence that the MyStay intervention led to reduced pain on Day 3. Content analyses of patients’ reported understanding and strategies for monitoring and managing pain suggest that this reduction in pain can be attributed to the intervention. Overall, patients in the intervention group were significantly more activated than control patients to participate in their goals of recovery which resulted in better outcomes (pain intensity on Day 3), higher satisfaction and earlier discharge from acute care.

#### 7.1.1.2.1 Pain intensity

Patients in the intervention group had greater knowledge about the postoperative goal for pain intensity and were more aware of, and more likely to, participate in pain management strategies than those in the control group. The difference between intervention and control group patients in their knowledge and understanding of strategies for the treatment and management of pain can explain differences in their capability to participate in their care. The lower reported pain intensity by intervention group patients can be explained by the finding that they received significantly more of their PRN opioid analgesics that patients in the control
group. It suggests that patients in the intervention group were more active in their recovery as they frequently engaged in pain relieving methods, for example asking clinicians for analgesia when their pain intensity goals were not met. They also reported higher use of relaxation methods such as deep breathing to relieve pain. High pain intensity is expected to be associated with high frequency of performing mobility exercises and therefore, patients in the intervention group who engaged in more activity and mobility may have experienced more pain requiring more analgesics. What is important is that patients recognised the importance of performing exercises and mobilisation and that pain relief was necessary. Patients in the control group were more likely to cease exercises and mobility until pain subsided or nurses came into their rooms rather than request additional analgesia. They were more likely to report waiting for nurses so that they could receive additional pain relief.

Support for the premise that patients requested more analgesia to manage their pain is derived from interview data with intervention group patients who reported pressing the call bell to alert nurses when pain was a barrier to performing exercises or mobilising. These findings indicate that intervention group patients were both aware of, and had the confidence to engage in the treatment and management of their postoperative pain further supporting the notion of activation (Hibbard, Peters, et al., 2005).

There were clear distinctions in the level of activation in pain management strategies between intervention and control group. Also important is that clinicians generally responded to patients’ requests for additional analgesia. This provides evidence that patients can influence pain management practices in the acute postoperative phase of recovery. The adequacy of pain management is highly reliant on
interactions between patients and nurses whereby assessments require that patients report their pain intensity to clinicians. Previous studies support the notion that patients who report their symptoms to a nurse typically receive a greater proportion of their PRN medications. For example, in a study of cancer patients’ engagement in symptom control, Cohen et al. (2012) found that patients who asked for PRN medications received more.

Although lower for patients in the intervention group, mean worst pain intensity scores for both groups were moderate to severe (NRS scores of 6 and 7/10), indicating suboptimal pain management. This suggests that non-patient related factors may also have influenced pain management and treatment. There was no difference between groups in the amount of fixed dose multimodal analgesics administered on Day 3. However, there was a difference in the proportion of patients prescribed an NSAID as part of the fixed regimen between intervention and control group patients. More patients in the intervention group were prescribed an NSAID. This may have occurred by chance or in response to patients’ requests for additional analgesia.

Additional considerations in regards to the suboptimal postoperative pain management are patients’ responses to the preadmission ‘Pain Barriers Questionnaire’ that suggests that patients’ misconceptions about pain treatment and management may have played a role. The majority of patients agreed or strongly agreed with the statements related to the likelihood of addiction to pain treatment (42.3%) and that pain medication cannot really control pain (34.9%). These beliefs may impact on patients’ expectations about achieving a pain free recovery after surgery and may have influenced how they reported their pain to clinicians. These findings are consistent with previous work (Cohen et al., 2008; Wong, Chan, & Chair, 2010a) indicating
congruence between what patients believe about analgesics and what they receive during an episode of care. Investigation of the effect of pre-existing beliefs on achieving optimal pain management was not the purpose of this study, however it is clear that this issue warrants additional investigation and may need to be addressed in future iterations of the *MyStay*.

In summary, the data provided evidence that patients can influence pain treatment and the finding that patients in the intervention group were able to negotiate additional analgesics suggests that this influence is significant.

### 7.1.1.2.2 Length of stay in acute care

Length of stay is an indirect indicator of the quality of patient recovery and may reflect postoperative wellness and absence of major complications (Frost, 2016). The findings of this study suggest that when patients have knowledge about their specific postoperative goals and how to achieve these goals, in that they can initiate pain relief, mobilise and perform knee exercises with less restriction, they can meet the requirements for discharge earlier. Early mobilisation, adequate pain management and discharge planning all impact on the length of hospital stay after joint replacement surgery (Ayalon et al., 2011; Barad et al., 2015; Husted et al., 2010; Vanhaecht et al., 2005; Woo et al., 2000).

Patient interview data provided evidence that intervention group patients were more aware of their goals of recovery than control group patients, and more frequently reported initiating actions to achieve daily goals such as sitting out of bed or carrying out knee exercises four times a day. In addition, intervention group patients were also more able to articulate the importance of adequate pain relief to enable mobility, exercises and accomplishment of daily goals.
A criterion for discharge from acute care after TKR is the degree of knee flexion achieved. Intervention group patients reported they were significantly more active in terms of mobility and were more likely than control group patients to articulate discharge requirements (e.g. $70^\circ$ knee bend) as well as plans following discharge from acute care (e.g. discharged home or rehabilitation facility), however objective measures of knee flexion, independent mobilisation or distance mobilised were not measured. The findings suggest that the provision of explicit information about key goals of recovery and animations of knee exercises contributed to the reduced length of stay in hospital.

7.1.1.2.3 Satisfaction with care

Press (2007) defines patient satisfaction as a summation of all patients’ experiences in hospital derived from how well a health service meets the personal, emotional and physical needs of patients in relation to their expectations. Patient satisfaction therefore, is a sentiment derived from patients’ expectations as well as past and current experiences. In this study, more than 80 percent of patients attended the pre-admission clinic and there was no difference between intervention and control groups in the proportion of patients recruited via the clinic or who had had previous hospital experience. The pre-admission program provides information about what to expect after surgery, managing pain and specific physiotherapy requirements.

At follow up, intervention group patients were significantly more satisfied overall and were more likely to refer a family or friend to the hospital for similar surgery than control group patients. Implementation of the *MyStay* intervention was via a portable smart device and required daily visits from the researcher and facilitated sessions with nurses. It is possible that the increased satisfaction was related to the
novel technology and increased attention patients received during their stay. However, patients in the control group were also visited daily by the researcher to mitigate this effect. It is considered unlikely that the novel technology alone would account for the wide differences in other outcomes measured, particularly length of stay and pain intensity. Instead, the specific nature of the MyStay intervention and the fact that it supported a nurse-facilitated component provide the most plausible explanations for the findings. It is more likely that the higher satisfaction scores were related to the overall experience of patients, that is that patients had lower pain intensity, were more active and mobile, and went home earlier.

An interesting finding of the study was the longitudinal changes in activation scores measured at baseline, Day 3 and at the 4-week follow-up. Activation scores were the same for both groups at baseline and indicted a high level of activation. On Day 3 activation levels decreased for both groups reflecting unfamiliarity with the acute care environment and the outcomes of surgery, and vulnerability related to pain and immobility. However there was a significant difference between intervention group and control group patients in activation on Day 3 where intervention group patients had less decline in their activation scores. Patient activation returned to baseline scores by the 4-week follow-up period.

The activation findings and the higher satisfaction of patients who were exposed to the MyStay intervention suggests that these patients were more likely to feel engaged with the health service and related with clinicians as partners in care because they were better informed and had more opportunities to take some control over their recovery and management of their symptoms (Patient centred care: Improving quality and safety through partnerships with patients and consumers, 2011).
7.1.2 Summary of integration

The study findings inform three key features fundamental to patient participation in achieving their recovery goals of care in the acute postoperative period, as set out in the conceptual framework for this research: 1) patients require capability through information in order to take an active role in their own care and management; 2) without opportunity provided by clinicians, the enactment of participation for patients is limited; and 3) patients need knowledge, skills and confidence (activation) to participate in their own care and management after TKR surgery.

The facilitated MyStay multimedia intervention delivered via iPad™ technology using a combination of text, sound and graphics provided information that was easy to use, specific to postoperative goals of recovery after TKR, was explicit about goals to achieve each day and provided details of what patients needed to do in order to achieve the goals. This information, together with facilitation by clinicians contributed to patients’ understanding and confidence to take an active role in their goals of recovery after TKR surgery. Participation in care led to improved patient outcomes. Figure 7.1 provides a diagrammatic summary of the integrated findings.
Figure 7.1 Integrated findings
7.1.3 Contribution to knowledge

Patient participation in their care has been previously demonstrated to improve outcomes for patients with chronic illness (Deakin et al., 2005; Guevara et al., 2003; Khan et al., 2004), however in acute care, outcomes of research have been variable (Hart, 2012; Krauss et al., 2008; Stenvall et al., 2007; Wyer et al., 2015) and questions raised about the sustainability of outcomes outside of trial conditions (McGuckin et al., 2004).

This research extends current knowledge and understanding of the enactment of patient participation in acute care contexts. An important contribution of this study was the development of a conceptual framework based on existing research that assists to explain the complex relationships between three key concepts necessary for patient participation in acute postoperative care contexts. The conceptual framework provides guidance for the development of future interventions to promote patient participation and assists the evaluation of these interventions in terms of how they are operationalised in an acute care context, impacts on patient activation, actual participation and patient outcomes. In summary, the framework provides a useful guide for future research for the development and evaluation of multimedia interventions to facilitate patient participation in acute recovery after surgery.

7.2 Implications of the Research for Practice

The MyStay intervention in providing consistent, relevant information of patients’ daily goals of recovery was shown to be effective in engaging patients to participate in their care. The multimedia presentation was an acceptable and accessible platform for providing this information within the context of postoperative recovery. While the initial development of such tools for patient engagement require initial costs
and resources, their subsequent use in practice given the outcomes is likely to be cost effective for several reasons. The time required to assist patients navigate MyStay was minimal and is not expected to add additional burden to clinicians. In this study the MyStay platform was on a portable device and patients did need initial assistance to navigate the system and there were other requirements such as specific infection control processes and the need to charge batteries overnight. The rapid change in technology in health care means that bedside, point-of-care devices for patients and clinicians to access are becoming more frequent and are likely to be the norm. Consequently, integrating programs such as MyStay for patient access is expected to be much more streamlined in the future. In addition, availability of programs such as MyStay will reduce the burden for clinicians related to providing the explicit daily information required for patients to participate, repeating information already provided if patients were not able to integrate the information when it is first received and ensuring that all patients have access to information that is consistent with their care pathway.

The process evaluation however did uncover processes of care that impacted on patient participation and outcomes that could potentially influence the effectiveness and sustainability of patient participation interventions, and these need to be addressed. These processes of care related to the opportunity for participation, in particular, facilitation of participation, the responsiveness of clinicians to patients’ attempts to participate, and the quality of pain management.

Opportunities for patient participation were variable and were related to patients’ perceptions of both the time clinicians had available to assist them and clinicians’ priorities. Nurse-facilitation of MyStay was an integral component of the
intervention. An expectation of the implementation of the *MyStay* intervention was that clinicians and patients would collaborate at the commencement of each shift to discuss plans for the day including goals and patients’ preferences. This was considered essential because discussing plans of care together would assist patients to recognise their shared role in achieving the goals of recovery (Arnetz et al., 2004; Baker, Marshak, Rice, & Zimmerman, 2001; McClain, 2015).

It was clear in the pre-implementation data and in field observations that there is significant variability between nurses in regards to how beginning of shift assessments are conducted and whether these involve conversations between nurses and patients about the plan of care. Whether or not this occurred appeared to be dependent on nurses’ workload. According to Kalisch (2009), when clinicians are facing multiple demands or insufficient resources, aspects of care that are often omitted include care planning, patient teaching and discharge planning, and surveillance.

The implications of omitting these care planning discussions was evident in relation to post TKR knee exercises. All patients had available to them at the foot of their beds diagrammatic information of the knee exercises required for rehabilitation of the knee joint. There was no difference between intervention and control group patients in their knowledge of exercises necessary for recovery. Barriers to performing the exercises included poor pain control and ambiguity about the meaning of the pain and possible damage to the knee joint. Patients in the control group were more likely to stop exercises and wait for the pain to improve rather than contact their nurses for additional pain relief. Although only 22 percent of patients in the intervention group reported that nurses had explicitly interacted with them using the *MyStay* intervention
on Day 3, it is highly likely that facilitation had occurred during their recovery period and patients felt comfortable using their call bell and initiating interactions with them.

Perceived busyness of clinicians, in particular nurses, is a well-recognised barrier to patient participation. The high workload of nurses in high throughput surgical units is well recognised. Nurses commonly have competing priorities and low work fluency requiring them to multi-task, monitoring several activities simultaneously and switching from one activity to another (Duffield, Gardner, & Catling-Paull, 2008). What is important is how this is perceived by patients who are reluctant to add to nurses’ burden by making requests for assistance. This discourages patients from participating in their care (Bolster & Manias, 2010; Entwistle, McCaughan, et al., 2010; Schwappach & Wernli, 2011; Sutton, Eborall, & Martin, 2015).

Meaningful opportunities for patients to participate in their care are essential, and require understanding by clinicians about behaviours that inhibit participation and clarification around what care processes can be adapted to facilitate participation (Entwistle, McCaughan, et al., 2010). These adaptations relate to actions that affect patients’ perceptions of clinicians’ presence and priorities and include: active listening and taking seriously patient concerns; providing clear explanation where views may differ from those of the patient; appearing to have time to engage and talk by making eye contact and other non-verbal behaviours such as sitting by the patient’s bed; and reassuring patients it is expected that they ask or call for assistance if they have questions or would like to raise concerns (Joseph-Williams et al., 2014).

The high reported intensity of worse pain requires review of postoperative pain management particularly in surgical procedures that require high levels of mobility and exercise. Multimodal analgesics were prescribed according to best available evidence
for postoperative pain treatment after TKR surgery (Lewis, Gunta, Mitchell, & Bobay, 2012; Parvizi, Miller, & Gandhi, 2011; Thomazeau et al., 2015). Nevertheless, prescriptions of multimodal analgesics could be improved overall as 28 percent of patients were not prescribed an NSAID, a key element of multimodal analgesia (Lamplot et al., 2014). Consistent prescription and administration of multimodal analgesics can provide baseline pain relief for patients and perhaps lessen breakthrough pain and the subsequent need for (PRN) opioids (Lamplot et al., 2014; Lewis et al., 2012; Parvizi et al., 2011; Peters et al., 2006). In addition to the potential to improve analgesic prescribing, were the apparent gaps in assessment and documentation of pain, in particular pain on movement. Dynamic pain was rarely recorded in patients’ medical records and this was surprising given a primary goal for patients after TKR surgery is to begin mobilisation and knee bending exercises as soon as possible. Failure to assess or record dynamic pain scores explained the lack of congruence between patients’ reported mean pain scores on Day 3 during interviews and the mean documented pain scores. If pain on movement is not assessed, then pain intensity is likely to be underestimated and not treated.

In summary, we are in the midst of an important and potentially transformative shift related to patients’ roles in health care. Patient participation in the context of acute recovery has been operationalised in this research as a complex interplay between the key concepts of capability, opportunity and patient activation. The underpinning premise of this research was that acute care environments present particular complexities that impact on patients’ capability to participate and influence opportunity for patients due to the context of care delivery, primarily the quality of interactions between nurses and patients.
Chapter 7 Integration and Conclusions

7.3 Strengths and Limitations of the Research

This study, involved three wards from one hospital, and employed a cluster randomised cross over trial design and concurrent process evaluation to uncover the impact patient participation has on key recovery outcomes in acute care. The study was powered to detect changes in pain intensity on Day 3 after TKR surgery. Findings from this research program have made an important contribution to our understanding of the role a facilitated multimedia intervention has on activating and engaging patients in their recovery after TKR surgery. In addition, results contribute to the current literature regarding outcomes of active participation in care.

7.3.1 Strengths of the research

The research program had several major strengths. First, the cluster randomised crossover design provided a robust determination of the effects of the intervention compared to usual care and addressed a number of methodological limitations of previous research, namely failure to address the complexity of ‘real’ clinical environments, absence of control groups or links to patient outcomes (Cook et al., 2014; Dalal et al., 2015; Davis, Sevdalis, Pinto, Darzi, & Vincent, 2011; Vawdrey et al., 2011). Randomised controlled trials are used widely for demonstrating underlying relationships in health care because the study design is able to control for unknown or unmeasured confounders (Lewin, Glenton, & Oxman, 2009).

The use of crossover between wards provided a more efficient comparison of the intervention by increasing the power of the study with less participants. In addition, the conduct of the trial within one institution and only three wards raised concerns about the influence of potential confounding covariates such as ward culture and processes of care. Crossover between wards somewhat mitigated against the risk of confounding.
The cluster design accounted for any potential contamination that would have occurred in a randomised trial where patients may have been allocated to the same ward during the same period. Potential for contamination of the intervention from one period to another related to the crossover design, was mitigated by removal of the intervention for a period of at least two weeks between study periods. When the data were analysed there were no period effects on any of the primary or secondary outcomes thus indicating that the intervention effects did not carry over once the intervention had been removed.

The cluster randomisation of the wards allowed recruitment of every eligible patient during the study periods, thus increasing efficiency of recruitment. In addition the cluster randomisation enabled a streamlined process for data collection. Retention of participants throughout this trial was very high, with only one patient not able to receive the intervention. A total of 230 (95%) of patients were interviewed on Day 3 and only 14 percent of participants were lost at follow up suggesting a strong approach to recruitment and maintenance of participants.

Another strength of the design was the inclusion of a rigorous process evaluation embedded in the trial that enabled a comprehensive review of all stages of the research approach and relationships in the data. Strength of the design also related to the multiple methods of data collection used throughout the study.

Patient interviews, self-reported questionnaires and chart audits enabled a full lens view of the influences of the multimedia intervention on patient capability and opportunity for participation in care after TKR surgery. The findings of significant differences in more than one outcome suggests strength in the trial design. Using mixed methods provided a comprehensive evaluation of barriers and facilitators for the
successful implementation of such an intervention within the context of care delivery in acute care and the role the intervention played in engaging patients in their recovery. These findings inform future implementation, external generalisability to other health services and sustainability.

7.3.2 Limitations of the research

Methodologic limitations to this study should be considered when interpreting results of this trial. First as the intervention was facilitated by nurses; blinding of ward nurses and patients was not possible. Blinding of the researcher collecting the data was also not practical as this study was conducted as part of a PhD research program and the student (JM) was also the primary data collector. To mitigate the chance of bias during data collection the researcher treated each group as equally as was possible. This involved using the same templates for patient interviews, using the same questionnaires to elicit information related to pain management and treatment. Data were collected from the medical records via the online web system used at the hospital, and the data collector was blinded, where possible, to intervention or control group patient charts. In addition, the multiple sources of data that were collected were triangulated to reduce bias.

Partial concealment at the time of recruitment was also applied in this study. Patients were blinded to the primary outcome of the study, they were informed the study was to investigate their overall experience; they were not told it was specifically related to their pain intensity and the iPad™ multimedia intervention was not discussed at time of consent.

A second limitation was that this study was conducted in a single site. However, as stated by Bellomo (2009) single centre trials are valuable when a robust
methodology is used. However, generalisability of the research findings to other health services is a factor to consider. The process evaluation provides some guidance but multi-site studies are necessary.

### 7.4 Future research agenda

The conceptual framework used to inform the implementation and evaluation of the *MyStay* intervention provides the foundation for future research and the context for understanding the synergies between the key concepts examined that influence patient participation in acute postoperative care.

Further analyses of the patient-related factors that influence participation such as age, sex, education level, and sociodemographic characteristics are intended through structural equation modelling (SEM). Although non-modifiable, these factors will inform modifications of the *MyStay* intervention to continue its refinement towards a program that is inclusive of patients with different requirements. Future iterations of the *MyStay* intervention could include flexible manipulation of the process whereby patients can access the program according to their desire for more in-depth information. In addition, provision of patient interaction with *MyStay* would add another dimension to the program and provide a vehicle for patients to communicate with health care providers at all levels.

Rigorous translation science studies are needed to examine the implementation of patient participation interventions in health care delivery processes to increase the potential for consistent, positive outcomes. These studies would consider the multifaceted barriers and facilitators for participation that are inherent in clinicians’ behaviours and practices and the processes of care.
This research was conducted within one institution and there is the need to extend this study to multiple sites to account for potential differences in the profile of patient demographic characteristics, clinician expertise and practices, health service care delivery culture, structure and processes.

7.5 Conclusions

The *MyStay* bedside, multimedia, facilitated intervention designed to increase the capability and opportunity for patients to participate in achieving their goals of recovery in the immediate postoperative period after TKR surgery enhanced patient participation in their care after surgery. Enhanced participation resulted in improved outcomes. In-hospital pain intensity and length of stay in acute care were reduced and patient satisfaction was increased. Patients who engaged with *MyStay* were more likely to recommend the hospital to family and friends who were undergoing similar surgery.

The embedded process evaluation confirmed the relationships between capability, opportunity and activation proposed by the conceptual framework informing this research and identified facilitators and barriers related to patient perceived clinician behaviours and processes of care that impact on participation. The findings provide a tool and framework and for implementing and evaluating interventions to promote patient participation in recovery after TKR surgery.

Future research is needed to confirm findings across health services and rigorous translation science processes investigated to increase the potential for consistent, positive outcomes and sustainability.
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Appendices

List of Appendices

Appendix 1: TKR Care Guide
Appendix 2: PCIF Patients
Appendix 3: Pre-admission questionnaire
Appendix 4: Day 3 Patient questionnaire
Appendix 5: Semi-structured Interview
Appendix 6: Chart Audit Tool
Appendix 7: Deakin Ethics Approval
Appendix 8: Hospital Ethics Approval
Appendix 9: Nursing Staff Handout
Appendix 10: Flyer Patient Notes
Appendix 11: MyStay Evaluation Questionnaire
Appendix 12: Laminated Cards
Appendix 1: TKR Care Guide
CARE GUIDE
Pre and Post Operative Management

Procedure

- **Total Knee Replacement** *(5 days)*

**Statement of Intent**
The Care Guide is intended for use within XX HealthCare. Its purpose is to enhance delivery of care, coordination and communication with respect to individual patient care, and may be revised to meet individualised care needs. Care Guides never replace clinical judgement, nor do they replace Doctor’s orders. It is expected that contemporaneous notes will be documented by all clinicians each shift.

**Definitions**

A **total knee replacement** (also referred to as a total knee arthroplasty) - involves the replacement of the knee joint with a prosthesis (artificial joint).

*Osteoarthritis* — is a disease process affecting cartilage and structures within joints resulting in inflammation and destruction of the articulating surfaces. It is clinically characterised by joint pain, stiffness and functional limitation.

*Rheumatoid arthritis* — a chronic inflammatory condition affecting the synovial membrane in joints. It primarily affects small joints (hands and feet) without aggressive treatment can lead to a decreased quality of life and major joint replacement.

**Aetiology / Background**
Total Knee Replacement (TKR)

- Pathology – MSU, FBE, Us Es and Creatinine, ECG and group and hold results available.
- Patients should be taken off anticoagulants at an appropriate time prior to surgery.
- Urinalysis should be attended to confirm evidence of micro/macro blood and/or leucocytes which may indicate urinary tract infection.
- Radiology films may include – e.g. MRI and plain x-ray and are to accompany patient to theatre.
- Surgical site skin preparation as per Surgeon’s orders, i.e. clip and betadine/chlorhexidine wash, huck towel wrap.

Observations:
- Record baseline observations, report to anaesthetist if not within normal limits.
- Measure and fit patient with anti-embolic stockings which are to be worn to theatre.
- Fasting time according to list (approx 8 hours).
- BSL and other medical needs attended to as required.
- Consent signed and theatre paperwork attended to.

Post-Operative Management

Risk Assessments
- Falls MR46
- Patient Transfer, Mobility MR46A
- Pressure Area MR46C
- VTE MR46D

The Safety and Risk assessments are to be completed as per recommended frequency. If patient condition alters refer to the risk assessments to update strategies as required.

Multidisciplinary Team

It is imperative to work and liaise within a team environment to achieve improved patient outcomes. Allied health interventions for recovery and planning for these patients may include, but not limited to, physiotherapy, dietetics, speech therapy, social work and occupational therapy.

Milestones to Achieve for Discharge

- Observations within medically acceptable parameters, tolerating diet and fluids.
- Walking independently and can safely ascend and descend stairs with the use of a walking aid.
- Demonstrates confidence in attending home exercise program.
- Assessed as medically stable to transfer to rehabilitation facility (if applicable).
- Comfortable with pain medication regime.

Complications
Total Knee Replacement (TKR)

**DVT/PE** – This patient is in a high risk category for DVT/PE. Mechanical prophylaxis e.g. anti-embolic stockings, sequential intermittent compression may be prescribed, unless contraindicated, and anticoagulation given as ordered. Early ambulation is encouraged and deep breathing & coughing is to be attended hourly.

**Constipation** is a common complication as a result of post-operative analgesia, immobility and dietary changes. It is essential to encourage early mobilisation, hydration and regular aperients.

---

The Care Guide provides an expected length of stay target.

If the LOS extends beyond what is routinely expected it may indicate that complications, unexpected clinical outcomes or co-morbidities have impacted on the patient clinical recovery.

Please ensure that this is clearly documented in the progress notes.
### Total Knee Replacement (TKR)

<table>
<thead>
<tr>
<th>S</th>
<th>I</th>
<th>Observations</th>
<th>Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S</strong></td>
<td><strong>I</strong></td>
<td><strong>S</strong></td>
<td><strong>A</strong></td>
</tr>
<tr>
<td>CNS</td>
<td>Introduce staff caring for the patient.</td>
<td>Patient identified.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Procedure: Total knee replacement.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post op RTW time.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reason for admission.</td>
<td></td>
</tr>
<tr>
<td>OBSERVATIONS</td>
<td>Assessments attended as per protocol.</td>
<td>Risk interventions and strategies reviewed as required.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Above knee anti-embolic stockings to be worn unless contraindicated.</td>
<td></td>
</tr>
<tr>
<td>CVS</td>
<td>Specifically</td>
<td>Patient orientated and appropriate.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patient comfortable with PCA/spinal narcotic/epidural.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observations: RPAO for 4 hours, then according to protocols.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Neurovascular observations (lower limbs) – according to protocols.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limb strength equal.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check IVT site and rate.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Document resite due date (48-96 hours).</td>
<td></td>
</tr>
<tr>
<td>Resp</td>
<td>Encourage patient to attend DB &amp; C and limb movements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renal</td>
<td>IDC insitu. Urine output &gt;30mls/hr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIT</td>
<td>Diet and fluids as desired when alert – please check post operative orders.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metabolic</td>
<td>Musculoskeletal/ADLs</td>
<td>Assist with post op wash 4/24 following RTW.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intermittent calf compression device insitu (if ordered).</td>
<td></td>
</tr>
<tr>
<td>Assessments</td>
<td>Skin</td>
<td>Knee dressing dry &amp; intact.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drain tubes insitu, patent and draining. Report drainage &gt;100ml/hr.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cryocuff or ice pack applied to knee.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Bellowac ABT reinfusion drain - blood collected &gt;150mls MUST be reinfused within 6/24 from time documented on drainage bag</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psycho-social</td>
<td>Patient mood / expression / cognition</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Investigations as ordered, (i.e. check Hb, x-rays). Consider relevant past history and any interventions required.</td>
<td></td>
</tr>
</tbody>
</table>

---

**DAY 1 POST OP (24 HOURS)**
Total Knee Replacement (TKR)

| I   | Introduce staff caring for the patient.  
    | Update whiteboard and hourly rounding documentation. |
|-----|---------------------------------------------------|
| S   | Specifically Patient identified.  
    | Procedure: Total knee replacement.  
    | Reason for admission. |
| O   | CNS Patient orientated and appropriate.  
    | Patient comfortable with PCA/spinal narcotics/pidural. |
|     | OVS Observations: As per protocols.  
    | Neurovascular observations (lower limbs) – according to protocols.  
    | Limb strength equal.  
    | Check IV site and rate.  
    | Document resite due date (48-96 hours). |
|     | Resp Encourage patient to attend OBB&C and limb movements. |
|     | Renal IDC insitu.  
    | Patient passing flatus. |
|     | GIT Diet and fluids as desired when alert.  
    | Patient to SOOB for meals. |
|     | Metabolic | |
|     | Musculo-skeletal /ADLs Patient seen by physiotherapist  
    | Patient showered with assistance. |
|     | Skin integ Knee dressing dry & intact.  
    | R/o drain/s as per surgeon orders.  
    | Cryocuff / ice pack applied to knee. |
|     | Psychiatry /social Patient mood / expression / cognition. |

**B** Investigations as ordered, (i.e. check Hb, U & E, X-rays). Results known, doctor notified if abnormal.  
Consider relevant past history and any interventions required.

**A** Risk assessments attended as per protocol.  
Risk interventions and strategies reviewed as required.  
Anti-thrombotic stockings to be worn unless contraindicated.

**R** Refer to Doctor orders/preferences.  
Commence discharge plan, consider allied or community referrals if discharge concerns.  
Ensure patient/family aware of discharge time by 0830, and expected LOS.

**Specific Care Instructions and Information**  
- Referral to rehabilitation if required.

**DAY 2**
**Total Knee Replacement (TKR)**

<table>
<thead>
<tr>
<th>I</th>
<th>Introduce staff caring for the patient. Update whiteboard and hourly rounding documentation.</th>
</tr>
</thead>
</table>
| S | **Specifically**  
Patient identified.  
Procedure: Total knee replacement.  
Reason for admission. |
| O | **CNS**  
Patient orientated and appropriate  
Ensure regular analgesia. |
| V | **Observations**  
Observations: As per protocols.  
Neurovascular observations (lower limbs) – according to protocols.  
Limb strength equal.  
Check IVT site and rate.  
Removal of IVC as per Doctor’s orders.  
Document route due date (48-96 hours). |
| R | **Resp**  
Encourage patient to attend DB&C and limb movements. |
| N | **Renal**  
Removal of IDC on Doctor’s orders. Patient voiding post removal. |
| T | **GIT**  
Diet and fluids as desired.  
Patient to be commence on no contraception if NPO. |
| M | **Metabolic**  
Supervise shower on shower chair. |
| S | **Musculo-skeletal /ADLs**  
Knee dressing dry & intact.  
R/o drain tube on surgeon’s orders.  
Cryocuff / ice pack applied to knee. |
| E | **Skin Integ**  
Patient mood / expression / cognition. |
| P | **Psychosocial**  
Patient mood / expression / cognition. |
| B | Investigations as ordered, (i.e. Check x-ray – AP/Lat)  
Consider relevant past history and any interventions required. |
| A | **Risk assessments attended as per protocol.**  
**Risk interventions and strategies reviewed as required.**  
Anti-embolic stockings to be worn unless contraindicated. |
| R | **Refer to Doctor orders/preferences.**  
Monitor discharge plan, consider allied or community referrals if discharge concerns.  
Ensure patient/family aware of discharge time by 0930, and expected LOS. |

**Specific Care Instructions and Information**  
- If patient is being discharged home, consider wound referral for removal of staples at 10/7.

**DAY 3**
Total Knee Replacement (TKR)

| I | Introduce staff caring for the patient. Update whiteboard and hourly rounding documentation. |
| O | CNS Patient orientated and appropriate. Ensure regular analgesia. |
| V | OBSERVATIONS - Assessments | CVS Observations: As per protocols. Neurovascular observations (lower limbs) – according to protocols. Limb strength equal. Check I.V.T site and rate. Removal of IVC as per Doctor's orders. Document route due date (48-96 hours). |
| R | Resp Encourage patient to attend DBSC and limb movements. |
| Renal | Normal pattern returned. |
| GIT | Diet and fluids as desired. Bowels opened. |
| Metabolic | Patient to be commence on nect aperients if BNO. |
| Musculo-skeletal /ADLs | Patient has independent shower standing. |
| Skin | Knee dressing dry & intact. |
| Integ | Grynocuff / ice pack applied to knee. |
| Psycho-social | Patient mood / expression / cognition |
| B | Investigations as ordered, (i.e. bloods, x-rays). Consider relevant past history and any interventions required. |
| A | Risk assessments attended as per protocol. Risk interventions and strategies reviewed as required. Anti-embolic stockings to be worn unless contraindicated. |
| R | Refer to Doctor orders/preferences. Monitor discharge plan, consider allied or community referrals if discharge concerns. Ensure patient/family aware of discharge time by 0930, and expected LOS. |

Specific Care Instructions and Information
- If patient is being discharged home, consider wound referral for removal of staples at 10/7.

DAY 4
### Introduce staff caring for the patient.
Update whiteboard and hourly rounding documentation.

### Specifically
- **Patient identified.**
- **Procedure:** Total knee replacement.
- **Reason for admission.**

### CNS
- **Patient alert and orientated.**
- **Ensure regular analgesia.**

### CVS
- **Observations:** As per protocols.
- **Neurovascular observations remain within normal limits.**
- **Pedal pulses present.**
- **Able to demonstrate plantar and dorsiflexion.**

### Resp
- **Encourage patient to attend DB&C and limb movements.**

### Renal
- **Normal voiding pattern.**

### GIT
- **Diet and fluids as desired.**
- **Bowels opened.**

### Metabolic
- **Patient to commence on nocte aperiens if BNO.**

### Musculo-skeletal/ADLs
- **Patient has independent shower.**

### Skin
- **Knee dressing dry & intact.**
- **Cryocuff / ice pack applied to knee.**

### Psycho-social
- **Patient mood / expression / cognition**

### Investigations as ordered, (i.e. bloods, x-rays).
Consider relevant past history and any interventions required.

### Risk assessments attended as per protocol.
Risk interventions and strategies reviewed as required.
Anti-embolic stockings to be worn unless contraindicated.

### Refer to Doctor orders/preferences.
Ensure discharge medications are ordered 24 hours prior to discharge.
Ensure patient/family aware of discharge time by 0930, and expected LOS.

### Specific Care Instructions and Information
- If patient is being discharged home, consider wound referral for removal of staples at 10/7.

### DAY 5 DISCHARGE
Total Knee Replacement (TKR)

| I | Introduce staff caring for the patient. 
Update whiteboard and hourly rounding documentation. |
|---|---|
| S | Specifically Patient identified. 
Procedure: Total knee replacement. 
Reason for admission. |
| O | CNS Assess pain. 
Ensure regular analgesia for the first 24/24. |
| B | CVS Observations: As per protocols. 
Neurovascular observations remain within normal limits. 
Pedal pulses present. 
Able to demonstrate plantar and dorsi flexion. 
Ensure IVC removed prior to discharge. |
| M | Resp Encourage patient to attend SBSC and limb movements. |
| R | Renal Normal voiding pattern. |
| A | GIT Diet and fluids as desired. 
Bowels opened. 
Patient to be commence on noce aperients if BNO. |
| A | Metabolic Patient showered independently. |
| A | Musculo- skeletal/ADLs Patient showered independently. |
| B | Skin Knee dressing attended to as per Surgeon’s preference. 
Nil signs of infection. 
Cryocuff / Ice pack applied to knee. |
| A | Integ |
| A | Psycho- social Patient mood / expression / cognition |
| B | Investigations as ordered, (i.e. bloods, x-rays). 
Consider relevant past history and any interventions required. |
| A | Risk assessments attended as per protocol. 
Risk interventions and strategies reviewed as required. 
Anti-embolic stockings to be worn unless contraindicated. |
| R | Refer to Doctor orders/preferences. 
Ensure patient/family aware of discharge time by 0930. |

**Specific Care Instructions and Information**

- Discharge medication education provided.
- Patient safe for discharge and discharged from physiotherapy.
- Ensure wound care organised for removal of staples at 10/7 (may require a clip remover).
Total Knee Replacement (TKR)

References


Revision History

Issued: August 2013
Date of last review: August 2013
Date of next review: August 2014
Appendix 2: PCIF Patients
PARTICIPANT INFORMATION AND CONSENT FORM

TO: Participant Patients

Participant Information and Consent Form

Date: 24th July 2013

Full Project Title: Patient participation in postoperative care activities: The patient experience.

Principal Researcher: Professor Mari Botti (Chair in Nursing)
Student Researcher: Ms. Jo McDonald (PhD Candidate)
Associate Researcher: Professor Richard De Steiger (Chair of Surgery)
Dr Bernice Reddy (Supervisor)
Associate Professor Trish Livingston (Supervisor)
Associate Professor John Reynolds (Statistician)

This document is six pages long. Please make sure you have all the pages.

Your Consent

You are invited to take part in this research project because you are preparing for Total Knee Replacement surgery at Epworth Healthcare.

This Participant Information and Consent Form tells you about the research project. It explains what is involved to help you decide if you want to take part.

Please read this information carefully. Ask questions about anything that you don’t understand or want to know more about. Before deciding whether or not to take part, you might want to talk about it to a relative, friend or your local health worker.

Participation in this research is voluntary. If you don’t wish to take part, you don’t have to.
If you decide you want to take part in the research project, you will be asked to sign the consent section. By signing it, you are telling us that you:

- Understand what you have read;
- Consent to take part in the research project;
- Consent to be involved in the procedures described;
- Consent to the personal use of your personal health and health information as described.

You will be given a copy of this Participant Information and Consent Form to keep.

2. **What is the purpose of this research project?**

In this study we are seeking to better understand how patients can participate in their postoperative care activities by observing how patients and nurses interact and share information and by asking patients how they feel about being involved in their recovery.

The results of this study will be collated in a PhD thesis to fulfill requirements of the Doctor of Philosophy degree at Deakin University for Ms Jo McDonald. The findings will also be published in peer reviewed professional journals.

3. **What does participation in this research project involve?**

You will be asked to fill out two (2) questionnaires, one before your operation and one 4-6 weeks after you are discharged from hospital. Each questionnaire will take approximately 20 minutes to complete. You will be interviewed by the researcher on Day three (3) after your surgery while you are in hospital. During this interview you will be asked questions about your recovery and whether you have had opportunities to take part in your care after surgery. This interview will last approximately 20 minutes. We are also seeking your permission to record information about your pain treatment from your medical records.

Data from the interview and medical records will be collected in written and electronic form and the interviews will be audiotaped.

A researcher (a Registered Nurse) may also observe interactions (communication) between you and your nurse on one occasion during your recovery. Should you be selected for the observation component of the research, the researcher (a Registered Nurse) will ask you if you are happy to participate. Should you feel you do not want to participate in the observations or during the observation period you require privacy, the observer will withdraw. The observation component will last about 15 to 20 minutes.

4. **What are the possible benefits?**

While you may or may not directly benefit from this study, your participation and that of others will contribute to our understanding of the way patients and clinicians communicate important information and help to improve the way we currently involve patients in their care after surgery.
5. **What the possible risks?**

There are no foreseeable risks to you from being involved in this study. A mutually suitable time will be arranged with you and the researcher on Day three (3) for a brief interview. If the time allocated is not suitable an alternative time will be arranged. If for any reason you feel that you do not want to participate in the interview or the observation component you can let the researcher or your nurse know and the interview/observation will not take place.

6. **Do I have to take part in this research project?**

Participation in any research project is voluntary. **If you do not wish to take part you are not obliged to.** If you decide to take part and later change your mind, you are free to withdraw from the project at any stage and the data that has not been analyzed will not be used and will be destroyed.

Your decision whether to take part or not to take part, or to take part and then to withdraw, will not affect the health care you receive or your relationship with Epworth Healthcare or Deakin University.

7. **How will I be informed of the final results of this research project?**

If you would like to receive a summary of results from this research project please check the box on the consent form. If you would like to receive results the researcher will ask for your mailing or email address.

8. **What will happen to the information about me?**

Any information obtained for the purposes of this research project that can identify you will be treated as confidential and securely stored. It will be destroyed only with your permission, or in compliance with the law.

All the information you provide will be coded so you cannot be identified by name, and only the research team will have access to the list that can link your name to the your data. All information will be stored in a locked filing cabinet in the office of the research staff, and will be disposed of as confidential waste after seven years. In any publication, information will be provided in such a way that you cannot be identified.

9. **Can I access research information kept about me?**

In accordance with relevant Australian and/or Victorian privacy and other relevant laws, you have the right to access the information collected and stored by the researchers about you. Please contact one of the researchers named at the end of this document if you would like to access your information.

Further, in accordance with regulatory guidelines, the information collected in this research project will be kept for at least 7 years after publication of the findings. You must be aware that the information may become de-identified at some point and access to information about you after this point will not be possible.
10. Is this research project approved?

The ethical aspects of this research project have been approved by the Human Research Ethics Committees of Epworth HealthCare and Deakin University.

This project will be carried out according to the *National Statement on Ethical Conduct in Human Research (2007)* produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.

11. Who can I contact?

The person you may need to contact will depend on the nature of your query. Therefore please note the following:

**Further information:**

If you would like further information about the project you can contact:

Name: Professor Mari Botti  
Position: Principal Researcher – Chair in Nursing  
Telephone: (03) 9426 6565

**Complaints:**

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about being a research participant in general, then you may contact:

Name: Dr Victoria Emery  
Position: Deakin University Human Research Integrity Officer  
Telephone: (03) 9251 7123  
Project id: 2013-195 (Deakin University)

Or

Name: Ms Hilary Young  
Position: HRRC Coordinator, Epworth HealthCare  
Telephone: (03) 9426 8806  
Project id: 598-3 (Epworth HealthCare)

You will need to tell the contact person the name of one of the researchers as listed at the top of the first page.
PARTICIPANT INFORMATION AND CONSENT FORM

To: Participant Patient

CONSENT FORM

Date:

Full Project Title: Patient participation in postoperative care activities: The patient experience.

I have read and I understand the attached Participant Information.

I freely agree to participate in this project according to the conditions in the Participant Information.

I have been given a copy of the Participant Information and Consent Forms to keep.

The researcher has agreed not to reveal my identity and personal details, including where information about the project is published or presented in any public form.

I understand that the interview will be audiotaped.

I would like to be informed of the final research results (please circle) Yes No

Participant's Name (printed).................................................................

Signature.................................................................................. Date........................................

Declaration by researcher*: I have given a verbal explanation of the research project, its procedures and risks and I believe that the participant has understood that explanation.

Researcher's name (printed)..................................................

Signature.................................................................................. Date........................................

Note: All parties signing the consent section must date their own signature.

Page 5 of 6

Participant Information and Consent Form  Patients  Version 1 (10 April 2013)
PARTICIPANT INFORMATION AND CONSENT FORM

To: Participant

PATIENT

WITHDRAWAL OF CONSENT FORM

Date:

Full Project Title: Patient participation in postoperative care activities: The patient experience.

I hereby wish to WITHDRAW my consent to participate in the above research project and understand that such withdrawal WILL NOT jeopardize my relationship with Deakin University or Epworth HealthCare.

Participant's Name (printed).................................................................

Signature................................................................. Date...........................................

Please mail or fax this form to:

Professor Mari Botti
School of Nursing and Midwifery, Deakin University
221 Burwood Hwy
Burwood, 3125
Ph (03) 9426 6565
Fax (03) 9266 6159
Appendix 3: Pre-admission questionnaire
PRE-ADMISSION QUESTIONNAIRE

There are 69 questions in this questionnaire, with a total of 11 pages.
Please make sure all questions are completed and return via the pre-paid envelope provided.
Patient ID _____

Demographic Characteristics
1. Age ______ years
2. Sex  □ MALE (1)
       □ FEMALE (2)
3. Country of birth
   □ Australia (1)
   □ United Kingdom (2)
   □ Asia (3)
   □ New Zealand (4)
   □ Europe (5)
   □ Other (6) please state _______________________
4. Preferred language spoken at home
   □ English (1)
   □ Italian (2)
   □ Mandarin (3)
   □ Greek (4)
   □ Other (5) please state _______________________

Social Supports
5. Living arrangements
   □ Living with partner, family or friends (1)
   □ Living alone (2)
6. Marital status
   □ Partnered (1)
   □ Not Partnered (2)
   □ Widowed (3)
Patient ID _____

7. Employment status prior to hospitalisation (select one most relevant)
   - Full Time (1)
   - Part Time (2)
   - Casual (3)
   - Volunteer (4)
   - Unemployed – looking for work (5)
   - Retired (6)
   - Other _______________ (7)

Previous hospital experience
8. Have been a patient in an acute hospital (any hospital) in the last 5 years (elective or emergency)?
   - Yes (1)
   - No (2)
Patient ID _____

**Preference for participation in care**

Below are some statements that people sometimes make when they talk about their health. Please indicate how much you agree or disagree with each statement as it applies to you personally by circling your answer. Your answers should be what is true for you and not just what you think the doctor wants you to say.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. When all is said and done, I am the person who is responsible for taking care of my health</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
<tr>
<td>10. Taking an active role in my own health care is the most important thing that affects my health</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
<tr>
<td>11. I am confident I can help prevent or reduce problems associated with my health</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
<tr>
<td>12. I know what each of my prescribed medications do</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
<tr>
<td>13. I am confident that I can tell whether I need to go to the doctor or whether I can take care of a health problem myself</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
<tr>
<td>14. I am confident that I can tell a doctor concerns I have even when he or she does not ask</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
<tr>
<td>15. I am confident that I can follow through on medical treatments I may need to do at home</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
<tr>
<td>16. I understand my health problems and what causes them</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
<tr>
<td>17. I know what treatments are available for my health problems</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
<tr>
<td>18. I have been able to maintain (keep up with) lifestyle changes, like eating right or exercising</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
<tr>
<td>19. I know how to prevent problems with my health</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
<tr>
<td>20. I am confident I can figure out solutions when new problems arise with my health</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
<tr>
<td>21. I am confident that I can maintain lifestyle changes, like eating right and exercising, even during times of stress</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>N/A</td>
</tr>
</tbody>
</table>
22. Please read the statements below and number each box starting from:
   1 (most preferred role) to 5 (least preferred role).

   Make sure each box in numbered with a different number including numbers 1, 2, 3, 4 & 5.

   □ I prefer to make the final selection about which treatment I will receive

   □ I prefer to make the final selection of my treatment after seriously considering my doctors opinion

   □ I prefer that my doctor and I share responsibility for deciding which treatment is best for me

   □ I prefer that my doctor makes the final decision about which treatment will be used, but seriously considers my opinion

   □ I prefer to leave all decisions regarding my treatment to my doctor
<table>
<thead>
<tr>
<th>Question</th>
<th>Please circle your response</th>
<th>How important is this to you?</th>
</tr>
</thead>
<tbody>
<tr>
<td>23 I expect to receive the best possible physical care, e.g. help to take care of my personal hygiene</td>
<td>1 2 3 4</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>24 I expect to receive the best possible medical care (as far as I can tell)</td>
<td>1 2 3 4</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>25 I expect to receive effective pain relief</td>
<td>1 2 3 4</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>26 I expect to have examinations and treatments within acceptable waiting times</td>
<td>1 2 3 4</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>27 I expect to receive food and drink that I like</td>
<td>1 2 3 4</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>28 I expect to have access to the apparatus and equipment that is necessary for my medical care (as far as I can tell)</td>
<td>1 2 3 4</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>29 I expect to have a comfortable bed</td>
<td>1 2 3 4</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>30 I expect to receive useful information on how examinations and treatments would take place</td>
<td>1 2 3 4</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>31 I expect to receive useful information regarding the results of examinations and treatments</td>
<td>1 2 3 4</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Question</td>
<td>Please circle your response</td>
<td>How important is this to you?</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td></td>
<td>Yes always</td>
<td>No</td>
</tr>
<tr>
<td>32</td>
<td>I expect to receive useful information on self-care: ‘how should I take care of myself?’</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>33</td>
<td>I expect to receive useful information on which doctors are responsible for my medical care</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>34</td>
<td>I expect to receive useful information on which nurses are responsible for my nursing care</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>35</td>
<td>I expect to have good opportunity to participate in the decisions that apply to my care</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>36</td>
<td>I expect the doctors to show commitment: ‘care about me’</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>37</td>
<td>I expect the nurses and assistant nurses to show commitment: ‘care about me’</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>38</td>
<td>I expect the doctors to understand how I might experience my situation</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>39</td>
<td>I expect the nurses and assistant nurses to understand how I might experience my situation</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>40</td>
<td>I expect the doctors to be respectful towards me</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>41</td>
<td>I expect the nurses and assistant nurses to be respectful towards me</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>42</td>
<td>I expect to talk to the doctors in private when I want to</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Question</td>
<td>Please circle your response</td>
<td>How important is this to you?</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-----------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>Sometimes</td>
</tr>
<tr>
<td>43 I expect to talk to the nurses in private when I want to</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>44 I expect there to be a pleasant atmosphere on the ward</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>45 I expect my relatives and friends to be treated well</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>46 I expect my care to be determined by my own requests and needs rather than the staff's procedures</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Patient ID ______

Expectation of experience questionnaire

Please circle the response on the scale from 1 – 4 that best describes what you expect from your care while you are in hospital after your knee replacement surgery, given expectations overall. There are 16 questions in this section.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Please circle your response</th>
</tr>
</thead>
<tbody>
<tr>
<td>47 When you have important questions to ask the doctor, do you expect to get answers that you can understand?</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>48 When you have important questions to ask the nurses, do you expect to get answers that you can understand?</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>49 Sometimes in a hospital, one doctor or nurse will say one thing and another will say something quite different. Do you expect this to happen to you?</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>50 If you have any anxieties or fears about your condition or treatment, do you expect a doctor to discuss these with you?</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>51 Do you expect doctors and nurses to talk in front of you as if you weren’t there?</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>52 Do you expect to be involved in decisions regarding your care and treatment?</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>53 Do you expect to be treated with respect and dignity while you are in hospital?</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>54 If you have any anxieties or fears about your condition or treatment, do you expect a nurse to discuss these with you?</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>55 Do you expect to be able to find someone on the hospital staff to talk to about your concerns?</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>56 Do you expect to have pain following surgery?</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>57 Do you expect the hospital staff to do everything they can to help control your pain?</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Questions</td>
<td>1</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td>58  If your family or someone else close to you wanted to talk to a doctor, do you expect they will have enough opportunity to do so?</td>
<td></td>
</tr>
<tr>
<td>59  Do you expect the doctors or nurses will give your family or someone close to you all the information they need to help you recover?</td>
<td></td>
</tr>
<tr>
<td>60  Do you expect a member of staff to explain the purpose of the medicines you will need to take at home in a way you could understand?</td>
<td></td>
</tr>
<tr>
<td>61  Do you expect someone to tell you about danger signs that you should watch for if you go home?</td>
<td></td>
</tr>
<tr>
<td>62  Do you expect a member of staff to tell you about medication side effects to watch for when you go home?</td>
<td></td>
</tr>
</tbody>
</table>
### Patient ID ______

**Barriers Questionnaire**

Please indicate your response to the next seven items by selecting a number that comes closest to how much you agree with that item. There are no right or wrong answers – we just want to know what you think.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Please circle your response</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 Pain medication cannot really control pain</td>
<td>1</td>
</tr>
<tr>
<td>64 People get addicted to pain medication easily</td>
<td>1</td>
</tr>
<tr>
<td>65 Good patients avoid talking about their pain</td>
<td>1</td>
</tr>
<tr>
<td>66 It is easier to put up with pain than with the side effects that come with pain treatment</td>
<td>1</td>
</tr>
<tr>
<td>67 Complaints of pain could distract the doctor from treating my underlying illness</td>
<td>1</td>
</tr>
<tr>
<td>68 Pain medication should be &quot;saved&quot; in case the pain gets worse</td>
<td>1</td>
</tr>
<tr>
<td>69 The experience of pain is a sign that the illness has gotten worse</td>
<td>1</td>
</tr>
</tbody>
</table>

This is the end of this questionnaire, thank you for your time. Please remember to mail this back in the pre-paid envelope provided.
Appendix 4: Day 3 Patient questionnaire
Patient ID ___

Day 3 - Patient participant questionnaire

There are 12 pages and a total of 66 questions in this questionnaire.

Please make sure you complete all questions.
Patient ID ___

Preference for participation in care

Below are some statements that people sometimes make when they talk about their health. Please indicate how much you agree or disagree with each statement as it applies to you personally by circling your answer. Your answers should be what is true for you and not just what you think you should say.

If the statement does not apply to you, circle N/A.

<table>
<thead>
<tr>
<th>Preference</th>
<th>Disagree Strongly</th>
<th>Disagree</th>
<th>Agree</th>
<th>Agree Strongly</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When all is said and done, I am the person who is responsible for taking care of my health</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
<tr>
<td>2. Taking an active role in my own health care is the most important thing that affects my health</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
<tr>
<td>3. I am confident I can help prevent or reduce problems associated with my health</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
<tr>
<td>4. I know what each of my prescribed medications do</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
<tr>
<td>5. I am confident that I can tell whether I need to go to the doctor or whether I can take care of a health problem myself</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
<tr>
<td>6. I am confident that I can tell a doctor concerns I have even when he or she does not ask</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
<tr>
<td>7. I am confident that I can follow through on medical treatments I may need to do at home</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
<tr>
<td>8. I understand my health problems and what causes them</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
<tr>
<td>9. I know what treatments are available for my health problems</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
<tr>
<td>10. I have been able to maintain (keep up with) lifestyle changes, like eating right or exercising</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
<tr>
<td>11. I know how to prevent problems with my health</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
<tr>
<td>12. I am confident I can figure out solutions when new problems arise with my health</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
<tr>
<td>13. I am confident that I can maintain lifestyle changes, like eating right and exercising, even during times of stress</td>
<td>Disagree Strongly</td>
<td>Disagree</td>
<td>Agree</td>
<td>Agree Strongly</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Patient Id _____

14. Please read the statements below and number each box starting from
   1 (most preferred role) to 5 (least preferred role)

Make sure each box in numbered with a different number including 1, 2, 3, 4 & 5.

☐ I prefer to make the final selection about which treatment I will receive

☐ I prefer to make the final selection of my treatment after seriously considering my doctor's opinion

☐ I prefer that my doctor and I share responsibility for deciding which treatment is best for me

☐ I prefer that my doctor makes the final decision about which treatment will be used, but seriously considers my opinion

☐ I prefer to leave all decisions regarding my treatment to my doctor
American Pain Society Patient Outcome Questionnaire

The following questions are about pain you experienced during the last 24 hours.

15. On this scale, please indicate the least pain you had in the last 24 hours:

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>no pain</td>
<td>worst pain possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. On this scale, please indicate the worst pain you had in the last 24 hours:

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>no pain</td>
<td>worst pain possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17. How often were you in severe pain in the last 24 hours? Please circle your best estimate of the percentage of time you experienced severe pain:

<table>
<thead>
<tr>
<th>0%</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>never in severe pain</td>
<td>always in severe pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
18. Circle the one number below that best describes how much pain interfered or prevented you from:

| a. Doing activities in bed such as turning, sitting up, repositioning: |
|-----------------------------|-----------------------------|
| 0 1 2 3 4 5 6 7 8 9 10     | does not interfere          |
|                            | completely interferes       |

| b. Doing activities out of bed such as walking, sitting in a chair, standing at the sink: |
|---------------------------------------------|-----------------------------|
| 0 1 2 3 4 5 6 7 8 9 10                     | does not interfere          |
|                                            | completely interferes       |

| c. Falling asleep                          |
|-------------------------------------------|-----------------------------|
| 0 1 2 3 4 5 6 7 8 9 10                     | does not interfere          |
|                                            | completely interferes       |

| d. Staying asleep                          |
|-------------------------------------------|-----------------------------|
| 0 1 2 3 4 5 6 7 8 9 10                     | does not interfere          |
|                                            | completely interferes       |
Patient Id ___

19. Pain can affect our mood and emotions.

On this scale, please circle the one number that best shows how much the pain caused you to feel:

   a. Anxious  0  1  2  3  4  5  6  7  8  9  10
      not at all                        extremely

   b. Depressed  0  1  2  3  4  5  6  7  8  9  10
      not at all                        extremely

   c. Frightened  0  1  2  3  4  5  6  7  8  9  10
      not at all                        extremely

   d. Helpless  0  1  2  3  4  5  6  7  8  9  10
      not at all                        extremely
20. Have you had any of the following side effects?

Please circle '0' if no; if yes, circle the one number that best shows the severity of each:

a. Nausea
   0 1 2 3 4 5 6 7 8 9 10
   none severe

b. Drowsiness
   0 1 2 3 4 5 6 7 8 9 10
   none severe

c. Itching
   0 1 2 3 4 5 6 7 8 9 10
   none severe

d. Dizziness
   0 1 2 3 4 5 6 7 8 9 10
   none severe
21. In the last 24 hours, how much pain relief have you received?

Please circle the one percentage that best shows how much relief you have received from all of your pain treatments combined (medicine and non-medicine treatments):

| 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100%
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
| no relief | complete relief |

22. Were you allowed to participate in decisions about your pain treatment as much as you wanted to?

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>not at all</td>
<td>very much so</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

23. Circle the one number that best shows how satisfied you are with the results of your pain treatment while in the hospital:

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>extremely</td>
<td>dissatisfied</td>
<td>extremely</td>
<td>satisfied</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
24. Did you receive any information about your pain treatment options?
   ___ No, ___ Yes (please tick).

   a. If yes, please circle the number that best shows how helpful the information was:

   0  1  2  3  4  5  6  7  8  9  10

   not at all helpful          extremely helpful

25. Did you use any non-medicine methods to relieve your pain?
   ___ No   ___ Yes (please tick).

   If yes, check all that apply:

   ___ cold pack      ___ meditation
   ___ deep breathing  ___ listen to music
   ___ distraction (such as watching TV, reading) ___ prayer
   ___ heat           ___ relaxation
   ___ imagery or visualization ___ walking
   ___ massage        other (please describe)

26. How often did a nurse or doctor encourage you to use non-medicine methods?
   ___ never           ___ sometimes       ___ often
### Perceived participation in care scale

Please circle the number that comes closest to what you perceive regarding the care you received over the last 3 days from the nurses and surgeon.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Please circle your response</th>
</tr>
</thead>
<tbody>
<tr>
<td>27. I find it hard to talk with my Nurse because he/she is always in such a hurry</td>
<td>Yes  1  2  3  4  5</td>
</tr>
<tr>
<td>28. What about your surgeon?</td>
<td>No  5</td>
</tr>
<tr>
<td>29. My Nurse does not like to spend time talking about treatment options</td>
<td>Yes  1  2  3  4  5</td>
</tr>
<tr>
<td>30. What about your surgeon?</td>
<td>No  5</td>
</tr>
<tr>
<td>31. My Nurse does not like it when I ask questions</td>
<td>Yes  1  2  3  4  5</td>
</tr>
<tr>
<td>32. What about your surgeon?</td>
<td>No  5</td>
</tr>
<tr>
<td>33. My Nurse focuses on just one or two topics during the visit so it is hard for me to bring up other issues or concerns that I may have</td>
<td>Yes  1  2  3  4  5</td>
</tr>
<tr>
<td>34. What about your surgeon?</td>
<td>No  5</td>
</tr>
<tr>
<td>35. My Nurse spends little time explaining treatment options to me</td>
<td>Yes  1  2  3  4  5</td>
</tr>
<tr>
<td>36. What about your surgeon?</td>
<td>No  5</td>
</tr>
<tr>
<td>37. I ask my Nurse for recommendations about my medical symptoms</td>
<td>Yes  1  2  3  4  5</td>
</tr>
<tr>
<td>38. What about your surgeon?</td>
<td>No  5</td>
</tr>
<tr>
<td>39. I ask my Nurse to explain the treatment or procedure in greater detail</td>
<td>Yes  1  2  3  4  5</td>
</tr>
<tr>
<td>40. What about your surgeon?</td>
<td>No  5</td>
</tr>
<tr>
<td>41. I ask my Nurse a lot of questions about my medical symptoms</td>
<td>Yes  1  2  3  4  5</td>
</tr>
<tr>
<td>Questions</td>
<td>Yes always</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>42. What about your surgeon?</td>
<td>1</td>
</tr>
<tr>
<td>43. I usually go into great detail about my medical symptoms to the Nurse</td>
<td>1</td>
</tr>
<tr>
<td>44. What about your surgeon?</td>
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<tr>
<td>45. My Nurse gives me a complete explanation for my medical symptoms or treatment</td>
<td>1</td>
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<tr>
<td>46. What about your surgeon?</td>
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</tr>
<tr>
<td>47. My Nurse encourages me to give my opinion about my medical treatment</td>
<td>1</td>
</tr>
<tr>
<td>48. What about your surgeon?</td>
<td>1</td>
</tr>
<tr>
<td>49. My Nurse encourages me to talk about personal concerns related to my symptoms</td>
<td>1</td>
</tr>
<tr>
<td>50. What about your surgeon?</td>
<td>1</td>
</tr>
<tr>
<td>51. My Nurse asks me whether I agree with his/her decisions</td>
<td>1</td>
</tr>
<tr>
<td>52. What about your surgeon?</td>
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</tr>
<tr>
<td>53. My Nurse asks me what I believe is causing my medical symptoms</td>
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</tr>
<tr>
<td>54. What about your surgeon?</td>
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</tr>
<tr>
<td>55. I talk about pain symptoms regardless of my Nurse's reactions when I do</td>
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<tr>
<td>56. What about to your surgeon?</td>
<td>1</td>
</tr>
<tr>
<td>57. I ask questions regardless of my Nurse's reaction to them</td>
<td>1</td>
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<tr>
<td>58. What about your surgeon?</td>
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<tr>
<td>Questions</td>
<td>Please circle your response</td>
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<td></td>
<td>Yes</td>
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<td>59. I suggest a certain kind of medical treatment to the Nurse</td>
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<td>60. What about your surgeon?</td>
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<td>61. I insist on a particular kind of test or treatment for my symptoms</td>
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<td>62. What about from your surgeon?</td>
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<tr>
<td>63. I express doubts about the tests or treatment that my Nurse recommends</td>
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<td></td>
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<tr>
<td>64. What about your surgeon?</td>
<td>1</td>
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<tr>
<td>65. I give my opinion about the type(s) or test(s) or treatment(s) that my Nurse recommends</td>
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<tr>
<td>66. What about your surgeon?</td>
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</table>

Thank you for your time this is the end of this questionnaire.
Appendix 5: Semi-structured Interview
Day 3 Semi-structured patient participant interview

Aim: To explore patient perceptions of their participation in recovery.

Question: Did the intervention change the way patients perceive their participation in care after TRR surgery?

Hi, I’m coming to see you today as it is the third day since your operation, I just want to know how things are going.

1. Can you tell me about where you have been able to take part in your own recovery?
   1. Why did you do that?
   2. If no, why not?

2. I noticed your pain was X/10 yesterday, can you tell me:
   1. Anything you did about your pain? What did you do?
   2. Who did you tell? (nurse, physio, Dr)
   3. What happened?
   4. What do you think should have been done??

3. Tell me about how well you are walking about?
   1. What sorts of things are you doing?
   2. What sorts of things do you think you should be doing? Are you doing them? Why/why not?
   3. What would help you? What makes it harder?
   4. Where do you sit for your meals? Why?
   5. Who have you spoken to about getting better at moving about?

4. Tell me about how your knee exercises are going?
   1. What things have made it harder?
   2. What things have helped?
   3. Did the physiotherapist come when you expected?
   4. Do you know all the exercises you should be doing for your knee?
   5. Do you/ did you need help with them? If so what did you do?
Appendix 6: Chart Audit Tool
Medication chart, observation chart and progress notes from the last **24 hours ONLY**

1. Allergies    Yes (1)  State________________________________________

No (2)

2. Have pain scores been documented on patients observation chart(s)   Yes (1)

No (2)

   a. Has pain scores at ‘rest’ been documented   Yes (1)

No (2)

   b. Has pain scores ‘on movement’ been documented   Yes (1)

No (2)

3. In total, how many times have pain scores been documented  ____

4. How many ‘at rest’ scores were documented  ____

   a. Of the ‘at rest’ scores how many were <3/10  ____ NA (1)

5. How many ‘on movement’ scores were documented  ____

   a. Of the ‘on movement’ scores how many were <3/10  ____ NA (1)
6. What is the highest pain score documented ______  

7. What was the lowest pain score documented ______  

8. Was pain documented in the patients progress notes Yes (1)  

               No (2) 

   a. If yes, what disciplines(s) documented the pain? 

           Nurse (1)  
           Doctor & Nurse (2)  
           Anaesthetist & Nurse (3)  
           Physiotherapist & Nurse (4)  
           Other ( 5)___________  
           Not Applicable (6)     

9. If the nurse(s) documented pain – which shift? 

           AM (1)  
           PM (2)  
           ND (3)  
           Not Applicable (4)  
           2 or more shifts (5)     

10. What, related to the patients pain was documented in patients progress notes:  

   a. Intensity (1)   (eg pain score 0-10)  
   b. Distress (2)    (eg patient stated in severe pain when standing)  
   c. Treatment administered (3)   (eg given morphine 5mg IM to treat pain)  
   d. Other (4 )__________________________  
   e. Not Applicable (5)     

11. Actual documentation wording used (directly quoted):  

           NA (1)
12. Was pain documented on the “TKR clinical pathway” document?
   - Yes (1)–
   - No (2)–

13. If yes, was the “TKR clinical pathway” document signed for all shifts?
   - Yes (1)–
   - No (2)–
   - Not Applicable (3)–
14. Does the patient have a prescription for an analgesic medication?

Yes (1)  
No (2)

15. Does the patient have a prescription for Paracetamol?

Yes (1) (if yes go to question 15.a)  
No (2) (if no go to question 16)

a.

<table>
<thead>
<tr>
<th>Medication</th>
<th>Max Dose per administration (mg)</th>
<th>PRN</th>
<th>Fixed</th>
<th>Shortest administration frequency</th>
<th>Oral</th>
<th>IV</th>
<th>IM</th>
<th>Other</th>
<th>Total dose administered in past 24/24</th>
<th>Total amount patient refused</th>
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</thead>
<tbody>
<tr>
<td>1) Paracetamol</td>
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<td>2) Panadol Osteo</td>
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</table>
16. Does the patient have a prescription for **Non-Steroidal Anti Inflammatory Drugs** (NSAIDs)?

Yes (1) (if yes go to question 16.a)

No (2) (if no go to question 17)

a.

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<th>Medication</th>
<th>Max Dose per administration (mg)</th>
<th>PRN</th>
<th>Fixed</th>
<th>Shortest administration frequency</th>
<th>Oral</th>
<th>IV</th>
<th>IM</th>
<th>Other</th>
<th>Total dose administered in past 24/24</th>
<th>Total amount patient refused</th>
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<tbody>
<tr>
<td>1) Ibuprofen</td>
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<td>2) Celecoxib</td>
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<td>3) Voltaren</td>
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<td>4) Ketorolac (Torodol)</td>
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<td>5) Naproxen</td>
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<td>6) Mobic (Meloxicam)</td>
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</table>
17. Does the patient have a prescription for *weak opioid*?

Yes (1) (if yes go to question 17.a)

No (2) (if no go to question 18)

<table>
<thead>
<tr>
<th>Medication</th>
<th>Max Dose Per administration (mg)</th>
<th>PRN</th>
<th>Fixed</th>
<th>Shortest administration frequency</th>
<th>Oral</th>
<th>IV</th>
<th>IM</th>
<th>Other</th>
<th>Total dose administered in past 24/24</th>
<th>Total amount patient refused</th>
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<tbody>
<tr>
<td>1) Tramadol</td>
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<td>2) Codeine</td>
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<td>3) Codeine 8mg &amp; paracetamol</td>
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<td>4) (Panadine)</td>
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<td>5) Codeine 30mg &amp; paracetamol</td>
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<td>6) (Panadine Forte)</td>
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<td>7) Digesic</td>
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</table>
18. Does the patient have a prescription for strong opioid?

Yes (1) (if yes go to question 18.a)

No (2) (if no go to question 19)

a.

<table>
<thead>
<tr>
<th>Medication</th>
<th>Max Dose per administration (mg)</th>
<th>PRN</th>
<th>Fixed</th>
<th>Shortest administration frequency</th>
<th>Oral</th>
<th>IV</th>
<th>IM</th>
<th>Other</th>
<th>Total dose administered in past 24/24</th>
<th>Total amount patient refused</th>
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<tbody>
<tr>
<td>1) Endone</td>
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<td>2) Oxycodone SR (Oxycontin)</td>
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<td>3) Morphine</td>
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<td>4) Pethedine</td>
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<td>5) Fentanyl</td>
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<td>6) Ketamine</td>
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<td>7) Oxycodone/naloxone (Targin)</td>
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</table>
19. Does the patient have a prescription for **adjuvant medication**?

Yes (1) (if yes go to question 19.a)

No (2) (if no go to question 20)

<table>
<thead>
<tr>
<th>ADJUVANTS</th>
<th>Medication</th>
<th>Max Dose per administration (mg)</th>
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<th>Fixed</th>
<th>Shortest administration frequency</th>
<th>Oral</th>
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<th>Total dose administered in past 24/24</th>
<th>Total amount patient refused</th>
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<tbody>
<tr>
<td>1)</td>
<td>Pregabalin (Lyrica)</td>
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<td>2)</td>
<td>Gabapentin (Neurontin)</td>
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</table>
20. Does the patient have a prescription for **anti-emetics**?

Yes (1) (if yes go to question 2.0.a)

No (2) (if no go to question 2.1)

<table>
<thead>
<tr>
<th>ANTIEMETIC</th>
<th>Medication</th>
<th>Max. Dose per administration (mg)</th>
<th>PRN</th>
<th>Fixed</th>
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<th>Oral</th>
<th>IV</th>
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<th>Total amount patient refused</th>
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<td>1) Maxalon</td>
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<td>2) Stemitil</td>
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<td>3) Ondansetron</td>
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<td>4) Granisetron</td>
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<td>5) Phenergan</td>
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</table>
21. Does the patient have a prescription for a **laxative medication**?

Yes (1) (if yes go to question 2 1.a)

No (2)

a.

<table>
<thead>
<tr>
<th>Laxatives</th>
<th>Medication</th>
<th>Max Dose per administration (mg)</th>
<th>PRN</th>
<th>Fixed</th>
<th>Shortest administration frequency</th>
<th>Oral</th>
<th>IV</th>
<th>IM</th>
<th>Other</th>
<th>Total dose administered in past 24/24</th>
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<tbody>
<tr>
<td></td>
<td>1) Coloxyl with/out Senna</td>
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<td>2) Lactulose</td>
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<td>3) Movicol</td>
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<td>5) Micorlax Enema</td>
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Appendix 7: Deakin Ethics Approval
Memorandum

To: Prof Mari Botti
School of Nursing & Midwifery

BCC: Ms Joanne McDonald

From: Deakin University Human Research Ethics Committee (DUHREC)

Date: 03 September, 2013

Subject: 2013-195
Patient participation in post-operative care activities: Improving the patient experience

Please quote this project number in all future communications.

The application for this project was considered at the DUHREC meeting held on 23/09/2013.

Approval has been given for Ms Joanne McDonald, under the supervision of Prof Mari Botti, School of Nursing & Midwifery, to undertake this project from 30/09/2013 to 30/09/2017.

The approval given by the Deakin University Human Research Ethics Committee is given only for the project and for the period as stated in the approval. It is your responsibility to contact the Human Research Ethics Unit immediately should any of the following occur:

- Serious or unexpected adverse effects on the participants
- Any proposed changes in the protocol including extensions of time.
- Any events which might affect the continuing ethical acceptability of the project.
- The project is discontinued before the expected date of completion.
- Modifications are requested by other HRECs.

In addition you will be required to report on the progress of your project at least once every year and at the conclusion of the project. Failure to report as required will result in suspension of your approval to proceed with the project.

DUHREC may need to audit this project as part of the requirements for monitoring set out in the National Statement on Ethical Conduct in Human Research (2007).

Human Research Ethics Unit
research.ethics@deakin.edu.au
Telephone: 03 9251 7123
Appendix 8: Hospital Ethics Approval
Human Research & Ethics Committee
Certificate of Approval

<table>
<thead>
<tr>
<th>Project Title:</th>
<th>Patient Participation in Postoperative Care Activities: Improving the patient experience.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Investigator:</td>
<td>Professor Mari Botti</td>
</tr>
<tr>
<td>Epworth study no:</td>
<td>598-13</td>
</tr>
<tr>
<td>HREC Meeting date:</td>
<td>03 July 2013</td>
</tr>
<tr>
<td>Board of Management</td>
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<td>approval:</td>
<td>24 July 2013</td>
</tr>
<tr>
<td>Duration of Project:</td>
<td>01 April 2013 to 01 December 2014</td>
</tr>
</tbody>
</table>

Alan R. Kinkade
Group Chief Executive

Terms and conditions of approval:
The Principal Investigator is required to notify the Human Research Ethics Committee of the following:

**All Projects:**
2. Any proposed changes to the protocol or approved documentation or the addition of documents (including flyers, brochures, advertising materials etc) must be submitted to the Human Research Ethics Committee for approval prior to implementation.
3. The Principal Investigator must notify HREC of:
   a. Any serious adverse effects of the study on participants and steps taken to deal with them
   b. Any unforeseen events (e.g. protocol violations or complaints)
   c. Investigators withdrawing from or joining the project
4. A Progress Report must be submitted annually and at the conclusion of the project.
5. Epworth HealthCare HREC approval must remain current for the entire duration of the project. If the project is not completed in the allocated time a renewal request must be submitted to the HREC.

**Clinical Trial:**
7. Must report all serious adverse events (SAEs) to the sponsor and the HREC within 72 hours of occurrence.
8. Must report all Suspected Unexpected Serious Adverse Reactions (SUSARs) to the Therapeutic Goods Administration (TGA). For sponsored studies, the sponsor may take this responsibility.

I, .........................................................................................., accept the terms and conditions set out above.

Signature of Researcher: ........................................... Date: ........................
Appendix 9: Nursing Staff Handout
Nursing Staff Please Read!!!

Your patient may have an iPad as part of the “MyStay TKR iPad study”.

Please click on the “articulate app” to open the program and look through all of the information.

The iPad program aims to gives patients knowledge about their pathway of recovery after total knee replacement surgery.

What we ask YOU to do with the iPad

- Be familiar with the “MyStay” TKR program by having a quick look today! Click on the articulate app.
- Encourage your patients who have an iPad to view their daily patient journey every shift.
- To ask the patient if they have questions about the information they have seen on the iPad.
- In the morning discuss with the patient their daily goals and write them on the whiteboard.

Thank you!!

Please call/email either Jo or Eline if you have any questions or comments.
Tel 0613 091 140 or Eline 0418 368 540
Email: jmc@deakin.edu.au or eileswin@yahoo.com.au
Appendix 10: Flyer Patient Notes
This patient is in the MyStay iPad study

Nursing staff please:

☐ Remind the patient to watch the appropriate day’s module

☐ Answer any questions the patient may have related to the module

☐ Set daily goals with patients on white board

Afternoon Staff
Please charge the iPad overnight

Please call either Jo or Ilse if you need assistance
Appendix 11: *MyStay* Evaluation Questionnaire
MyStay Evaluation Questionnaire

1. How many times did you look at the MyStay TKR program via the iPad yesterday?
   - Never (1)
   - Once (2)
   - More than once (3)
   - Other ______________________ (4)

2. Were you able to view the MyStay TKR program via the iPad as often as you wanted to:
   - Yes (1)
   - No (2)

3. If no, what got in the way (please tick all that apply):
   - No time, too busy recovering (1)
   - Too tired (2)
   - Too unwell (3)
   - Pain too severe (4)
   - Didn't understand it (5)
   - Did not find it useful (6)
   - iPad not available when I had the opportunity (7)
   - iPad did not work properly when I had the opportunity to watch (8)
   - Forgot about watching it (9)
   - Goes for too long – no time (10)
   - Other ______________________ (please state) (11)
Patient ID ____________________

4. Did the nurse go through or discuss with you information from the MyStay TKR program yesterday?

☐ Yes (1)
☐ No (2)

5. Did you find it easy to use the MyStay TKR program via iPad?

☐ Yes (1)
☐ No (2)

6. If no, can you please explain why it was difficult

________________________________________________________________________

________________________________________________________________________

7. How likely is it that you would recommend the MyStay TKR program to a family member or friend who is going to have TKR surgery?

Not likely at all                                                                                     Extremely likely

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8. On a scale of 0-10 how satisfied are you with the MyStay TKR program?

Not satisfied at all                                                                              Extremely satisfied

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Appendix 12: Laminated Cards
**MyStay Total Knee Replacement Program**

1. Push the “Home” button and wipe the iPad to open

2. Touch the “Articulate” app on the home screen

3. Touch on the arrow to begin the presentation. The next page will appear touch the iPad as directed on the screen

4. This is the main menu, all of the information starts from this page.

5. This is the MyDay page where you will find your goals for each day