Pressure Injury Prevention and the Role of the Patient: A Mixed Methods Study

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Abstract

Pressure injuries are acknowledged worldwide as a quality care indicator and a patient safety issue. Pressure injuries have negative impacts for patients, nurses and healthcare organisations in terms of physical and emotional distress, increased workloads and economic burden. Additionally, pressure injuries result in reduced community confidence in the healthcare system. Internationally and in Australia, pressure injury prevalence rates are concerning, with sustained reductions difficult to achieve despite the availability of prevention resources. International clinical practice guidelines recommend pressure injury prevention strategies that are widely adopted by clinicians. There is agreement these strategies may help prevent the development of pressure injuries, however, nurses’ planning and implementation of these strategies often does not reflect best practice standards, possibly placing patients at risk.

This mixed methods, multicentre study had two aims: first, to describe the pressure injury prevention clinical practices in hospitalised adult medical patients with reduced mobility; and second, to describe patients’ perceptions of their current and future role in pressure injury prevention care. Utilising a sequential, explanatory research design, this study used a priority-sequence model whereby the quantitative data was collected first, followed by the qualitative data. A consecutive sample of 241 participants with reduced mobility was recruited to the study. Chart audits and semi-structured observations were used to collect the quantitative data; with the observations conducted at 30-minute intervals over a continuous 24-hour period. The quantitative data included the planned and implemented pressure injury prevention strategies, predictors of the implemented strategies and patient body positions. Descriptive and inferential statistics were used to analyse this data. Qualitative data included semi-structured interviews from a purposive sample of 20 participants, who had also participated in the quantitative phase. Conventional content analysis was used to analyse this data. Using a configuration approach, a meta-synthesis of the quantitative and qualitative data resulted in the development of a proposed preliminary conceptual model of patient participation in pressure injury prevention.

Quantitative results indicate that nurses often implemented regular repositioning for participants, yet other prevention strategies were delivered less frequently. Participant age, gender and those identified at risk of pressure injuries were predictors for the implementation of prevention strategies. While participants changed their body
position frequently, they also adopted positions that increased their risk of pressure injuries.

The semi-structured interview questions focussed on participant’s knowledge and experience of pressure injuries, and their role in prevention. Three categories emerged from the data: experiencing pressure injuries; participating in pressure injury prevention; and resourcing pressure injury prevention and treatment. Most participants wanted to be involved in their pressure injury prevention care. Barriers to patient participation included knowledge gaps about pressure injuries, and timely access to prevention strategies. A collaborative nurse-patient relationship was a major facilitator of patient participation.

Data meta-synthesis resulted in development of the proposed conceptual model of patient participation in pressure injury prevention. The model consists of seven concepts: risk assessment, pressure injury prevention strategies, patient education, resources, patient characteristics, relationships and patient participation. Patient participation, the main model concept, is facilitated or hindered by the aforementioned six concepts. While not tested, the model situates the nurse and patient at its core, and provides nurses with a way to engage patients in their pressure injury prevention care.

The research findings emerging from this study prompt several recommendations for clinical practice, education, research and policy development. Innovation in clinical practice is recommended to increase patient risk assessment rates, improve access to prevention strategies, and the delivery of nurse and patient education. In addition, nurses should identify patients’ willingness to participate in their pressure injury prevention care, and provide the necessary resources to encourage and support this engagement in their care. Further research is required to refine and test the proposed conceptual model on patient participation in pressure injury prevention.

Pressure injury prevention care is complex and involves numerous stakeholders. This study highlighted some positive findings and a number of practice gaps. Generally, patients want to be involved in their pressure injury prevention care. The proposed conceptual model is new and may be used by nurses to engage patients in their care – a positive step toward reducing pressure injury incidence.
Statement of Originality

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Sharon Latimer
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<th>Description</th>
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<tbody>
<tr>
<td>CPG</td>
<td>Clinical Practice Guidelines</td>
</tr>
<tr>
<td>EPUAP</td>
<td>European Pressure Ulcer Advisory Panel</td>
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<tr>
<td>HAPI</td>
<td>Hospital Acquired Pressure Injury</td>
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<tr>
<td>HLOS</td>
<td>Hospital Length of Stay</td>
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<td>HOBE</td>
<td>Head of Bed Elevation</td>
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<tr>
<td>IQR</td>
<td>Interquartile Range</td>
</tr>
<tr>
<td>LOS</td>
<td>Length of Stay</td>
</tr>
<tr>
<td>NPUAP</td>
<td>National Pressure Ulcer Advisory Panel</td>
</tr>
<tr>
<td>OR</td>
<td>Odds Ratio</td>
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<tr>
<td>PI</td>
<td>Pressure Injury(ies)</td>
</tr>
<tr>
<td>PIP</td>
<td>Pressure Injury Prevention</td>
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<tr>
<td>PPPIA</td>
<td>Pan Pacific Pressure Injury Alliance</td>
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<tr>
<td>SD</td>
<td>Standard Deviation</td>
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Peer-reviewed journal publications:


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Acknowledgement of Published Papers in this Thesis and Extent of Assistance

ALL PAPERS INCLUDED ARE CO-AUTHORED

Included in this thesis are published and accepted papers in Chapters 4 and 5; co-authored with other researchers. My contribution to each co-authored paper is outlined at the front of the relevant chapter. The bibliographic details for these papers including all authors, are:

Chapter 4:


Chapter 5:
Appropriate acknowledgements of those who contributed to the research but did not qualify as authors are included in each paper.

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“A journey of a thousand miles begins with a single step”

– Lao Tzu (Chinese philosopher)

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CHAPTER 1

Introduction

1.1 Introduction

Pressure injuries (PI), or pressure ulcers, are a significant patient safety and quality healthcare issue (World Health Organisation, 2005). Research into PI and their prevention continues, yet sustained reductions in PI prevalence rates are proving difficult (Moore, Johansen, & van Etten, 2013a; Mulligan et al., 2011). PI impacts include reduced patient quality of life (Essex, Clark, Sims, Warriner, & Cullum, 2009), increased nursing workloads (Chaboyer & Gillespie, 2014), and rising economic healthcare costs (Graves, Birrell, & Whitby, 2005b; Nguyen, Chaboyer, & Whitty, 2014). National and international clinical practice guidelines (CPG) recommend a suite of pressure injury prevention (PIP) strategies including PI risk assessment, appropriate support surfaces, regular repositioning, patient education, and nutrition (National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, & Pan Pacific Pressure Injury Alliance, 2014).

Although widely adopted by clinicians and healthcare organisations, there are inconsistencies in the planning and implementation of PIP strategies in hospitals (Barker et al., 2013; Gunningberg, 2005; McInnes, Chaboyer, Allen, Murray, & Webber, 2013; Vanderwee et al., 2011). This demonstrates that more needs to be done to improve the uptake of these guidelines (Gunningberg, Hommel, Bååth, & Idvall, 2012). In Australia, little is known about current hospital PIP practices or if evidence practice gaps exist. New approaches in PIP care, such as involving the patient in their care, might be needed. However, we do not know if patients want to participate in their PIP care. This mixed methods study sought to address these knowledge practice gaps by identifying current PIP practices for adult hospital patients with reduced mobility at two Australian hospitals. This study also described patient perceptions of their current and future role in PIP, to determine if patient participation as a PIP strategy, is worthy of future investigation.
1.2 Background

1.2.1 Patient safety

Patient safety underpins contemporary nursing practice (Committee on Quality of Health Care in America & Institute of Medicine, 2000; World Health Organisation, 2014) and dominates national and global healthcare agendas (Tingle, 2011; World Health Organisation, 2005, 2014). Clinical indicators such as PI, patient falls and medication error rates are quality of care measures for healthcare organisations (Burston, Chaboyer, & Gillespie, 2014; Soban, Hempel, Munjas, Miles, & Rubenstein, 2011). In Australia, 10 National Safety and Quality Health Service Standards outline the minimum requirements for patient safety and quality of care, and are used to measure and determine a healthcare organisations’ accreditation status (Australian Commission on Safety and Quality in Health Care, 2014). Reducing patient harm during the delivery of healthcare is the overall aim of these standards (Australian Commission on Safety and Quality in Health Care, 2014). The prevention and management of PI is Standard eight; confirming this is as a healthcare focus (Australian Commission on Safety and Quality in Health Care, 2014).

Adverse events, defined as unintended injuries or complications caused by healthcare management, result in patient morbidity and mortality (Brady et al., 2009; de Vries, Ramrattan, Smorenborg, Gouma, & Boermeester, 2008; Tingle, 2011). PI, patient falls and medication errors are types of adverse events patients may experience during their hospitalisation (Tingle, 2011). In Australia, a combined figure for all types of adverse events is approximately 18,000 patient deaths annually, with another 50,000 experiencing permanent disability (Richardson & McKie, 2007). Additionally, these adverse events are associated with significant healthcare costs in Australia (Richardson & McKie, 2007). Healthcare organisations contribute a large amount of resources to treat and prevent PI (Nguyen et al., 2014); a significant burden for organisations and the community.

1.2.2 The burden of pressure injuries

PI are defined as localised skin and/or underlying tissue damage caused by pressure, shearing or friction (National Pressure Ulcer Advisory Panel, 2016; National Pressure Ulcer Advisory Panel et al., 2014). Internationally, hospital-acquired pressure injuries (HAPI) prevalence rates range from 1.1% to 26.7% (Bredesen, Bjøro, Gunningberg, & Hofoss, 2015; Graves & Zheng, 2014; Moore et al., 2013a), while in Australia these rates are reported to be 4.0% to 9.0% (Miles, Fulbrook, Nowicki, & Franks, 2013; Mulligan et al., 2011; Queensland Health, 2014). There is agreement that
some of these HAPIs are considered preventable (Burston et al., 2014; D’Amour, Dubois, Tchouaket, Clarke, & Blais, 2014; Moore et al., 2013a).

Preventing PI is complex and, a ‘one size fits all’ approach, inadequate. Effective PIP involves the provision of recommended care from admission to discharge (Australian Commission on Safety and Quality in Health Care, 2012). Nurses can implement the following recommended PIP strategies including PI risk assessment, PIP management plan, appropriate support surfaces, regular patient repositioning, continence management, patient education, skin protection, nutritional assessment and adequate nutrition (National Pressure Ulcer Advisory Panel et al., 2014). However, limited empirical evidence exists to support the effectiveness of these strategies (Chou et al., 2013; Gillespie, Chaboyer, McInnes, et al., 2014; Miles, Nowicki, & Fulbrook, 2013). For example, regular repositioning, considered the hallmark of good PIP care (Gillespie, Chaboyer, McInnes, et al., 2014; Källman, Bergstrand, Ek, Engström, & Lindgren, 2015), has benefits including improved patient comfort and reductions in complications (National Pressure Ulcer Advisory Panel et al., 2014; Tayyib, Lewis, & Coyer, 2013). While 2–4 hourly repositioning is often considered ‘standard care’ (Miles, Nowicki, et al., 2013; Tayyib et al., 2013), agreement on a PIP repositioning frequency is lacking (Gillespie, Chaboyer, McInnes, et al., 2014; Miles, Nowicki, et al., 2013; Tayyib et al., 2013).

Many researchers argue clinical practice around PIP strategies does not always reflect current best evidence in CPG (Clarke et al., 2005; Gunningberg, 2005; Gunningberg, Donaldson, Aydin, & Idvall, 2012; Moore & Price, 2004; O’Brien & Cowman, 2011; Thoroddsen, Sigurjónsdóttir, Ehnfors, & Ehrenberg, 2013). Reported gaps in the delivery of PIP care (Bredesen et al., 2015; Thoroddsen et al., 2013) may partly explain why, despite increased PIP resources (Moore, 2013), PI prevalence rates remain relatively unchanged (Beitz, 2011; Gunningberg, Stotts, & Idvall, 2011; Moore, 2013; Mulligan et al., 2011), prompting a need to review current practices. As an adjunct to these practices, involving patients in their PIP care may be a new direction for consideration, and could be a way to improve current PIP practices, patient safety, and the quality of care.

1.2.3 Patient participation

In the past, healthcare professionals often believed they were best positioned to make healthcare decisions for patients (Emanuel & Emanuel, 1992). Recently, the concept of patient-centred care (PCC) has emerged as a viable prevention and quality of care strategy, aiming to improve patient experiences and health outcomes (Eldh, Ekman,
& Ehnfors, 2006; Longtin et al., 2010; World Health Organisation, 1994, 2005). PCC encompasses informing patients about their care, shared decision-making, and incorporating the patient’s needs and preferences into their care (Luxford, Safran, & Delbanco, 2011; Stewart, 2001). Respect, information sharing, communication, empowerment, partnership, and promoting patient self-determination are guiding principles of PCC (Australian Commission on Safety and Quality in Health Care, 2010; University of Gothenburg, 2014). The recent development of a nursing practice model, with nurse-led patient-partnered interventions at its core, is a first step in the implementation of this new approach in complex patient care (Moyle, Rickard, Chambers, & Chaboyer, 2015).

Patient participation, sometimes referred to as patient engagement, is a key component of PCC receiving increased attention as a potential prevention strategy in nursing care, and as a way to improve patient safety and quality of care (Kitson, Marshall, Bassett, & Zeitz, 2013; Longtin et al., 2010; Tobiano, Marshall, Bucknall, & Chaboyer, 2015). Patient participation encourages self-care (University of Gothenburg, 2014) and offers nurses a way to engage patients in their care (Tobiano, Marshall, et al., 2015). Although used in everyday healthcare language, the concept of patient participation is complex, and lacks an agreed definition (Cahill, 1996; Longtin et al., 2010). When patients participate in their care they tend to experience reduced length of stay (LOS), fewer adverse events, and increased care satisfaction (Australian Commission on Safety and Quality in Health Care, 2010; Kitson et al., 2013; Tobiano, Marshall, et al., 2015; Weingart et al., 2011). Most patients want some level of participation in their care (Alharbi, Carlström, Ekman, Jarneborn, & Olsson, 2014; Levinson, Kao, Kuby, & Thisted, 2005; Tobiano, Bucknall, Marshall, Guinane, & Chaboyer, 2015b). However, there is limited research into the role patient participation plays in PIP.

Several studies have examined patient perception of their role in aspects of their hospital care (Alharbi et al., 2014; McInnes, Chaboyer, Murray, Allen, & Jones, 2014; McTier, Botti, & Duke, 2013; Roberts, Desbrow, & Chaboyer, 2014; Tobiano, Bucknall, et al., 2015b). A few focus on aspects of PIP care (Gillespie, Chaboyer, Sykes, O’Brien, & Brandis, 2014; McInnes et al., 2014; Roberts et al., 2014). Varied levels of patient participation in their PIP care have been reported ranging from limited to full participation (McInnes et al., 2014). Two studies found patients had good general PIP knowledge (McInnes et al., 2014; Roberts et al., 2014) but specific knowledge on the role of nutrition was lacking (Roberts et al., 2014). Patients wanted more PIP
education and thought nurses should deliver it (McInnes et al., 2014). Patient engagement in their PIP care was influenced by their perception of their PI risk (Gillespie, Chaboyer, Sykes, et al., 2014). Therefore, if a patient participation approach was implemented as part of PIP care, it may reduce the incidence of HAPI, and related economic costs. Yet, in Australia limited research exists on current PIP practices (McInnes et al., 2013; Miles, Fulbrook, et al., 2013), patient perceptions of their role in PIP care (Cahill, 1996; McInnes et al., 2014) and the precise implementation of patient participation in clinical practice (Sahlsten, Larsson, Lindencrona, & Plos, 2005). These research gaps provided the impetus for this study.

1.3 Aim of the study

This mixed methods study had a number of aims. Utilising quantitative and qualitative methodologies, the first study aim was to identify current PIP practices in Australian hospitalised adult medical patients with reduced mobility, and to ascertain any evidence of practice gaps. Second, this study aimed to describe patients’ perceptions of their role in PIP and determine patient’s views on their participation in PIP care. The final study aim was to develop a conceptual model of patient participation in pressure injury prevention and used a meta-synthesis of the quantitative and qualitative findings. More specifically, this research aimed to answer the following questions:

1. What are the planned and implemented PIP strategies in hospitalised adult medical patients with reduced mobility?

2. What is the relationship between the planned and implemented PIP strategies of support surfaces and regular repositioning in hospitalised adult medical patients with reduced mobility?

3. What patient, clinical, and contextual factors predict the implementation of PIP strategies in hospitalised adult medical patients with reduced mobility?

4. What are the observed body positions and frequency of repositioning in hospitalised adult medical patients with reduced mobility over three consecutive nursing shifts (day, evening and night)?
5. What is the difference in the repositioning frequency in hospitalised adult medical patients with reduced mobility over three consecutive nursing shifts (day, evening and night)?

6. What factors predict the frequency of repositioning in hospitalised adult medical patients with reduced mobility?

7. What are patients’ perceptions of their current and future role in the prevention of PI?

8. What factors facilitate patient participation in pressure injury prevention in hospitalised adult medical patients with reduced mobility?

9. What factors hinder patient participation in pressure injury prevention in hospitalised adult medical patients with reduced mobility?

1.4 Significance of the study

PI have major negative impacts for patients, nurses and healthcare organisations (National Pressure Ulcer Advisory Panel et al., 2014) including pain, increased workload, economic burden, litigation and sometimes patient death (Chaboyer & Gillespie, 2014; Moore, 2013; Nguyen et al., 2014; Redelings, Wise, & Sorvillo, 2007; Theisen, Drabik, & Stock, 2012; World Health Organisation, 2014; Worsley, Smith, Schoonhoven, & Bader, 2016). This study is significant for patients, nurses, and healthcare organisations because of its potential to provide new insights into nurses’ planning and implementation of PIP strategies and the repositioning patterns of hospitalised patients. In addition, understanding patients’ perceptions of their current and future PIP role may assist in providing a foundation to increase patient participation in their PIP care.

1.4.1 Significance for patients

Safe patient care is a community expectation (Australian Commission on Safety and Quality in Health Care, 2014; Committee on Quality of Health Care in America & Institute of Medicine, 2000). PI can negatively impact a patient’s life (Calianno, 2007; Essex et al., 2009; Gorecki et al., 2009). These impacts include physical, social, psychological and financial and a loss of independence (Gorecki et al., 2009). Approximately 920 Australian patients died between 2001–2003 as a direct result of PI
In United States of America (USA) hospitals, PI-related complications result in approximately 60,000 patient deaths annually (Agency for Healthcare Research and Quality, 2014; Lyder et al., 2012).

PIP strategies can reduce PI incidence yet, current evidence suggests there is varied implementation by nurses (Bååth, Idvall, Gunningberg, & Hommel, 2014; Miles, Nowicki, et al., 2013; Mulligan et al., 2011; Vanderwee et al., 2011), with different approaches needed to improve practice (Gunningberg, Hommel, et al., 2012). Prior research evidence supports this study’s aims. There is the potential for the new knowledge generated through this study to inform clinical practice and further research in the implementation of PIP strategies. Uptake of the research findings may lead to clinical practice changes resulting in patients being involved in the planning and implementation of their PIP care. Over the longer term, this may also result in greater patient satisfaction in their care.

1.4.2 Significance for nurses

The delivery of safe, competent and high quality care is a requirement of the Australian nursing profession (Nursing and Midwifery Board of Australia, 2010). Nurses provide care to patients and have a significant role in the prevention of adverse events and harm during their hospitalisation (Burston, Chaboyer, Wallis, & Stanfield, 2011). PI are a quality indicator of nursing care (Burston et al., 2014; Gunningberg et al., 2011) and nurses play a central role in PIP (Considine & Botti, 2004).

When patients develop a PI the burden on nursing care is raised (Burston et al., 2014). Two recent studies also found patients with a HAPI experienced higher rates of infection (Theisen et al., 2012; Worsley et al., 2016); increasing the need for nursing care. Despite the available evidence on PI, current approaches to PIP care appear not to be having the desired outcome – reducing PI prevalence (Moore, 2013). This study describes current PIP practices in hospitalised adult medical patients with reduced mobility. Any identified practice gaps may provide justification for the development of PIP approaches that encourage patients’ participation in their care. It could also provide the opportunity to develop strategies that encourage the knowledge translation of research findings into PIP practice (Barker et al., 2013; Burston et al., 2011; Chaboyer et al., 2015; Moyle et al., 2015). Targeted nursing PI and PIP education may be developed that aim to improve nurses’ knowledge and confidence in this clinical practice area (Porter-Armstrong, Moore, Bradbury, & McDonough, 2015).

1.4.3 Significance for healthcare organisations
PIP is a national (Australian Commission on Safety and Quality in Health Care, 2014) and international patient safety priority area (National Pressure Ulcer Advisory Panel et al., 2014), forming part of the Australian best-practice standards in safe and quality care (Australian Commission on Safety and Quality in Health Care, 2014). For healthcare organisations, PI can result in litigation (Worsley et al., 2016) and significant financial penalties (Agency for Healthcare Research and Quality, 2014; Queensland Government, 2013b; Sanada et al., 2010). Internationally, some governments have imposed financial penalties as an incentive to reduce avoidable PI and encourage changes in current PIP clinical practice (Agency for Healthcare Research and Quality, 2014; Queensland Government, 2013b; Sanada et al., 2010). In 2008, USA Medicare/Medicaid listed PI as ‘never events’, with no payments made to hospitals in the event of severe HAPI (Niederhauser et al., 2012). Furthermore, since 2014, USA hospitals with the highest HAPI rates are penalised 1% of their Medicare patient funding (Agency for Healthcare Research and Quality, 2014; Meddings, Reichert, Hofer, & McMahon, 2013). In Japan, hospitals supported by the National Medical Insurance system have their funding reduced if required PIP strategies are not implemented (Sanada et al., 2010). Similarly, financial penalties exist in Australia. For instance, in Queensland hospitals severe HAPI attract fines of $30,000 to $50,000 (AUD) (Queensland Government, 2013b).

From 2005–2007, the average cost incurred for each HAPI in Australia was $8,435 (Jackson, Nghiem, Rowell, Jorm, & Wakefield, 2011). Furthermore, the estimated costs to treat all PI in Australian public hospitals for the period 2012–13 was $983 million (AUD) (Nguyen et al., 2014), £1.4 to 2.1 billion (GBP) in the United Kingdom (UK) and $9.7 to 11.6 billion (USD) in the USA (Agency for Healthcare Research and Quality, 2014). These costs are not sustainable, so gaining a better understanding of current PIP practices will assist healthcare managers to support the development of strategies to improve the use of PIP resources or make changes to policies, resulting in economic savings.

Lastly, this research will serve as a foundation for future studies by providing good quality detailed information on the current PIP strategies of hospitalised adult medical patients with reduced mobility. The study findings can be used by clinicians and educators to inform the development of strategies to increase patient participation in PIP care. There is also the potential for researchers to use these data to incorporate patient activity patterns into their research on repositioning, as well as developing innovative PIP education strategies that increase patient participation.
1.5 Overview of the thesis

This introductory chapter situates this mixed methods study in context, by providing a broad overview of patient safety, PI, recommended PIP strategies, and the concept of patient participation. The significance of this study to patients, nurses and healthcare organisations was also discussed. The thesis structure is outlined below.

Chapter Two contains a comprehensive and critical review of the literature on PI and their prevention, and the concept of patient participation. Firstly, a definition of PI is provided, including classifications and aetiology. An examination of PI prevalence and incidence rates across Australia and globally will highlight the extent of the PI problem. PI risk factors, and their impacts to patients, healthcare professionals and organisations are described. Current recommended international CPG prevention strategies are highlighted. Finally, the concept of patient participation is defined, along with its benefits and barriers, and its application to PIP.

The methodological approach undertaken by this study is outlined in Chapter Three, along with the research questions and hypothesis. The research sites, sample size and participant recruitment process are described. The data collection methods are outlined, including the development of the data collection tools and interview questions. For the quantitative data, the analytic techniques using descriptive and inferential statistics are explained. For the qualitative data, the use of content analysis is described. The approach and process undertaken during the meta-synthesis of the quantitative and qualitative data is detailed, including the approach to the development of a preliminary conceptual model. Finally, the ethical considerations and ethical approval process is outlined.

Chapter Four contains the results of the quantitative data analysis presented in three manuscripts (Figure 1) published (papers 2 and 3) or accepted (paper 1) in international peer-reviewed journals. Prior to each paper is a brief introduction, followed by a signed statement of the contributions to the co-authored paper.

The qualitative results of the semi-structured interviews are presented in Chapter Five. Published in an international peer-reviewed nursing journal (Figure 1), a copy of this article appears in the chapter. The paper is briefly introduced, followed by a signed statement of contributions to the co-authored paper.
Chapter Six contains a meta-synthesis of the quantitative and qualitative results presented in Chapters Four and Five. The results of the meta-synthesis are presented in a preliminary conceptual model on patient participation in PIP. The model, represented figuratively in the chapter, consists of seven concepts and eight proposition statements.

Chapter Seven, the discussion, situates the quantitative and qualitative findings and the meta-synthesis in the context of previous research. The contributions this study makes to the body of PIP knowledge are highlighted. Recommendations for clinical practice, education (patient and nurses), future research, policy and procedures are proposed, with a focus on strategies to increase patient participation in their PIP care. The study limitations and overall conclusions are discussed.

1.6 Summary

To summarise, PI are a patient safety and quality of care issue, resulting in negative impacts for patients, nurses and healthcare organisations. The absence of a reduction in PI prevalence rates suggests current PIP strategies may not be as effective as previously believed. While a body of PI and PIP knowledge exists, several areas have not been examined. The results of this research will provide good quality detailed information on the current PIP strategies of hospitalised adult medical patients with reduced mobility, the relationship between these strategies, factors that predict the implementation of PIP strategies, and patient repositioning frequency and patterns, including their predictors. This study will also provide insights into patients’ perceptions of their role in PIP care. Finally, a preliminary conceptual model on
patients’ participation in PIP is presented. The next chapter provides a critical review of literature pertaining to PI, current PIP strategies and patient participation.
CHAPTER 2  

Literature review

2.1 Introduction

Pressure injuries (PI) pose significant safety and quality of care issues for patients, nurses and healthcare organisations. Patient participation is a way for patients to engage in their care, potentially improving their care outcomes. This chapter contains a comprehensive and critical synthesis of the contemporary literature on PI. An overview of PI, describing the definition, aetiology and classification (also known as stages), is presented. The extent of the problem of PI is highlighted through the examination of hospital acquired pressure injury (HAPI) prevalence rates globally and in Australia. Factors that increase patients’ risk of PI development are described. Current recommended pressure injury prevention (PIP) strategies outlined in clinical practice guidelines (CPG), including the importance of repositioning, are presented. Finally, patient participation is defined, along with facilitators, barriers and the application to PIP.

The literature in this review was identified using the following databases: CINAHL, Medline, and Cochrane Library (Table 1). Other sources of information, such as government documents, were located using the Google™ and Google Scholar™ search engines. The search terms used, along with their synonyms, are contained in Table 1. Relevant research literature was scrutinised for inclusion. Studies examining planned and implemented PIP strategies and patient participation in their care featured in the search. The reference lists of the sourced journal articles were manually examined; resulting in the inclusion of additional articles. Initially, date of publication limiters was not applied to the databases, with relevant information sourced from 1952 to 2016. Date limiters were used when specific information was required, for example, recent PI prevalence rates.
Table 1 Literature Review Search Terms

<table>
<thead>
<tr>
<th>Search term</th>
<th>Synonyms</th>
</tr>
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<tbody>
<tr>
<td>Pressure injury</td>
<td>pressure ulcer; pressure sore; decubitus ulcer; bed sore</td>
</tr>
<tr>
<td>Patient</td>
<td>patient centred care; person centred care; consumer participation; decision-making</td>
</tr>
<tr>
<td>Patient safety</td>
<td>safe care; quality care; nurse sensitive indicators</td>
</tr>
<tr>
<td>Pressure injury</td>
<td>nursing care; strategies; prevention strategies; treatment; management</td>
</tr>
</tbody>
</table>

2.2 Pressure injuries

Historically, PI have appeared in medical writings for more than 5,000 years (Bansal, Scott, Stewart, & Cockerell, 2005), with their presence signalling imminent death (Bansal et al., 2005; Wound Ostomy and Continence Nurses Society, 2009). In contemporary healthcare, PI are a measurement of quality of healthcare (Australian Commission on Safety and Quality in Health Care, 2014; World Health Organisation, 2014). More recently, litigation of healthcare providers (Worsley et al., 2016) has prompted political involvement. This has resulted in the introduction of national healthcare standards for PI (Australian Commission on Safety and Quality in Health Care, 2012; National Health Service, 2010), with the aim of reducing HAPI.

2.2.1 Definition

PI, also known as pressure ulcers, pressure sores, and decubitus (lying down) ulcers (Wounds Australia, 2016), are a type of adverse event (World Health Organisation, 2014). Defined as localised injury to the skin and/or underlying tissue, PI often occur over a bony prominence and are caused by the mechanical factors of unrelieved pressure, shearing, and/or friction (Coleman et al., 2014; National Pressure Ulcer Advisory Panel, 2016; National Pressure Ulcer Advisory Panel et al., 2014). The past decade has seen changes to the language and definitions associated with PI and PIP (Dunk & Arbon, 2009; National Pressure Ulcer Advisory Panel et al., 2014). The term PI has become an accepted replacement for pressure sores, bed sores and decubitus ulcers (Dunk & Arbon, 2009; National Pressure Ulcer Advisory Panel, 2016). In 2012, the Pan Pacific Pressure Injury Alliance, representing healthcare contexts across the
Australasian region, adopted the term PI for sole use (Australian Wound Management Association, 2011) however, PI, pressure ulcers and bed sores continue to be used synonymously in the international literature (National Pressure Ulcer Advisory Panel et al., 2014). Adopting standardised language and definitions makes the comparison of research and evidence easier.

2.2.2 Classification

Pressure injuries (PI) are classified according to a standardised grading scale of 1 to 4 (previously I to IV), two sub-categories: unstageable and deep-tissue injury, and two new definitions: medical device PI and mucous membrane PI (National Pressure Ulcer Advisory Panel, 2016; National Pressure Ulcer Advisory Panel et al., 2014). In April 2016, using a consensus format, the National Pressure Ulcer Advisory Panel (NPUAP) in the USA made the following changes to the PI classification system. The term pressure injury replaces pressure ulcer; Arabic numbers replace the Roman numerals; the term ‘suspected’ has been removed from the deep tissue injury; and two new PI definitions were added (National Pressure Ulcer Advisory Panel, 2016). Two terms are used in the grading scale: ‘category’ or ‘stage’. Prior to 2014, the term ‘stage’ was used in Australia to describe PI (Australian Wound Management Association, 2011), whereas ‘category’ was used in Europe and the USA (European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010). Universal agreement in the use of both terms means they are now being used interchangeably in the description and classification of PI (National Pressure Ulcer Advisory Panel et al., 2014). This positive step forward in providing common definitions and language is a way to gain consistency in clinical practice and research in terms of audits.

This current study was informed by the 2009 and 2011 Australian and international CPG (Australian Wound Management Association, 2011; European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010). Table 2 outlines the category/stage PI classification published by the NPUAP, the European Pressure Ulcer Advisory Panel (EPUAP), and the Pan Pacific Pressure Injury Alliance (PPPIA) (National Pressure Ulcer Advisory Panel, 2016; National Pressure Ulcer Advisory Panel et al., 2014). Throughout this thesis and in the manuscripts, PI stages are referred to using Roman numerals (I, II, III, and IV) and not Arabic numbers (1, 2, 3, and 4) as outlined in the new NPUAP staging update (National Pressure Ulcer Advisory Panel, 2016).
<table>
<thead>
<tr>
<th>Classification (category/stage)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category/Stage I: Pressure Injury:</strong></td>
<td>Intact skin with localised non-blanchable areas of redness often situated over a bony prominence. Patient experiences pain. Skin is either discoloured, warm, cool to touch, evidence of swelling or hardness. Blanching may not be easily visible on darkly pigmented skin.</td>
</tr>
<tr>
<td>Non-blanchable erythema of intact skin</td>
<td></td>
</tr>
<tr>
<td><strong>Category/Stage II: Pressure Injury: Partial thickness skin loss with exposed dermis</strong></td>
<td>Partial thickness loss of dermis, and a shallow open ulcer. Red-pink wound bed, and the absence of slough. May present as a shiny or dry shallow ulcer without slough or bruising.</td>
</tr>
<tr>
<td><strong>Category/Stage III: Pressure Injury: Full thickness skin loss</strong></td>
<td>Full thickness tissue loss, with subcutaneous fat exposed. Sloughy wound bed, with evidence of undermining and tunnelling. No exposure of bone, tendon or muscle. Depth varies depending on the anatomical location of the ulcer.</td>
</tr>
<tr>
<td><strong>Category/Stage IV: Pressure Injury: Full thickness skin and tissue loss</strong></td>
<td>Full thickness tissue loss, with exposure of the underlying subcutaneous fat, bone, tendon, or muscle. Sloughy wound bed and presence of eschar, undermining and tunnelling. Depth varies depending on the anatomical location of the ulcer.</td>
</tr>
<tr>
<td><strong>Unstageable Pressure Injury:</strong> Obscured full thickness skin and tissue loss</td>
<td>Full thickness tissue loss. Slough and/or eschar in wound bed. Category/stage can only be determined once the wound bed slough/eschar is excised; exposing the wound bed.</td>
</tr>
<tr>
<td><strong>Deep Tissue Pressure Injury:</strong> Persistent non-blanching deep red, maroon or purple discoloration</td>
<td>Intact or non-intact skin. Underlying soft tissue damaged from pressure and/or shear. This results in a localised area of discoloured intact skin (non-blanching deep red, maroon or purple), or a blood-filled blister. Patient can experience pain.</td>
</tr>
<tr>
<td><strong>Medical Device Related Pressure Injury</strong></td>
<td>Caused by a medical device (e.g. oxygen mask). Staging system used to determine stage.</td>
</tr>
<tr>
<td><strong>Mucosal Membrane Pressure Injury</strong></td>
<td>Located on the mucous membrane. Caused by a medical device (e.g. nasogastric tube). No staging due to location of injury.</td>
</tr>
</tbody>
</table>

(National Pressure Ulcer Advisory Panel, 2016)
While this classification system provides clinicians with a standardised approach to PI description, errors in staging are frequent (Beeckman et al., 2007; Charlton, 2014; Gunningberg & Ehrenberg, 2004). One Swedish study that collected observational and chart audit data on 412 participants, found nurses incorrectly classified 20% of PI; with stage I PI the most frequently under-reported (Gunningberg & Ehrenberg, 2004). While a large number of participants were recruited to the study, inaccuracy in chart audit data is a known limitation that might affect their results (Gunningberg & Ehrenberg, 2004). Another European study also reported nurses’ difficulties in distinguishing between stage II and III PI (Beeckman et al., 2007). In this study of 1,452 nurses from Belgium, the UK, The Netherlands, Portugal and Sweden, 33.5% of observations of coloured photographs of PI resulted in stage III PI being classified as stage II (Beeckman et al., 2007). The two-dimensional photographs might affect nurses’ ability to assess the PI depth, an important differentiation between stage II and III PI, possibly influencing the study findings. Regardless, errors in the classification of PI can result in the under-delivery or inappropriate implementation of PIP strategies (Beeckman et al., 2007; Gunningberg & Ehrenberg, 2004), potentially raising patient PI risk. The complexity of the classification system is reported as one reason for these results (Beeckman et al., 2007). Other factors include nurses’ poor documentation practices (Gunningberg & Ehrenberg, 2004), limited PI knowledge (Demarré et al., 2012; Pancorbo-Hidalgo, García-Fernández, López-Medina, & López-Ortega, 2007) and clinical experience (Kottner, Dassen, & Tannen, 2009). Criticisms of the complexity of the classification system continue, with longstanding requests for its simplification (Beeckman et al., 2007). However, the publication of the 2014 international CPG suggests this will not be forthcoming soon (National Pressure Ulcer Advisory Panel et al., 2014).

2.2.3 Aetiology

The precise aetiology of PI is not clearly understood (Bouten, Oomens, Baaijens, & Bader, 2003). A number of theories are suggested, such as impaired lymphatic drainage (Reddy, Cochran, & Krouskop, 1981), reduced interstitial fluid flow (Reddy et al., 1981), cell deformation (change in the cell shape due to applied loading) (Gawlitta, Oomens, Bader, Baaijens, & Bouten, 2007) and poor tissue reperfusion (Loerakker et al., 2012).

A number of models are hypothesised to explain the development of PI, with two models featuring- the ischaemic (Bansal et al., 2005) and mechanical models (Kottner, Gefen, & Lahmann, 2011; Linder-Ganz & Gefen, 2009). First, the ischaemic model suggests that prolonged unrelieved pressure occludes the microvascular blood
vessels in tissues, resulting in localised tissue hypoxia and cell death; the beginning of a PI (Bansal et al., 2005; Bouten et al., 2003; Overgaard, 2000). Landis’ (1934) landmark study reported an interface pressure of >32mmHg caused capillary closure, resulting in cell damage. Although widely accepted as the benchmark (Andrychuk, 1998; Bansal et al., 2005), Bouten et al. (2003) and Gefen (2007) challenge the reliability of the Landis (1934) study. Bouten et al. (2003) argue the interface skin pressure is only considered, with the local blood vessel pressure gradients ignored. Others assert the Landis (1934) study has been incorrectly interpreted to mean the pressure required to close capillaries, thus preventing blood flow (Daniel, Wheatley, & Priest, 1985). Furthermore, there is limited agreement on the pathophysiological response to unrelieved pressure (Bouten et al., 2003).

Second, the mechanical model has recently gained momentum to explain PI development. Linder-Ganz and Gefen (2009) hypothesise that prolonged and intensive exposure to load causes the mechanical properties of muscle tissues to change, which may affect the distribution of soft tissue stresses under bony prominences. The researchers conclude that the current evidence on interfacial muscle pressures that is used to predict PI and determine prevention strategies may not be reliable (Linder-Ganz & Gefen, 2009). Further, it is thought that extended mechanical loads on skin and tissue tension, compression and shear contribute to the aetiology of PI, with under-weight patients most at risk (Kottner et al., 2011). It is clear we have a lack of understanding about the aetiology of PI. As a result, the strength of the evidence upon which prevention and treatment strategies are based is questionable, with more research needed (Lutz, 2008).

### 2.2.4 Prevalence

Globally, PI are a long-standing and significant healthcare problem (Bredesen et al., 2015; Gunningberg, Donaldson, et al., 2012; Miles, Fulbrook, et al., 2013). Patients can develop PI in any healthcare setting (Graves & Zheng, 2014), including the community (Asimus, Li, & Kendall, 2011), nursing homes (Bååth et al., 2014), and acute care facilities (Gunningberg et al., 2011; Lyder et al., 2012). In Australia, health service districts are required to monitor and report PI, however, each organisation is able to determine the frequency of PI prevalence audits (Australian Commission on Safety and Quality in Health Care, 2014). In Queensland hospitals, a HAPI prevalence benchmark of 10% or less has been set for these audits (Queensland Government, 2015).
Table 3 summarises published Australian studies reporting the PI prevalence rates in acute healthcare settings from 2000 to 2014. Only four of the six Australian states are represented, with none of the Australian territories featuring. Skin inspections were used to collect the data presented in Table 3, with problems acknowledged with this data collection method in terms of the identification of PI, especially stage I (Beeckman et al., 2007; Gunningberg & Ehrenberg, 2004).

**Table 3 Pressure Injury Prevalence Rates in Australian Public Hospitals 2000–2014**

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>State</th>
<th>Methodology</th>
<th>Setting</th>
<th>PI staging</th>
<th>Sample (n)</th>
<th>HAPI prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victoria Health (2006)</td>
<td>VIC</td>
<td>Skin inspection &amp; Chart audit</td>
<td>M&amp;RH</td>
<td>NPUAP</td>
<td>5,714</td>
<td>17.6</td>
</tr>
<tr>
<td>Mulligan et al. (2009)</td>
<td>WA</td>
<td>Skin inspection &amp; Chart audit</td>
<td>M&amp;RH</td>
<td>NPUAP</td>
<td>3,110</td>
<td>6.3</td>
</tr>
<tr>
<td>Mulligan et al. (2011)</td>
<td>WA</td>
<td>Skin inspection &amp; Chart audit</td>
<td>M&amp;RH</td>
<td>NPUAP</td>
<td>3,194</td>
<td>7.4</td>
</tr>
<tr>
<td>Queensland Health (2011)</td>
<td>QLD</td>
<td>Skin inspection</td>
<td>M&amp;RH</td>
<td>NPUAP</td>
<td>6,376</td>
<td>8.8</td>
</tr>
<tr>
<td>Miles et al. (2013)</td>
<td>QLD</td>
<td>Skin inspection</td>
<td>Acute hospital</td>
<td>NPUAP</td>
<td>327</td>
<td>4.0</td>
</tr>
<tr>
<td>Queensland Health (2014)</td>
<td>QLD</td>
<td>Skin inspection</td>
<td>M&amp;RH</td>
<td>NPUAP</td>
<td>3,843</td>
<td>9.0</td>
</tr>
</tbody>
</table>

NPUAP-National Pressure Ulcer Advisory Panel; QLD-Queensland; SA-South Australia; VIC-Victoria; WA-Western Australia; M&RH-Metropolitan and Rural hospitals
Internationally, HAPI rates range from 1.1% to 26.7% (Bredesen et al., 2015; Graves & Zheng, 2014). Recent Australian data (Table 3) shows a 4.0% to 9.0% HAPI rate (Miles, Fulbrook, et al., 2013; Mulligan et al., 2011; Queensland Health, 2014), with suggestions up to 22.6% of these are preventable (Mulligan et al., 2011). Worldwide, sustained decreases in PI prevalence have been difficult to achieve (Bååth et al., 2014; Gunningberg, Donaldson, et al., 2012; Moore, 2013; Mulligan et al., 2011). A Swedish study that collected HAPI prevalence data on 70,000 patients at three intervals from March 2011 to March 2012 found unchanged rates of 16.6% (Bååth et al., 2014). While the Queensland HAPI rate of 9.0% is below the 10% state benchmark (Queensland Government, 2015), these figures are concerning given the availability of PIP resources in the clinical environment (Moore et al., 2013a). Resources include PIP strategic plans, online PIP education modules (e.g. nutrition), and Pressure Ulcer Prevention (PUP) champions (Queensland Government, 2013a; Queensland Health, 2012b; Royal Brisbane and Women's Hospital Safety and Quality Unit, 2011). However, it seems more could be done to reduce HAPI. Sustained HAPI reductions have been achieved in one Queensland hospital through the implementation of nurse-led initiatives such as ear protectors, bed cradles, and targeted PIP education and staff awareness (Miles, Fulbrook, et al., 2013). These initiatives, implemented over ten years, have seen a 9.7% reduction of HAPI rates from 13.7% in 2001 to 4.0% in 2012 (Miles, Fulbrook, et al., 2013).

There is consensus that most HAPI are preventable, with only a small number deemed unavoidable (Australian Commission on Safety and Quality in Health Care, 2012; Black et al., 2011; Edsberg, Langemo, Baharestani, Posthauer, & Goldberg, 2014; Wound Ostomy and Continence Nurses Society, 2009). A preventable PI is defined as an injury that develops because the patient’s clinical condition was not fully assessed, and appropriate PIP strategies were not implemented (Black et al., 2011; Edsberg et al., 2014; Wound Ostomy and Continence Nurses Society, 2009). Whereas, an unavoidable PI is defined as the development of a PI despite the implementation of appropriate risk assessment and PIP strategies (Black et al., 2011; Edsberg et al., 2014; Wound Ostomy and Continence Nurses Society, 2009). The USA Centres for Medicare and Medicaid Services has implemented a zero tolerance to HAPI; labelling them as ‘never events’ (Agency for Healthcare Research and Quality, 2014; United States Department of Health and Human Services, 2013). This position sets a new expectation for PIP care that may be widely adopted in the future.
2.2.5 Risk factors

Studies into the risk factors of PI began more than 50 years ago (Exton-Smith & Sherwin, 1961; Norton, 1962), with over 80 factors identified (Bianchetti, Zanetti, Rozzini, & Trabucchi, 1993; Braden & Bergstrom, 1987; García-Fernández, Agreda, Verdú, & Pancorbo-Hidalgo, 2014). PI risk factors are broadly classified as extrinsic and intrinsic (Braden & Bergstrom, 1987; Coleman et al., 2014; García-Fernández et al., 2014). Extrinsic risk factors are external to the patient and include pressure, shear, friction and moisture (Braden & Bergstrom, 1987; Coleman et al., 2013; García-Fernández et al., 2014; National Pressure Ulcer Advisory Panel et al., 2014). Intrinsic factors are the physical and psychological patient characteristics that increase their PI risk (García-Fernández et al., 2014). Pressure is described in terms of intensity and duration (Pieper, 2012). This, along with the individual’s skin and tissue tolerance, are thought to influence the development of a PI (Pieper, 2012).

Shear forces can be iatrogenic (e.g. patient is moved by nurses) (Pieper, 2012), or result from a combination of pressure and movement (e.g. head of bed elevation) (National Pressure Ulcer Advisory Panel et al., 2014). Shear, together with pressure, is thought to cause tissue distortion and capillary occlusion, resulting in tissue damage (Bennett, Kavner, Lee, & Trainor, 1979; Bouten et al., 2003). Friction also contributes to PI development through the production of shear stress (Collier & Moore, 2008). A Swedish cross-sectional study conducted a one-day PI prevalence study of 1,192 patients in five hospitals, and found shear and friction were the main causative factors for PI development (Gunningberg et al., 2011). Although the large sample size and multiple study sites increases the generalisability of the findings, the data collection method of skin assessment has the potential for subjectivity in the staging of PI, which may impact on the results.

Moisture, such as perspiration, urine or faeces, reduces the resilience of the skin, and increases the effects of pressure, shear and friction (Pieper, 2012; Wounds International, 2010); although the exact mechanism remains unclear. Roaf (2006) proposes the concept of micro-climate, which identifies the impact of moisture, air movement, humidity and temperature on the skin’s ability to withstand long periods pressure. While this is important information, it is unclear how Roaf (2006) developed this concept, or if testing has occurred, major limitations of the research. One study used skin monitors to measure the skin temperature and perspiration of 20 nursing home residents with dementia (Rapp, Bergstrom, & Padhye, 2009). The researchers concluded skin temperature was a viable objective measure of tissue tolerance that contributes to
the development of PI (Rapp et al., 2009). The small sample size and premature removal of skin monitors by some residents are study limitations (Rapp et al., 2009), however these findings warrant further investigation, given rising skin temperature often results in perspiration. Many of these extrinsic factors are modifiable (Baumgarten et al., 2003), such as removing moisture, targets for prevention strategies (National Pressure Ulcer Advisory Panel et al., 2014).

Intrinsic factors include increased age, reduced mobility, malnutrition and dehydration, poor dietary intake, increased co-morbidities, chronic illness, incontinence, obesity, anaemia, and poor tissue perfusion (Fogerty et al., 2008; Gillespie, Chaboyer, McInnes, et al., 2014; McInnes et al., 2015; National Pressure Ulcer Advisory Panel et al., 2014; Tayyib, Coyer, & Lewis, 2015a). Many of these factors are non-modifiable, such as age and gender (Baumgarten et al., 2003; Worsley et al., 2016). Patient age, mobility, nutrition, incontinence, and level of consciousness are the intrinsic risk factors most frequently included in PI risk assessment tools (García-Fernández et al., 2014). Older patients are at greater risk of PI (Hartigan, Murphy, & Hickey, 2012; Langemo & Black, 2010; Theisen et al., 2012; Worsley et al., 2016), because their skin is often frail, easily injured and dry (Henoch & Gustafsson, 2003). Reduced patient mobility is a significant PI risk factor (Collier & Moore, 2008; Gillespie, Chaboyer, McInnes, et al., 2014), hence its inclusion as a criterion in this current study.

Notably, these extrinsic and intrinsic risk factors are not independent of each other. One study of 9,400 patients at 20 USA hospitals, conducted a secondary data analysis of their medical records and found intrinsic factors (e.g. increased age and multiple chronic diseases) most likely contribute to extrinsic factors (e.g. longer surgical time, increased LOS); potentially raising patient risk of PI (Baumgarten et al., 2003). The large sample size and varied clinical settings strengthen the generalisability of the study results (Baumgarten et al., 2003), with two theoretical and conceptual models on PI development (Coleman et al., 2014; García-Fernández et al., 2014) supporting these study findings.

García-Fernández et al. (2014) used the Delphi Method to review the risk factors contained within 56 PI risk assessment scales published from 1962 to 2009. They identified 83 PI risk factors that were grouped into 23 risk factor dimensions (García-Fernández et al., 2014). From this, a mid-range theoretical model for PI development was proposed (García-Fernández et al., 2014). The Delphi method relies on the consensus of a panel of experts (Powell, 2003) and is often implemented when limited empirical evidence exists in a clinical practice area (M. Murphy et al., 1998); making it
an appropriate approach for work. However, some suggest panel consensus does not mean the decisions reached are accurate (M. Murphy et al., 1998); a possible limitation. Another proposed theoretical causation schema and conceptual model into PI development takes into account the biomechanical, individual, mechanical PI risk factors (Coleman et al., 2014). This model was developed using three approaches: data from a systematic review on PI risk factors (Coleman et al., 2013); a consensus study; and a meeting of experts in the field (Coleman et al., 2014). While there is limited empirical evidence underpinning many of the studies included in the review and consensus study, this model provides nurses with a new way to understand the implications of risk factors on PI development (Coleman et al., 2014). A notable omission in both models is the impact of psychological variables such as depression. A few studies have reported depression as a risk factor for PI development (Krause, Vines, Farley, Sniezek, & Coker, 2001; Smith, Guihan, Lavela, & Garber, 2008; Suttipong & Sindhu, 2012), with suggestions patient motivation to engage in prevention activities could be reduced (Smith et al., 2008). The development of PI is complex, and much of the current available knowledge about risk factors is based on weak evidence; making it difficult for nurses to accurately predict and identify patient risk and need for PIP care.

Finally, Exton-Smith and Sherwin (1961) measured the in-bed movements of 50 elderly patients using a movement detector, and found those with reduced movements had a higher risk for PI. While the precision of the data collected by the movement detector is questioned, the study results provide valuable beginning knowledge on PI risk factors. In a cross-sectional study of 148 psychogeriatric patients, researchers identified urinary incontinence and impaired cognitive function as risk factors for PI (Bianchetti et al., 1993). Despite the limitations of generalisability associated with their small sample size and the participant population, the findings of Bianchetti et al. (1993) have been confirmed by others (Ferrell, Josephson, Norvid, & Alcorn, 2000).

2.2.6 Prevention strategies

Internationally, and in Australia, the prevention of PI is a major patient safety and quality healthcare area (Australian Commission on Safety and Quality in Health Care, 2012; National Health Service, 2013; World Health Organisation, 2014). Aimed at improving the quality and safety of patient care in Australia, ten national health service standards have been developed; with Standard 8, last published in 2012, guiding the prevention and management of PI (Australian Commission on Safety and Quality in Health Care, 2014). A number of PIP strategies are recommended in CPG for the prevention of PI including PI risk assessment, a PIP management plan, appropriate
support surfaces (e.g. pressure relieving mattress), regular repositioning, skin assessment and protection, continence management, nutritional assessment and supplements, and patient education (National Pressure Ulcer Advisory Panel et al., 2014). The empirical evidence underpinning these CPG is limited (Black, 2015; Bouten et al., 2003) and some question the robustness of the studies (Black, 2015; Chou et al., 2013; Gillespie, Chaboyer, McInnes, et al., 2014). Despite these lingering uncertainties, CPG are widely adopted and endorsed by healthcare and patient safety organisations as effective prevention strategies (Agency for Healthcare Research and Quality, 2014; Australian Commission on Safety and Quality in Health Care, 2012; Queensland Health, 2013; World Health Organisation, 2014) because they reflect the best available evidence.

**Pressure injury risk assessment**

A comprehensive and accurate PI risk assessment is the first step in PIP care (Moore & Cowman, 2014) and it is recommended to be conducted within eight hours of a patient’s hospital admission and when there is a change in their medical condition (National Pressure Ulcer Advisory Panel et al., 2014). This assessment includes three components: a PI risk assessment, skin assessment and nutritional assessment (National Pressure Ulcer Advisory Panel et al., 2014). A PI risk assessment is used to determine a patient’s risk for PI development using clinical judgement and/or a validated risk assessment tool or scale (Moore & Cowman, 2014; WA Pressure Injury Forum, 2013; Webster et al., 2011). A skin assessment is the visual examination of a patient’s skin for erythema, oedema and tissue integrity breaches, conducted on admission and at every repositioning episode (National Pressure Ulcer Advisory Panel et al., 2014). A nutritional assessment helps to screen patients for malnutrition – a known PI risk factor (Banks, Bauer, Graves, & Ash, 2010). Following this assessment, it is recommended that at-risk patients have PIP strategies implemented within two hours (National Pressure Ulcer Advisory Panel et al., 2014), with many Queensland hospitals allocating prevention resources and treatment based on the PI risk assessment outcome (Webster, Gavin, Nicholas, Coleman, & Gardner, 2010).

Worldwide, more than 50 PI risk screening tools are used in clinical practice (García-Fernández et al., 2014), highlighting the lack of standardisation in this aspect of PIP care. In Australia, nurses predominantly use the Waterlow risk assessment tool, the Norton and Braden scales, or clinical judgement to assess PI risk (Bergstrom, Braden, Laguzza, & Holman, 1987; Braden & Makleburst, 2005; Pancorbo-Hidalgo, Garcia-
Fernandez, Lopez-Medina, & Alvarez-Nieto, 2006; Waterlow, 1985; Webster et al., 2011). Table 4 provides examples of some risk assessment tools including the assessment criteria.

Table 4 Pressure Injury Risk Assessment Screening Tools

<table>
<thead>
<tr>
<th>Tool</th>
<th>Assessment criteria</th>
<th>Score</th>
<th>Level of pressure injury risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braden scale (1988)(^a)</td>
<td>Mobility</td>
<td>≥18</td>
<td>Low risk</td>
</tr>
<tr>
<td></td>
<td>Activity</td>
<td>7-17</td>
<td>At risk</td>
</tr>
<tr>
<td></td>
<td>Sensory perception</td>
<td>6</td>
<td>Very high risk</td>
</tr>
<tr>
<td></td>
<td>Moisture</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Friction-Shear</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nutrition</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tissue perfusion and oxygenation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterlow (1985)(^b)</td>
<td>Build (weight for height)</td>
<td>10+</td>
<td>At risk</td>
</tr>
<tr>
<td></td>
<td>Skin type</td>
<td>15+</td>
<td>High risk</td>
</tr>
<tr>
<td></td>
<td>Sex</td>
<td>20+</td>
<td>Very high risk</td>
</tr>
<tr>
<td></td>
<td>Continence</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mobility</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Malnutrition screening tool</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tissue malnutrition</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Neurological deficit</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Major surgery or trauma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norton (1962)(^c)</td>
<td>Physical condition</td>
<td>≤14</td>
<td>At risk</td>
</tr>
<tr>
<td></td>
<td>Mental condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mobility</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incontinence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical judgement (2011)(^d)</td>
<td>Clinicians use their clinical judgement to assess the patients’ pressure injury risk</td>
<td>No risk</td>
<td>At risk</td>
</tr>
</tbody>
</table>

Adapted from \(^a\)Braden and Bergstrom, 1988; \(^b\)Norton, 1962; \(^c\)Waterlow, 1985; \(^d\)Webster et al. 2011

Despite their widespread use, criticism exists around the reliability and validity of these screening tools (Fulbrook & Anderson, 2016; Moore & Cowman, 2014; Webster et al, 2011), with no empirical evidence suggesting these tools accurately predict a patient’s PI risk or contribute to reductions in PI incidence (Moore & Cowman, 2014). An Australian randomised controlled trial (RCT) of 1,231 medical hospital patients. Compared the effectiveness of the Waterlow and Ramstadius PI risk assessment tools against nurses’ clinical judgment in preventing PI (Webster et al,
found the incidence of HAPI was similar between the groups (clinical judgement, Waterlow and Ramstadius) (Webster et al., 2011). The study’s randomisation process (Booth & Tannock, 2014), is a strength. In contrast, the researchers who conducted a systematic review of 33 controlled clinical trials and prospective cohort studies concluded the Braden and Norton scales are better able to predict a patient’s PI risk compared to nurses’ clinical judgement (Pancorbo-Hidalgo et al., 2006). While, Webster et al.’s (2011) RCT provides the strongest evidence on the effectiveness of PI risk assessment to prevent PI (Booth & Tannock, 2014). It is clear further research is needed.

PI risk assessment screening is recommended as part of the CPG (National Pressure Ulcer Advisory Panel et al., 2014), yet numerous studies report varied completion rates by nurses (Barker et al., 2013; Gunningberg, Donakdson, et al., 2012; Gunningberg & Ehrenberg, 2004; Gunningberg et al., 2011; Hoviattalab, Hashemizadeh, D’Cruz, Halfens, & Dassen, 2015; O’Brien & Cowman, 2011). A recent German observational study of 32 adult patients, either with a PI or at high risk of PI development, found low PI risk assessment completion rates (34.3%) (Hoviattalab et al., 2015). Although the small sample size is a limitation, these findings confirm the results of others (Gunningberg & Ehrenberg, 2004; Gunningberg et al., 2011; O’Brien & Cowman, 2011). Yet, high completion rates of PI risk assessment are reported. A cross-sectional study found 99% to 100% completion of PI risk assessment in USA hospitals (n = 16,427) compared to 6% to 60% at the Swedish research sites (n = 883) (Gunningberg, Donakdson, et al., 2012). Retrospective chart audits were used to collect data, with the accuracy of chart information influencing the study findings – a known limitation. However, the large sample sizes of the hospitals and the multiple hospital sites increases the external validity of the results. Legislated specific nurse-patient ratios and financial penalties may explain the USA findings. Factors such as nurses PIP education or organisational culture, might explain the Swedish findings. Overall, these studies highlight some of the complexities of PIP care, with varied PI risk assessment practices evident, which is a quality of care issue.

Reasons for nurses’ varied completion of PI risk assessment have been examined. Researchers report nurses’ attitude toward PI risk assessment varied (Beeckman, Defloor, Schoonhoven, & Vanderwee, 2011; Demarré et al., 2012; Moore & Price, 2004), with some viewing PIP care as a low priority (O’Brien, 2009). Researchers of a cross-sectional, multi-centre study surveyed 553 Belgian nurses about their PI knowledge and attitudes (Beeckman et al., 2011). They found nurses’ positive
attitudes toward PIP care correlated with the implementation of CPG, yet PI knowledge did not (Beeckman et al., 2011). In another study, Moore and Price (2004) conducted a cross-sectional study of 121 Irish nurses, surveying them about their attitudes toward PIP care. They found nurses had positive attitudes toward PIP, however, this did not always result in the delivery of planned care (Moore & Price, 2004). While both studies found nurses had positive attitudes toward PIP, the different patient care outcomes might be due to the variances in the sample sizes or healthcare systems. The researchers administered their surveys in contrasting manners; with one survey mailed to nurses (Moore & Price, 2004), and the other supervised by a researcher over a 30-minute period (Beeckman et al., 2011). These different approaches may have influenced the participant responses; with time restrictions, possibly influencing data collection, or low survey return rates also a problem. Other factors reported to influence nurses’ completion of risk assessments include increased workloads (Dawson, Stasa, Roche, Homer, & Duffield, 2014), reduced staffing resources (Moore & Price, 2004; O’Brien, 2009), limited PI knowledge (Beeckman et al., 2011) and clinical inexperience (Barker et al., 2013). Our current understanding of this issue is largely based on international evidence, with limited Australian research available (Barker et al., 2013; Dawson et al., 2014), making the comparison of results difficult due to differences in healthcare standards and contexts.

**Pressure injury prevention management plan**

Regardless of a patient’s PI risk, current CPG recommend all patients should have a PIP management plan (also known as prevention protocols) (National Pressure Ulcer Advisory Panel et al., 2014). This individualised plan, developed by the nurse, outlines the PIP strategies to be implemented (National Pressure Ulcer Advisory Panel et al., 2014). Documenting this plan is thought to increase the continuity of PIP care (Gunningberg & Ehrenberg, 2004; Moore, Johansen, & van Etten, 2013b). The research on the use of PIP management plans is scant. Gunningberg et al.’s (2012) cross-sectional study compared the nursing PIP practices between two Swedish ($n = 883$) and 207 USA hospitals ($n = 16,427$). A PIP management plan was evident in less than one-third (28%) of the at-risk patients in Sweden, yet 96% of the USA sample had evidence of this plan (Gunningberg, Donaldson, et al., 2012). The researchers suggest the different results might be attributed to Swedish nurses’ reduced focus on nurse-sensitive outcomes such as PI (Gunningberg, Donaldson, et al., 2012). That study provides valuable insights into the variability in nursing practices of this PIP strategy. However,
it is difficult to compare clinical practice findings between countries because of subtle differences in the healthcare systems and nurses’ approach to care. There appears to be a gap in nurses’ completion of PIP management plans in some countries, but little research data is available. These plans provide documentation of the patients’ PIP care, and their omission could lead to gaps in care.

Support surfaces

The appropriate use of support surfaces is a major component in PIP care, forming part of a suite of prevention strategies available to nurses (McInnes et al., 2015; Sprigle & Sonenblum, 2011). Examples of support surfaces for the prevention of PI include pressure-relieving mattresses, seating cushions, foam wedges, pillows, sheepskins, and bandages used to protect limbs from friction (Australian Wound Management Association, 2011; McInnes et al., 2015; National Pressure Ulcer Advisory Panel et al., 2014). Pressure-relieving mattresses are broadly classified as constant, low-pressure devices and alternating pressure devices (Australian Wound Management Association, 2011). Low-pressure devices (e.g. visco-elastic mattresses) redistribute the patient’s weight by moulding to their body shape, or by varying the pressure mechanically (Bliss & Thomas, 1993; McInnes et al., 2015). Alternating pressure devices (e.g. pressure-relieving mattress) mimic the repositioning of a healthy person by alternating the pressure between the patient’s body and the mattress (Australian Wound Management Association, 2011; McInnes et al., 2015).

Questions have been raised about the effectiveness of these support surfaces, with varied evidence available (McInnes, Jammali-Blasi, Bell-Syer, Dumville, & Cullum, 2012). A recent Cochrane systematic review found unclear evidence on the PI reducing abilities of low pressure and alternating mattresses (McInnes et al., 2015). Forming part of this review, an RCT conducted by Nixon et al. (2006) compared alternating pressure mattresses with alternating pressure overlays and the development of PI. The researchers found no difference in PI development between the groups, suggesting the less expensive overlays could be as effective in preventing PI (Nixon et al., 2006). The main study limitation was the inability to blind the outcome assessment (mattress), acknowledged by the researchers as a threat to internal validity, increasing the risk of bias (Nixon et al., 2006). Despite these uncertainties, the use of support surfaces, in conjunction with other PIP strategies is regarded as best practice worldwide.

It is recommended that support surfaces should be implemented within two hours of their identified need (National Pressure Ulcer Advisory Panel et al., 2014).
This recommendation is based on logic rather than research evidence and is an area of continued debate (McInnes et al., 2015). A recent UK retrospective study found almost 27% of patients with a HAPI did not have support surfaces implemented within 24 hours (Worsley et al., 2016). This study used secondary data derived from chart audits. Therefore, the accuracy, completeness and consistency of the data may be a limitation. However, the large sample (n = 6,516) increases the study’s external validity (Worsley et al., 2016). A delay in the implementation of support surfaces may not only increase the patient’s PI risk, it may add to their physical and emotional discomfort (McGinnis, Nelson, Gorecki, & Nixon, 2015).

In addition to the delay in the implementation of support surfaces, nurses’ inconsistent implementation of appropriate support surfaces is reported (Table 5) (Bååth et al., 2014; Baumgarten et al., 2010; Gunningberg, 2005; Halfens et al., 2013; Shahin, Dassen, & Halfens, 2009; Sving, Idvall, Högberg, & Gunningberg, 2014; Worsley et al., 2016). Of the seven studies outlined in Table 5, three were conducted in Sweden, one study in the USA, UK and Germany, and one was a multi-centre study across The Netherlands, Austria and Switzerland. These studies found between 7.5% to 94.5% of patients received support surfaces (Bååth et al., 2014; Baumgarten et al., 2010; Gunningberg, 2005; Halfens et al., 2013; Shahin et al., 2009; Sving et al., 2014; Worsley et al., 2016). In the Halfen et al. (2013) cross-sectional, multi-centre study of over 20,000 hospital patients, 94.5% of Dutch patients at risk of PI received support surfaces, yet in Switzerland this figure was 51.7%. The large sample size and multiple hospital sites is a major strength of this study, increasing the generalisability of the findings (Halfens et al., 2013). The differences between the countries is noted by the researchers, with possible variations in healthcare systems, PI treatment and prevention policies and the adoption of international CPG likely explanations (Halfens et al., 2013). These studies highlight that many patients at risk of PI are not receiving recommended support surfaces as a part of their overall PIP care. These study results are important, however, their location (Europe, UK and USA) makes it difficult to generalise these findings to the Australian healthcare setting because of probable differences in nurses’ roles, team structures, and organisational funding arrangements.
<table>
<thead>
<tr>
<th>Author/Country</th>
<th>Setting</th>
<th>Sample size</th>
<th>Method</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worsley et al., UK (2016)</td>
<td>District hospital</td>
<td>6,516 participants at PI risk; Aged &gt; 18 years</td>
<td>3-year retrospective study (2007-2010); Observation and chart audit</td>
<td>27% of participants with HAPI did not have support surfaces implemented within 24 hours</td>
</tr>
<tr>
<td>Bååth et al., Sweden (2014)</td>
<td>Hospitals and nursing homes</td>
<td>Hospital participants 39,271; Nursing home participants 30,874</td>
<td>Cross-sectional; prevalence surveys (2011-2012); Skin observation and chart audit using the EPUAP methodology</td>
<td>Hospital participants at PI risk who received: Support surfaces: 75.8% to 81.4%; Repositioning: 47% to 49.7%</td>
</tr>
<tr>
<td>Sving et al., Sweden (2014)</td>
<td>A university hospital and general hospital</td>
<td>825 participants; Aged &gt; 17 years</td>
<td>Cross-sectional study (2009); Skin observation and chart audit using the EPUAP methodology</td>
<td>Participants at PI risk who received: Support surfaces: 47%; Repositioning: 44%</td>
</tr>
<tr>
<td>Halfens et al., The Netherlands, Austria and Switzerland (2013)</td>
<td>211 hospitals and 165 nursing homes</td>
<td>All hospitals only: 20,368; Hospitals: The Netherlands: 6,622; Austria: 3,648; Switzerland: 10,098</td>
<td>Annual cross sectional multi-centre design; Observations, skin inspection, chart audit</td>
<td>Participants at PI risk who received: The Netherlands: Support surfaces: 94.5%; Repositioning: 27.9%; Austria: Support surfaces: 53.4%; Repositioning: 27.4%; Switzerland: Support surfaces: 51.7%; Repositioning: 26.9%</td>
</tr>
<tr>
<td>Baumgarten et al., USA (2010)</td>
<td>9 hospitals and 105 post-acute care facilities</td>
<td>658 participants; Aged &gt; 65 years; Recent hip fracture surgery</td>
<td>Prospective cohort study (2004-2007); Observations at baseline and every alternate day for 21 days</td>
<td>Use of support surfaces: 57%; Weak relationship between support surfaces and PI risk factors</td>
</tr>
<tr>
<td>Shahin et al., Germany (2009)</td>
<td>Intensive care units at 18 hospitals</td>
<td>169 participants; Aged &gt; 18 years</td>
<td>Cross sectional design; Observations, skin inspection, chart audit, Braden risk assessment</td>
<td>Participants at PI risk who received: Support surfaces: 36.5%; Repositioning: 41.5%</td>
</tr>
<tr>
<td>Gunningberg, Sweden (2005)</td>
<td>Acute care hospitals</td>
<td>612 participants; Aged &gt; 18 years</td>
<td>Cross-sectional survey (2002); Chart audit, skin inspection; EPUAP methodology</td>
<td>Participants at PI risk who received: Support surfaces: 25.3%; Repositioning: 6.7%</td>
</tr>
</tbody>
</table>

EPUAP – European Pressure Ulcer Advisory Panel
Regular repositioning

Regular patient repositioning is a cornerstone of PIP care, often implemented by nurses (Gillespie, Chaboyer, McInnes, et al., 2014; Gunningberg, 2005; Sharp et al., 2000; Vanderwee, Grypdonck, De Bacquer, & Defloor, 2007). Repositioning is defined as the movement of patients from one position to another in an effort to alleviate or redistribute sustained pressure exerted on the body tissues (Chou et al., 2013; Gillespie, Chaboyer, McInnes, et al., 2014; Moore & Cowman, 2012). Regular repositioning is thought to redistribute the tissue interface pressure, reducing soft-tissue injury and ischaemia (Australian Wound Management Association, 2011; Peterson, Gravenstein, Schwab, van Oostrom, & Caruso, 2013). Regular repositioning for PIP is complex, with consideration given to the frequency of repositioning, patient positioning, and patient mobility patterns.

Repositioning results in changes to the patient’s body position with little evidence available on subtype lying patterns such as right and left lateral, supine, degree of incline, and head of bed elevation [HOBE] (Foerster & Fahrenberg, 2000). Current CPG recommend patients avoid a HOBE ≥ 30° because this position increases the tissue interface pressure on the coccyx; increasing their PI risk (National Pressure Ulcer Advisory Panel et al., 2014). However, if medical treatment dictates that patients should adopt this position, then increased skin and risk assessment is recommended (National Pressure Ulcer Advisory Panel et al., 2014). Studies on the subtype lying patterns of hospitalised patients have been undertaken (Chaboyer, Mills, Roberts, & Latimer, 2013; McInnes et al., 2013). An Australian observational study of 26 hospitalised patients found they frequently adopted a HOBE between 46-90°; increasing their PI risk (McInnes et al., 2013). The researchers collected three hours of observational data per participant (one hour per morning, afternoon and night shift), which may not accurately represent the patient lying patterns across an entire day. In contrast, another Australian observational study of 84 hospital patients with reduced mobility, found they mostly adopted a HOBE of 10–30° (Chaboyer et al., 2013); reflecting the recommended CPG.

The activity patterns of hospitalised patients are not well known, with different findings reported (Chaboyer et al., 2013; Kuys, Dolecka, & Guard, 2012; Mudge et al., 2016). Two Australian studies found hospitalised patients are inactive; spending most of their time in their bed or room (Kuys et al., 2012; Mudge et al., 2016). A prospective observational study of 132 patients in an Australian hospital reported all patients, regardless of their clinical setting, had limited mobility patterns (Mudge et al., 2016). Furthermore, medical patients in their study spent more time upright in bed compared to...
surgical patients (Mudge et al., 2016); with differing healthcare requirements a possible explanation. The researchers used intermittent data collection points (two-minute observations every 12–14 minutes on four observation occasions), which could possibly result in an overestimation of the time patients spent upright (Mudge et al., 2016). In another Australian study of 84 hospital patients, the researchers collected continuous mobility data over 24 hours using actigraphs (Chaboyer et al., 2013). The researchers found patients were quite active; changing their body position 3.8 times every hour (Chaboyer et al., 2013). Participants recruited to this study had reduced mobility, reducing the generalisability of the findings to other patient groups. The data collection method used in the study gathered detailed and continuous patient movement data – a strength of this study. However, the small sample size limits the generalisability. While both results only reflect the Australian hospitals in the studies, it does highlight that patients are not a homogenous group, with individualised approaches to PIP care needed.

Nurses’ implementation of regular repositioning for hospitalised patients is reported to range from 6.7% to 49.7% (Table 5) (Bååth et al., 2014; Gunningberg, 2005; Halfens et al., 2013; Shahin et al., 2009; Sving et al., 2014). The five studies outlined in Table 5 were conducted in Europe; three in Sweden, one in Germany and a multisite study in The Netherlands, Austria and Switzerland. The researchers of a cross-sectional Swedish study of 39,271 hospital patients found less than half of the patients at PI risk (49.7%) were regularly repositioned (Bååth et al., 2014). The large sample size of this study is a major strength. However, generalising the results to Australian hospitals is difficult because of possible differences in the healthcare systems. All of the studies outlined in Table 5 were cross-sectional in design, providing clinical data at a specific point in time. A limitation of this design is that it does not allow researchers to identify patterns in clinical care; an important factor given repositioning is implemented at numerous intervals during the course of a day.

For the prevention of PI, current CPG recommend two-to-four-hourly patient repositioning, with the frequency adjusted to meet individual needs (Gillespie, Chaboyer, McInnes, et al., 2014; National Pressure Ulcer Advisory Panel et al., 2014). A few studies have examined the effectiveness of repositioning frequencies – all RCTs (Defloor, De Bacquer, & Grypdonck, 2005; Moore, Cowman, & Conroy, 2011; Young, 2004). Defloor et al. (2005) examined the effect of four repositioning regimes and various mattresses on PI incidence among 838 geriatric nursing home residents in Belgium. They found four-hourly repositioning with a visco-elastic mattress resulted in
a significant reduction in PI incidence (Defloor et al., 2005). While Defloor et al.’s (2005) study has merit, the sample of geriatric nursing home participants means the generalisability of the results to acute hospitals is limited. The other two RCTs compared 30° tilt with 90° supine/lateral repositioning on PI incidence (Moore et al., 2011; Young, 2004). Young’s (2004) RCT of 46 older hospital patients in Wales found 30° tilt did not reduce PI incidence compared to 90° supine/lateral repositioning. However, this study was underpowered, affecting the study findings (Gillespie, Chaboyer, McInnes, et al., 2014). In contrast, the Moore et al. (2011) RCT of 213 hospital patients in Ireland found 30° tilt reduced PI incidence compared to 90° supine/lateral repositioning on PI incidence. All three RCTs were assessed to have performance bias issues (Gillespie, Chaboyer, McInnes, et al., 2014), with blinding of the participants or personnel either not stated (Defloor et al., 2005; Young, 2004) or participants and personnel were aware of their group allocation (Moore et al., 2011). These studies were conducted in Europe, limiting the generalisability of the findings to other countries. The quality of the body of evidence in this area is limited (Gillespie, Chaboyer, McInnes, et al., 2014); highlighting the need for further research.

**Nutrition**

Patients have a range of nutritional health needs and medical conditions requiring specialised intake (Dorner, Posthauer, & Thomas, 2009). While not the focus of this study, the role of nutrition in the development of PI features in the dietetics field (Banks et al., 2010; Roberts, Desbrow, & Chaboyer, 2015). For nurses, nutritional screening tools, such as the Malnutrition Screening Tool (MST), forms part of the Waterlow risk assessment tool (2005) and are used to identify a patient’s nutritional risk status (Banks et al., 2010; Dorner et al., 2009). The MST is standard practice across all Queensland Health hospitals (Australian Commission on Safety and Quality in Health Care, 2014; Queensland Health, 2013), with malnutrition acknowledged as a major PI risk factor (Australian Wound Management Association, 2011; Banks et al., 2010; National Pressure Ulcer Advisory Panel et al., 2014; Roberts et al., 2014). A patient’s nutritional status has been correlated to PI development (Banks et al., 2010; Langer & Fink, 2014; Roberts et al., 2015). Banks et al. (2010) conducted a large Australian multi-centre, cross-sectional study of 2,208 hospital patients and 839 nursing home residents. They found hospital patients with malnutrition were 2.6 times more likely to develop a PI, and nursing home residents twice as likely (Banks et al., 2010). The strength of this study is the large sample and multiple healthcare facilities from which
the sample was drawn; increasing the generalisability of the findings in Queensland. However, the accuracy of the MST score is reliant on the knowledge and skills of the clinicians completing this assessment, a limitation that could affect the findings. A Cochrane review of the effectiveness of enteral and parenteral nutrition in the prevention of PI found the methodological quality of current RCTs was weak (Langer & Fink, 2014), indicating more research is needed.

**Patient education**

Healthcare environments are complex and challenging places for patients to navigate in terms of processes, people and relationships, which can contribute to poor patient outcomes (Australian Commission on Safety and Quality in Health Care, 2013). Approximately 60% of Australian adult patients do not have the necessary skills and knowledge to understand health information, and apply it to their healthcare decision making (Australian Commission on Safety and Quality in Health Care, 2013). An individual’s health literacy is defined as the skills, knowledge, capacity and motivation to obtain, understand and apply health information in their care decision making and participation (Australian Commission on Safety and Quality in Health Care, 2013). Poor health literacy results in increased hospitalisation and adverse events and reduces patient uptake of prevention services (Australian Commission on Safety and Quality in Health Care, 2013; Scott, Gazmararian, Williams, & Baker, 2002). A UK longitudinal cohort study of 7,857 patients aged over 52 years, tested their functional health literacy at three points over five years. The researchers found patients with a low health literacy score were twice as likely to die within a five-year period compared to those with moderate-to-high health literacy (Bostock & Steptoe, 2012). This study used a test to measure patient health literacy; a method that could bias those with good health literacy. While these UK findings might not be easily applied to Australia, they do highlight potential risks associated with poor health literacy. One way to improve a patient’s health literacy is through increased access to information and education (Australian Commission on Safety and Quality in Health Care, 2013; Bostock & Steptoe, 2012; Institute of Medicine, 2004).

Nurses are well positioned to provide PIP education to patients. Before any education session, nurses should identify a patient’s prior knowledge. A couple of studies found patient knowledge of PI and PIP ranges from poor to excellent (McInnes et al., 2014; Roberts et al., 2014). One Australian qualitative study of 51 hospitalised patients report they had good knowledge about PI and overall prevention strategies.
Another Australian interpretive qualitative study of 20 hospital patients found they had little to excellent PI and PIP knowledge as it related to nutrition (Roberts et al., 2014). Different data collection methods were used: a questionnaire (multiple choice and short answers) was implemented by McInnes et al. (2014), while Roberts et al. (2014) utilised semi-structured interviews, allowing for detailed patient responses to be collected. A strength of both studies is the detailed data around patient knowledge. Rather than patient self-reports of PI knowledge (e.g. how would you rate your knowledge?), participants in both studies were asked about the causes of PI and possible prevention strategies (McInnes et al., 2014; Roberts et al., 2014). These study findings are reflective of their Australian patients, however, they highlight the gaps in patient knowledge that nurses can use in the delivery of patient education and the implementation of PIP care (Rudd, 2013). Studies from other countries were unable to be located, demonstrating the need for more research.

Educating all patients about PIP is part of the CPG (National Pressure Ulcer Advisory Panel et al., 2014). PIP education aims to fill gaps in a patient’s PI and PIP knowledge so they can make decisions about their healthcare (Australian Commission on Safety and Quality in Health Care, 2013; National Pressure Ulcer Advisory Panel et al., 2014). Nurses are in an optimal position to provide patient PIP education. However, several studies (Table 6) found low nursing engagement with this strategy (Halfens et al., 2013; Hoviattalab et al., 2015; McInnes et al., 2014; Özdemir & Karadag, 2008; Shahin et al., 2009). The five studies outlined in Table 6, conducted in Europe, Australia and Turkey, found that 3.1% to 40% of patients received PIP education (Halfens et al., 2013; Hoviattalab et al., 2015; McInnes et al., 2014; Özdemir & Karadag, 2008; Shahin et al., 2009). The highest rate of PIP education (40%) occurred among intensive care unit (ICU) patients located at 18 German hospitals (Shahin et al., 2009). Halfens et al. (2013) reported up to 30% of patients received PIP education, with the large sample size, and multiple country location (The Netherlands, Austria and Switzerland) increasing the external validity and generalisability of their findings. Participants in the Australian study thought nurses should provide PIP education to patients on their admission to hospital (McInnes et al., 2014). Nurses’ limited PIP knowledge can affect their ability to deliver patient education (Demarré et al., 2012; Pancorbo-Hidalgo et al., 2007).
Table 6 *Summary of Research Studies Reporting the use of Patient Education 2005-2016*

<table>
<thead>
<tr>
<th>Author/Country (Year)</th>
<th>Setting</th>
<th>Sample size</th>
<th>Method</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoviattalab et al. (2015) Germany</td>
<td>Two general hospitals</td>
<td>32 participants at high risk of PI or with a current PI</td>
<td>Observational descriptive study</td>
<td>3.1% of participants received PI and PIP education</td>
</tr>
<tr>
<td>McInnes et al. (2014) Australia</td>
<td>Hospital</td>
<td>51 participants; Aged &gt; 18 years</td>
<td>Questionnaire (multiple choice and short answers)</td>
<td>33% of participants received PIP education</td>
</tr>
<tr>
<td>Halfens et al. (2013) The Netherlands, Austria and Switzerland</td>
<td>All hospitals and 165 nursing homes</td>
<td>All hospitals only: 20,368 Hospitals: The Netherlands: 6,622 Austria: 3,648 Switzerland: 10,098</td>
<td>Annual cross sectional multi-centre design; Observations, skin inspection, chart audit</td>
<td>Participants receiving PI and PIP education: The Netherlands: 30.3% Austria: 12.2% Switzerland: 23.6%</td>
</tr>
<tr>
<td>Shahin et al. (2009) Germany</td>
<td>Intensive care units at 18 hospitals</td>
<td>169 participants; Aged &gt; 18 years</td>
<td>Cross sectional design; Observations, skin inspection, chart audit, Braden risk assessment</td>
<td>40% (64) of participants received education about PI and PIP</td>
</tr>
<tr>
<td>Özdemir and Kradag (2008) Turkey</td>
<td>3 Intensive care units</td>
<td>30 nurses</td>
<td>Observational descriptive study; Observations (nurses), chart audit, Braden scale; 3 observations per nurse (90 observations in total)</td>
<td>Nurses were observed on 8 occasions (8.8%) delivering PIP education to participants</td>
</tr>
</tbody>
</table>

**PIP care bundles**

Traditional approaches to PIP involve the implementation of one or a number of recommended strategies (National Pressure Ulcer Advisory Panel et al., 2014). New PIP care approaches include the use of PIP care bundles (Coyer et al., 2015; Tayyib, Coyer, & Lewis, 2015b). These bundles consist of purposefully selected PIP strategies such as skin care, repositioning, patient and staff education, and nutrition (Baldelli & Paciella, 2008). The aim of PIP care bundles is to improve patient outcomes through nurses’
increased compliance with CPG (Institute for Healthcare Improvement, 2014; Rello, Chastre, Cornaglia, & Masterton, 2011).

Niederhauser et al.’s (2012) systematic literature review of acute care and long-term facility PIP programs containing more than one prevention strategy (called multifaceted), found 24 eligible studies. Although none of the studies include RCT’s, the multifaceted PIP programs may be successful in achieving reductions in HAPI, with many of the programs implemented in multiple clinical practice areas (Niederhauser et al., 2012). A systematic review conducted by Sullivan and Schoelles (2013) identified 26 implementation studies that examined the effectiveness of multifaceted PIP programs in preventing PI among patients admitted to acute care and long-term care facilities in the US. These studies contained moderately strong evidence, although no RCT’s were conducted in the acute care facilities (Sullivan & Schoelles, 2013). The use of multiple core PIP strategies in a simple and standardised manner were considered most effective in preventing PI (Sullivan & Schoelles, 2013). While the studies contained in these reviews have limitations in terms of design, sample size and generalisability (Niederhauser et al., 2012; Sullivan & Schoelles, 2013), there are merits reported with PIP programs, requiring further investigation.

Studies have examined the effectiveness of PIP care bundles on the reduction of PI incidence (Coyer et al., 2015; Tayyib et al., 2015b). Tayyib et al.’s (2015b) two-arm, cluster-randomised, experimental control trial, conducted in intensive care units (ICU) at two large Saudi Arabian hospitals, recruited 140 participants. The intervention group received a PIP care bundle consisting of PI risk assessment, skin hygiene and moisturising, nutritional assessment, three-hourly repositioning, support surfaces, and nurse education and training (Tayyib et al., 2015b). Their results showed a 7.1% PI cumulative incidence rate for the intervention group, compared to 32.8% for the control group who received standard care (Tayyib et al., 2015b). There is some risk of performance bias in this trial with non-blinding of the PIP care bundle (Tayyib et al., 2015b). Similarly, Coyer et al. (2015) conducted a before and after study that tested a PIP care bundle (InSPIRE) among 207 participants in an Australian ICU. Their bundle comprised three interventions: skin integrity assessment, reduction in pressure and friction, and PIP strategies (skin hygiene, three-hourly repositioning, no heel pressure) (Coyer et al., 2015). The researchers found a lower PI cumulative incidence rate (18.1%) for the intervention group compared to the control group (30.4%) (Coyer et al., 2015). In both studies, formal risk assessments were not part of the ‘standard care’ assigned to the control group; a study limitation. The strategies included in the PIP care
bundles targeted the needs of ICU patients, reducing the generalisability of the results. While promising, replication of these studies is required to confirm the findings.

Research into PIP care bundles that include patient engagement with their care have been conducted (Chaboyer et al., 2015). The INTACT trial tested the efficacy of a PIP care bundle of the development of HAPI among at-risk patients (Chaboyer et al., 2015). The bundle, consisting of targeted patient educational resources (brochure, DVD and poster), delivered three key PIP messages: increased mobility, skin care, and good nutrition (Chaboyer et al., 2015). Nurses also received training on effectively engaging patients in their PIP care (Chaboyer et al., 2015). The trial was based on the assumption that a combined approach of specifically selected PIP strategies, coupled with nursing and/or patient involvement, could achieve reductions in HAPI (Chaboyer et al., 2015). Some suggest this trial “has the potential to deliver new insights into the major ingredients of effective pressure ulcer prevention in clinical practice” (Balzer & Kottner, 2015, p. 1656). However, the trial findings have not yet been published.

2.2.7 Predictors of prevention strategies

There is some research on the predictors of PI development yet evidence on the predictors of the use of PIP strategies is scarce and dated. A handful of studies have identified predictors for the use of support surfaces (Bergstrom, Braden, Kemp, Champagne, & Ruby, 1996; Gunningberg, 2005; Perneger, Héliot, Raë, Borst, & Gaspoz, 1998) and regular repositioning (Gunningberg, 2005). In Bergstrom et al.’s (1996) cohort study of 843 USA patients, females at PI risk were more likely to have support surfaces implemented compared to male at-risk patients. The study’s strengths are its large sample size and the multiple healthcare settings (hospitals, veteran centres and nursing homes). However, one third of the participants were from nursing homes, who are not representative of hospitalised patients. Furthermore, a cross-sectional Swedish study of 612 hospital patients found increased hospital LOS and a Braden score identifying patients at PI risk, were predictors for the implementation of support surfaces and regular repositioning. Perneger et al.’s (1998) cross-sectional study of 2,373 hospital patients conducted in Switzerland also found risk assessment score and the presence of a PI predicted the use of support surfaces. The external validity of these findings is increased by the large sample sizes. The cross-sectional design of both studies also provides a snapshot of clinical practice at a specific point in time. While the findings from these studies are valuable, they were conducted more than a decade ago with contemporary information needed that accurately reflects present healthcare environments.
To summarise, hospitalised patients are at risk of PI, and current HAPI prevalence rates have remained relatively unchanged over the past decade. The prevention of PI is complex, with a suite of PIP strategies available for nurses to implement. Current evidence suggests nurses are not consistently implementing PIP strategies. PIP care bundles are an approach to PIP care that show some potential in reducing PI incidence. However, innovative ways to achieve sustained reductions in PI prevalence need to be found.

2.3 Patient participation

Patient participation, a key concept of patient-centred care (PCC) (Kitson et al., 2013; Longtin et al., 2010), is a priority healthcare area (Australian Commission on Safety and Quality in Health Care, 2010; Vaismoradi, Jordan, & Kangasniemi, 2015; World Health Organisation, 2005). Patient participation is an approach to care that increases patient involvement in their care, improves patient outcomes and safety (Longtin et al., 2010), and increases their satisfaction with care (Davis, Sevdalis, & Vincent, 2011; Kitson et al., 2013; Longtin et al., 2010; Sahlsten, Larsson, Sjostrom, & Plos, 2008; Tobiano, Marshall, et al., 2015; Vaismoradi et al., 2015). Despite these benefits, the uptake and application of patient participation in clinical practice has been slow. Disparities in the definition and language surrounding patient participation may partly explain this.

2.3.1 Definition

No single agreed definition exists of the concept of patient participation (Cahill, 1996; Eldh, Ekman, & Ehnfors, 2010; Longtin et al., 2010; Sahlsten et al., 2008). The terms patient collaboration, engagement, person-centred care and PCC are used synonymously with patient participation (Cahill, 1996; Longtin et al., 2010; Moyle et al, 2015). This increases confusion among nurses and researchers, making the application to clinical practice and the comparison of research findings difficult (Vaismoradi et al., 2015). Current definitions of patient participation include dimensions of negotiation, active participation, mutual respect, information sharing, decision-making, and the yielding of power by nurses (Brownlea, 1987; Cahill, 1996; Eldh et al., 2010; Jewell, 1996; Longtin et al., 2010; Sahlsten et al., 2008; Thompson, 2007; Tobiano, Marshall, et al., 2015; World Health Organisation, 2005). Tutton (2005) adds patient participation is a dynamic process that occurs in the context of care-giving, and can change over time depending on the patient’s preferences or health. Two patient participation conceptual models outline the attributes needed for patient participation.
These include a nurse-patient relationship, information sharing between the nurse and patient, nurses’ surrendering of power, the engagement of intellectual or physical care activities, and a perceived benefit of these activities (Cahill, 1996; Sahlsten et al., 2008). These models are valuable, however, they were developed based on the nurse’s role and their broad approach means they do not take into account the specific nuances associated with PIP care.

Patient participation in their healthcare cannot be assumed (Florin, Ehrenberg, & Ehnfors, 2006). Doherty and Doherty (2005) outline three broad patient participation preferences: active, collaboration, and passive. Likewise, patients can choose to participate in selected aspects of their care (Alharbi et al., 2014; Levinson et al., 2005; Tobiano, Bucknall, et al., 2015b), with Guadagnoli and Ward (1998) asserting “participation should be defined by whatever level the patient is most comfortable with” (p. 337). There is limited understanding of patient perceptions of their participation in their care. A handful of qualitative studies report most patients are willing and motivated to participate in aspects of their care if they have the information and knowledge to do so (McInnes et al., 2014; Tobiano, Bucknall, et al., 2015b), while only a minority prefer to be passive in their care (Alharbi et al., 2014). Furthermore, the nurse-patient relationship was a key component of participation (Alharbi et al., 2014; McInnes et al., 2014; Tobiano, Bucknall, et al., 2015b). Two of the studies examined patient perceptions of their participation in care (McInnes et al., 2014; Tobiano, Bucknall, et al., 2015b), while Alharbi et al. (2014) investigated patient perception of partnerships in a new model of care. Of these studies, two were conducted in Australian hospitals (McInnes et al., 2014; Tobiano, Bucknall, et al., 2015b), the third was a Swedish study (Alharbi et al., 2014). Semi-structured interviews were used by Tobiano et al. (2015b) and Alharbi et al. (2014) allowing for detailed data to be gathered on participant perceptions; a study strength. Content analysis were used to analyse data in all three studies; an appropriate method when little is known about a research area (Elo & Kyngäs, 2008). Deemed appropriate, an inductive and deductive approach to analysis were undertaken by Tobiano et al. (2015b) and Alharbi et al. (2014) respectively, with McInnes et al. (2014) not stating their approach. Although a range of patient participation preferences is reported (McInnes et al., 2014; Tobiano, Bucknall, et al., 2015b), this limited evidence means patient views from other countries have not been gathered, which could uncover other findings.

Patient participation relies on nurses’ ability to engage patients in their care, an effective nurse-patient relationship and patients’ medical or cognitive functionality.
An interpretive qualitative Australian study examined 20 hospital nurses’ views of patient participation in nursing care (Tobiano, Bucknall, et al., 2015a). Using semi-structured interviews, the researchers found many nurses perceived patients as knowledgeable partners in their care (Tobiano, Bucknall, et al., 2015a). Similar views of patient participation were reported among Greek nurses (Kolovos et al., 2015). In this cross-sectional study of 181 hospital nurses, qualitative and quantitative data were collected using a questionnaire containing Likert scales and open-ended questions (Kolovos et al., 2015). Nurses viewed their role in patient participation in two broad areas: information sharing, and their ability to influence others (patients and nurses) (Kolovos et al., 2015). The Kolovos et al. (2015) study had a large sample size – a study strength. The use of questionnaires as a data collection method of nurses’ views might not provide the researcher detailed information, which could affect the study’s findings. Both studies provide an insight into the views of patient participation among Australian and Greek nurses, limiting their generalisability to other countries.

2.3.2 Facilitators

Patient participation involves a number of stakeholders. Nurses are pivotal in promoting and facilitating patient participation in their care (Vaismoradi et al., 2015) through education, encouragement, and positive attitudes (Davis et al., 2011). Workplace environments that value and encourage the contribution of the patient in their care, are more likely to implement and encourage patient participation (Davis et al., 2011; Koutantji, Davis, Vincent, & Coulter, 2005). Finally, healthcare environments that foster a culture of patient participation, through the provision of resources such as ongoing nurse education, are more likely to result in increased patient participation (Rathert, Huddleston, & Pak, 2011).

2.3.3 Barriers

A number of barriers to patient participation exist including nurses’ knowledge and skills, and patient factors such as attitude, cognition and health literacy (Larsson, Sahlin, Sjöström, Lindencrona, & Plos, 2007; Longtin et al., 2010; Tobiano, Marshall, et al., 2015; Weingart et al., 2011; Wellard, Lillibridge, Beanland, & Lewis, 2003).

Nurses play a pivotal role in patient participation, however deficits in their knowledge and skill can become a barrier to participation (Tobiano, Bucknall, et al., 2015a). A recent Swedish study examined hospitalised patients’ experience of a PCC model and found that despite the willingness of many nurses to encourage patient participation, some did not know how to invite patients to participate in their care.
(Alharbi et al., 2014). Furthermore, limited information sharing has been reported between healthcare professionals and patients (Larsson, Sahlsten, Segesten, & Plos, 2011; Longtin et al., 2010). The actions of some healthcare professionals confirm paternalistic views still exist in contemporary healthcare systems (Larsson et al., 2011) which can impact on a patient’s willingness to participate in their care (Australian Commission on Safety and Quality in Health Care, 2010). It is evident more work is needed to better equip nurses with the knowledge and skills needed to encourage and facilitate patient participation.

Patient factors can also influence their participation in their care. A recent Australian study found many nurses try to engage patients in their care, however patient attitudes toward participation was frequently a barrier, with these patients often described by nurses as ‘stubborn’ (Tobiano, Bucknall, et al., 2015a). In addition, patients with cognitive impairment were less likely to participate in their care because of the impact this has on decision making (Tobiano, Bucknall, et al., 2015a). Further, some patients do not possess the necessary health literacy skills to access, understand, and apply healthcare information and navigate the complex health system, which could preclude them from participating in their care (Australian Commission on Safety and Quality in Health Care, 2013; Longtin et al., 2010). Poor health literacy often results in patients’ experiencing uncertainty around their healthcare rights, their ability to exercise them and their participation in their care (Australian Commission on Safety and Quality in Health Care, 2010).

2.3.4 Patient participation in healthcare and pressure injury prevention

Currently, only a few studies have examined active strategies to promote patient participation in specific clinical practice areas such as medication management (McTier et al., 2013), chronic heart failure (Eldh, Ehnfors, & Ekman, 2004), end-of-life care (Lindström, Gaston-Johansson, & Danielson, 2006), and the development of a PIP care bundle (Gillespie, Chaboyer, Sykes, et al., 2014). An Australian pilot study tested a PIP care bundle among 58 hospital patients in one medical and one surgical ward (Gillespie, Chaboyer, Sykes, et al., 2014). Their bundle, aimed at increasing patient participation in PIP care, had four strategies (video, combined checklist/brochure and poster): delivering information categorised as ‘keep moving’, ‘care for your skin’ and ‘ensure a good diet’ (Gillespie, Chaboyer, Sykes, et al., 2014). The researchers reported varied results, with good patient engagement with the video and poster, and reduced engagement with the checklist and information brochure (Gillespie, Chaboyer, Sykes, et al., 2014).

Although the pilot study strategies are effective teaching tools (Coulter & Ellins, 2007),
an acknowledged limitation is the assumption that participants had good literacy (Gillespie, Chaboyer, Sykes, et al., 2014). This possibly accounts for the low participant interaction with the checklist and brochure. Patients are motivated to participate in their care (Tobiano, Bucknall, et al., 2015b) and so greater nurse engagement seems to be the next logical step.

Exploring patient participation as a potential PIP strategy is hindered by the lack of empirical evidence on its application, or a precise model to direct its implementation (Moyle et al., 2015; Sahlsten et al., 2008). A recent conceptual model underpinned by PCC, provides an understanding of how complex nursing interventions can be developed, tested and implemented into practice (Moyle et al., 2015). The model, titled ‘Partnering with Patients Model of Nursing Interventions’, shifts the focus from care being a service provided by nurses to patients, to one where patients and nurses form partnerships to achieve common goals (Moyle et al., 2015). This conceptual model values the unique contribution of the patient and nurse, providing an opportunity for collaboration and ‘partnering’ in the delivery of complex care (Moyle et al., 2015). While this model needs testing (Moyle et al., 2015), it provides beginning opportunities for the development of a model that guides nurses’ PIP practice and increases patient participation in their care; possibly resulting in a reduction of HAPI.

2.4 Summary

While a body of knowledge exists on the prevention and treatment of PI, greater understanding is needed. Limited research of the PIP practices in the Australian context exists, with the available evidence suggesting current approaches to PIP are not having the desired impact. International and national CPG for PIP recommend a suite of clinical practice strategies. However, gaps exist in their planning and implementation, with recent Australian data not readily available. The complex and multifactorial aspects of PI and PIP care means the development of appropriate prevention strategies is not easy. Patient participation is an important concept warranting further exploration as a possible approach to PIP. The following chapter will describe the methodological approach used in this study.
CHAPTER 3

Methodology

3.1 Introduction

This two-phased, mixed methods study investigated pressure injury prevention (PIP) strategies in hospitalised adult medical patients with reduced mobility. It comprised quantitative and qualitative data collection methods, and a meta-synthesis of these data. The aim of the quantitative phase was to increase understanding of current planning and implementation of PIP strategies, the relationships between these strategies, predictors of implemented PIP strategies, and the observed patient body positions across three nursing shifts, including their predictors. The aim of the qualitative phase was to describe patient perception of their current and future role in the prevention of pressure injuries (PI). Then, based on a meta-synthesis of the quantitative and qualitative data a preliminary conceptual model on patient participation in PIP was developed.

Presenting an overview of the study methodological approach, this chapter details the research questions posed and hypotheses tested. The conceptual and operational definitions are described followed by the research design. An outline of the research sites and sampling plan, including the recruitment criteria, is provided. The data collection methods, and the development and testing of the data collection tools and interview questions, are described. Quantitative analytic techniques using descriptive and inferential statistics and the qualitative analytic process of conventional content analysis are outlined. The process used in the meta-synthesis and conceptual model development are explained, as are the ethical considerations and approval process.

3.2 Research questions

As outlined in Chapter One, the following research questions were posed:

1) What are the planned and implemented PIP strategies in hospitalised adult medical patients with reduced mobility?

2) What is the relationship between the planned and implemented PIP strategies of support surfaces and regular repositioning in hospitalised adult medical patients with reduced mobility?
3) What patient, clinical, and contextual factors predict the implementation of PIP strategies in hospitalised adult medical patients with reduced mobility?

4) What are the observed body positions and frequency of repositioning in hospitalised adult medical patients with reduced mobility over three consecutive nursing shifts (day, evening and night)?

5) What is the difference in the repositioning frequency in hospitalised adult medical patients with reduced mobility over three consecutive nursing shifts (day, evening and night)?

6) What factors predict the frequency of repositioning in hospitalised adult medical patients with reduced mobility?

7) What are patients’ perceptions of their current and future role in the prevention of PI?

8) What factors facilitate patient participation in pressure injury prevention in hospitalised adult medical patients with reduced mobility?

9) What factors hinder patient participation in pressure injury prevention in hospitalised adult medical patients with reduced mobility?

For the study research questions 1 to 6, the following hypotheses were tested:

I. There is a relationship between the planned and implemented PIP strategies of support surfaces and regular repositioning in hospitalised adult medical patients with reduced mobility.

II. Patient, clinical and contextual factors predict the implementation of support surfaces, regular repositioning, patient education, and the number of PIP strategies in hospitalised adult medical patients with reduced mobility.

III. Patient, clinical, and contextual factors predict the frequency of patient repositioning in hospitalised adult medical patients with reduced mobility.

IV. There is a difference in repositioning frequency in hospitalised adult medical patients with reduced mobility across three consecutive nursing shifts (day, evening and night).
3.3 Definitions

Based on previous research, the following conceptual and operational definitions applied in this study (Table 7):

Table 7 Study Conceptual and Operational Definitions

<table>
<thead>
<tr>
<th>Concept</th>
<th>Conceptual definition</th>
<th>Operational definitions</th>
<th>Previous research</th>
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<tbody>
<tr>
<td><strong>Completed pressure injury risk assessment tool</strong></td>
<td>The PI risk assessment was completed on the admission date, and the tool was completed if all of the tool items had a documented response (clinical judgement tool = 1 item; Waterlow (2005) tool = 10 items)</td>
<td>Completed PI risk assessment tool on admission: 0 = not completed; 1 = partially completed; 2 = fully completed</td>
<td>(Waterlow, 2005; Webster et al., 2011)</td>
</tr>
<tr>
<td><strong>Contextual factors</strong></td>
<td>The elements related to the healthcare organisation. For this study, it included hospital site and medical unit</td>
<td>Hospital B =1; Hospital A = 2. Medical unit1 = 1; Medical unit 2 = 2; Medical unit 3 = 3; Medical unit 4 = 4</td>
<td>(Oxford, 2011)</td>
</tr>
<tr>
<td><strong>Head of Bed Elevation (HOBE)</strong></td>
<td>HOBE is the degree of elevation of the head of the bed. This could range from 1° to 90°. Supine was measured at 0°</td>
<td>Degree of bed incline: continuous level of measure (1 to 90°)</td>
<td>(Moore et al., 2011; M. Wilson, 2008)</td>
</tr>
<tr>
<td><strong>Pressure injury prevention strategies</strong></td>
<td>Includes the strategies of PI risk assessment, PIP management plan, appropriate support surfaces, regular repositioning, participant PIP education, continence management, skin protection, nutritional assessment, and participant position. These strategies are documented (planned) in the nursing care plan and implemented by healthcare professionals, usually a nurse</td>
<td>All of these variables are binary: 0 = no; 1 = yes. Participant position: categorical (supine, left or right lateral, walking, sitting, HOBE, unable to view)</td>
<td>(European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010; Queensland Health, 2009)</td>
</tr>
</tbody>
</table>
## Pressure injury risk assessment

A PIP strategy, conducted by the nurse, to determine the participant’s risk of PI development. The assessment is conducted using a standardised tool such as the Waterlow risk assessment tool or nurses use their clinician judgement and document the result. Screening should be conducted on hospital admission or soon after. The assessment outcomes are: ‘no PI risk’, ‘at PI risk’, ‘high PI risk’, ‘very high PI risk’, not assessed. PIP strategies are implemented following the outcome of this assessment.

<table>
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<td>PI risk assessment: 0 = ‘no PI risk’, ‘1 = ‘at PI risk’, 2 = ‘high PI risk’, 3 = ‘very high PI risk’, 4 = not assessed. Clinical judgement: 0 = ‘not at PI risk’, 1 = ‘at PI risk’</td>
<td>(Moore &amp; Cowman, 2008; Waterlow, 2005; Webster et al., 2011)</td>
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### Regular repositioning

Considered to be implemented if a participant’s position changed at least six times in a 24-hour period (i.e. once every four hours).

<table>
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<tr>
<th>Concept</th>
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<td>Regular repositioning</td>
<td>Considered to be implemented if a participant’s position changed at least six times in a 24-hour period (i.e. once every four hours)</td>
<td>Regular repositioning: 0 = no; 1 = yes</td>
<td>(Defloor et al., 2005)</td>
</tr>
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### Repositioning

A PIP strategy implemented either manually or with the aid of equipment (slide sheet or hoist). Repositioning ranges from small positional shifts, executed independently by the participant, to repositioning performed by the nurses with or without equipment. Participant repositioning was observed at 30 minute intervals during the 24-hour observation period.

<table>
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<td>Repositioning: any observed body position change, resulting in the alleviation of pressure or the redistribution in a body part. 0 = no; 1 = yes. Participant position: categorical (supine, left or right lateral, walking, sitting, HOBE, unable to view)</td>
<td>(Gillespie et al., 2012; Moore &amp; Cowman, 2012; M. Wilson, 2008)</td>
</tr>
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### 3.4 Research design

This study used a mixed methods research design combining quantitative (semi-structured observations and retrospective chart audits) and qualitative (semi-structured interviews) methods. Incorporating quantitative and qualitative research methodologies into a single study (Creswell, 2003; Denzin, 1989) is a way to gather evidence on complex healthcare areas (Creswell & Plano-Clark, 2011; Monti & Tingen, 1999; Morgan, 1998). After quantitative and qualitative approaches, mixed methods are considered the third research paradigm (Johnson, Onwuegbuzie, & Turner, 2007).
Through the exploration of multiple viewpoints, this methodological design allows researchers to gain a unique understanding of the topic under investigation (Monti & Tingen, 1999; Morgan, 1998; Tashakkori & Teddlie, 2010; Williamson, 2005).

Increasingly used by researchers to examine social, behavioural and human science areas (Denzin, 1989; Johnson et al., 2007), mixed methods designs have been implemented in PI research (Gorecki, Closs, Nixon, & Briggs, 2011). Some argue mixed methods increases the research rigour through triangulation (Rose & Webb, 1998; Williamson, 2005), with the strengths of one method compensating for any weakness of the other method (Andrew & Halcomb, 2009; Denzin, 1989; Morgan, 1998; Williamson, 2005). Tashakkori and Teddlie (2010) explain that collecting quantitative and qualitative data allows the research questions to be answered from a number of perspectives. Using multiple data collection methods reduces the likelihood of data collection gaps (Tashakkori & Teddlie, 2010). Finally, this approach is useful when a single methodology is unable to be used to collect the data needed to answer the study research questions (Tashakkori & Teddlie, 2010).

Three factors were considered when determining the data collection strategy for this mixed methods study: implementation, priority and integration (Creswell, 2003). Implementation refers to the order of the quantitative and qualitative data collection, which may be sequential (data is collected in phases) or concurrent (data is collected at the same time) (Creswell, 2003). The intent of the researcher and study research questions guides the selection of the implementation sequence (Creswell, 2003). Priority is the weight assigned to the quantitative and qualitative approaches; which may be equal or skewed toward one approach (Creswell, 2003). Integration is the process whereby the researcher ‘mixes’ the data (Creswell, 2003). This can occur during data collection, analysis, interpretation or at a time determined by the researcher (Creswell, 2003).

The study questions and research design guided the selection of the priority-sequence model (Morgan, 1998). This model determines which method is the principal data collection strategy, as well as the data collection timing (Morgan, 1998). A sequential, explanatory research design was selected for this mixed methods study, with a priority sequence of QUANTITATIVE → qualitative (Creswell & Plano-Clark, 2011). This two phase study began with the quantitative data being collected first, following up with the qualitative data collection in the second phase (Creswell, 2003; Creswell & Plano-Clark, 2011). By using this strategy, the results of the quantitative phase are used to further explore the qualitative phase of the study (Tashakkori &
In addition, most of the research questions are quantitative in nature; so collecting this data first helped to inform the design and development of the qualitative research interview questions. Furthermore, the potential for response bias in the interviews was reduced by collecting the quantitative data prior to the semi-structured qualitative data. The final step is the integration and interpretation of the results emerging from the two study phases (Creswell, 2003; Creswell & Plano-Clark, 2011). In this study, the data integration (mixing) occurred at the data analysis stage (Creswell, 2003), using a meta-synthesis approach and process (Sandelowski, Voils, & Barroso, 2006). As with all research designs strengths and weaknesses exist. Creswell (2003) describes the sequential, explanatory design as straightforward. This is a major strength because the design steps are clear, and the stages distinct and easy to follow, making the description and reporting of the study results relatively easy (Creswell, 2003). A noted weakness of this design is the length of time it takes to collect the data in the two study phases (Creswell, 2003). This priority-sequence model allowed the researcher to explore the patient’s perception of their role in PIP; complementing and strengthening the research design and meeting the study aims (Morgan, 1998).

In the quantitative phase, semi-structured observations and retrospective chart audits were used to collect the data. Frequently used to investigate a range of healthcare research areas, semi-structured observations allows the researcher to observe and collect participant data unobtrusively, whilst recording behaviours and events (Polit & Beck, 2010), making the selection of this method appropriate. Disadvantages include observer bias, and reactivity or the participant awareness of being observed (Polit & Beck, 2010). Eliminating observer bias and participant reactivity is unlikely. However, comprehensive training of research assistants (RA) prior to data collection can minimise this (Polit & Beck, 2010). In this study, these factors were minimised by conducting pre-data collection RA training, wearing non-organisational clothing to reduce identification during data collection and observing the patient from the doorway of the patient’s room.

Retrospective chart audits were also used to gather quantitative research data – a method implemented in previous studies on PI (Cox, 2011; Gunningberg et al., 2011). Relatively cost-effective, this method also allows for concurrent data on a number of variables can be collected (Polit & Beck, 2010). A noted limitation, chart audits rely on the accuracy and reliability of the record from which the data is extracted (Connelly, 2008; Hess, 2004). So, if the chart information is incorrect or incomplete, these errors will be reflected in the collected data (Polit & Beck, 2010). To minimise this, a process
for managing missing data was followed (Gearing, Mian, Barber, & Ickowicz, 2006), as outlined in the data analysis section of this chapter. Some of the medical chart files were electronic, with organisational computer passwords needed – a noted difficulty (Hess, 2004). The researcher gained a password for the electronic medical record system that resolved this issue. Hospital staff facilitated access to quiet data collection areas and desktop computers.

In the qualitative study phase, semi-structured interviews conducted in private, were used to collect the data. Described as a relative, context-dependent and interpretive method, this approach allows the researcher to gather unique psychological information from participants, such as their opinions and feelings (Taylor, Kermode, & Roberts, 2006). Patient perceptions about a subject matter are valued. However, it is acknowledged that an individual’s perception can change over time (Taylor et al., 2006). Prior to data collection, a ‘script of questions’ was developed as an interview guide, increasing consistency across the data collection episodes (Taylor et al., 2006). During the interviews, probing questions, such as ‘Can you tell me a bit more about….’, allowed the researcher to illicit additional information from participants. This strategy increased the consistency and quality of the data (Graneheim & Lundman, 2004).

3.5 Research settings

Two Australian metropolitan hospitals were selected as the research sites, with two medical units participating at each facility, four in total (Figure 2). The sites were publically-funded, tertiary teaching hospitals, offering a range of inpatient healthcare services, and administered by Queensland Health (QH) – a state government department (Queensland Health, 2012a). Nursing staff who deliver patient care include Registered Nurses (RNs), Endorsed Enrolled Nurses (EENs), Enrolled Nurses (ENs) and Assistants in Nursing (AINs). RNs are solely responsible for patient PI risk assessment and the subsequent planning of PIP care. Nursing staff participate in annual PI prevalence audits, and clinician-led PIP education and research activities. In the published and accepted manuscripts contained in this thesis (Figure 1, Chapter One), the anonymity of the research sites was preserved by referring to them as Hospital A and B (Figure 2).
The research setting selected included four medical units across the specialties of renal, immunology, respiratory and endocrinology. Hospital clinicians, who were PIP experts, assisted in the selection of these medical units, with a number of clinical, research and professional factors used to justify their inclusion. These factors included patient diagnosis and acuity, average length of stay (LOS), average patient occupancy rates, sufficient access to potential participants during the data collection period, professional research networks, and the tertiary nature of the organisation. First, both research sites were tertiary referring hospitals, with high levels of patient acuity increasing the likelihood of recruiting patients with reduced mobility. Second, both hospitals reported high bed occupancy rates; a factor required to ensure the recruitment of sufficient study participants. Third, using the three-day average LOS data for adult medical patients in Australian public hospitals (Australian Institute of Health and Welfare, 2009), and the medical unit bed capacities at each research site (Hospital A: 30 beds per medical unit; Hospital B: 20 beds per medical unit), it was estimated 800 patients would be admitted to the medical units during the two-month data collection period. Access to a large patient population was a study requirement, with these admission figures increasing the likelihood of recruiting the required sample within the study timeframe. Lastly, strong research networks are crucial to a study’s success (Burston et al., 2011; Harvath, 2007). The established hospital research networks proved invaluable during the all preparation, data collection, analysis and reporting phases of this current study. These carefully considered factors and approach confirmed the medical units were appropriate for selection in this study, and provided access to participants with diverse clinical needs (McCloughen & O’Brien, 2006), increasing the generalisability and robustness of the evidence (Twycross & Corlett, 2007). The strengths of this approach outweigh the limitations, making it an appropriate choice.
Prior to the commencement of the study, an overview of the research project was given to the Nurse Unit Managers of the four medical units, and their questions answered. Information sessions were held with the unit clinical staff. Posters outlining the study and research team members contact details were displayed in staff common areas (Appendix A). Ongoing staff education occurred during data collection, resulting in a problem-free data collection period. Regular meetings between the clinical managers and researchers were conducted to improve communication and collaboration, and reduce difficulties in accessing resources (Twycross & Corlett, 2007).

3.6 Sample

A consecutive sample of study participants was drawn from a population of hospitalised adult medical patients with reduced mobility. Recruited participants were not required to have a PI or be assessed at PI risk. The required sample size was determined by the research questions, the hypotheses being tested, and associated inferential tests (Polit & Beck, 2010). For the quantitative study phase, power analysis was used to determine the sample size, and reduce the likelihood of a Type II error (Polit, 2010). Calculating the sample size is dependent on knowing the significance criterion (α), power, and population effect size (Polit, 2010). For this study, the significance criterion (α) was set at 0.05, power = 0.80, and the population effect size was 0.20 (i.e. it represents the association between the independent and dependent variables). The large effect size of 0.80 is deemed sufficient to determine the sample size and provide enough power to support the null hypothesis (Cohen, 1990). With this information, and using chi-square and correlation tests power tables (Polit, 2010), a minimum sample of 196 participants was required to identify a relationship between the planned and implemented PIP strategies. For logistic regression modelling, 10 to 20 cases per predictor is required, with 20 cases preferred (Polit, 2010).

In this study, 12 predictors were used in the multiple regression model, so a sample size ranging from 120 to 240 participants was estimated (Polit, 2010) to identify the predictors. The predictors were age, gender, hospital, hospital length of stay (HLOS), weight, PI risk assessment during admission, sedative medication, narcotic medication, sedative and narcotic medication, current or previous PI, observed skin assessment and support surfaces. A target participant sample of 240 was deemed appropriate to answer the predictor research questions.

For the qualitative study phase, an estimated sample of 10 to 20 participants would be sufficient to achieve data saturation during sampling (Polit, 2010;
Sandelowski, 1995b). Purposive sampling was used to select the interview participants to answer the research questions (Marshall, 1996). Maximum sample variation was captured in terms of gender, age, race, and medical conditions, ensuring a range of perspectives was captured in the interviews (Graneheim & Lundman, 2004). Small sample sizes are acceptable for qualitative studies, so long as the sample is sufficiently large enough to adequately answer the research question (Marshall, 1996).

3.6.1 Inclusion criteria

For this study, participants needed to meet all of the following inclusion criteria:

1. aged ≥18 years;
2. hospitalised for the 24-hour data collection period;
3. reduced mobility (equipment and/or staff needed to ambulate/reposition in bed);
4. HLOS ≥ 3 days at data collection; and
5. ability to provide an informed consent.

The following justification is provided for each inclusion criterion. Participants aged ≥18 years were included in this study because adult patients are known to have a greater PI risk (Langemo & Black, 2010). Observing the study participants for a continuous 24-hour data collection period allowed the researcher to gather data on the continuity of PIP care over three nursing shift periods. The reliability and validity of PI screening tools or clinical judgement to determine a patient’s PI risk is contested (Braden & Maklebust, 2005; Fulbrook & Anderson, 2016; Walsh & Dempsey, 2011; Webster et al., 2010), with no agreement reached. Reduced patient mobility was used as a criterion because it is a known PI risk factor (Australian Wound Management Association, 2011; European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010).

The ≥3 day HLOS at data collection as an inclusion criterion was chosen because PI are reported to increase LOS (Graves, Birrell, & Whitby, 2005a). In Australian public hospitals, the average LOS data for adult medical patients is three days (Australian Institute of Health and Welfare, 2009). Furthermore, the ≥3 day HLOS at data collection would provide nurses with ample time assess patients’ PI risk on admission and implement PIP strategies. Written consents were obtained from willing participants. Withdrawal from the study could occur at any time.

3.6.2 Exclusion criteria

One exclusion criterion applied to this study, that being participants previously recruited into the study. Participants could only be recruited once. Additionally, it was
deemed unethical to continue to collect data on recruited participants whose medical condition suddenly deteriorated and they were withdrawn from the study.

3.6.3 Sample recruitment

A participant eligibility screening tool was developed (Appendix B) to identify if patients approached for recruitment met the inclusion criteria. Participant recruitment occurred in the following manner. First, the RN-in-charge identified potential participants in the medical unit that may be suitable for recruitment. The RN and researchers then approached these patients to enquire if they were willing to hear about the study. Using the screening tool, the researcher approached the patient, giving them a verbal study overview. Subsequent questions were answered, with a signed consent obtained from willing participants. Hospital-specific consent forms were developed (Appendix C & D). The consent form included the qualitative and quantitative phases of the study. The researcher verbally confirmed the ongoing study consent prior to conducting interviews with the willing participants. Consents were witnessed by the researcher and securely stored. Recruited participants were given a site-specific plain language patient information sheet (Appendix E & F). For the qualitative study phase, potential interview participants were approached a few days after their observational data was collected. Using purposive sampling, an informal interview was conducted with willing participants.

3.7 Data collection

Data collection occurred over two months, from November 2011 to February 2012. Across the four medical units, there were a total of 28 days (672 hours) of data collection; with seven days spent in each medical unit. In the medical units, data were collected on each day of the week (i.e. Monday through to Sunday); known as the data collection schedule. The data collection schedule (Appendix G) for each medical unit was randomly generated using a computer. To increase recruitment numbers a minimum two-day absence was scheduled between data collection days in the same medical unit, allowing new patient admissions to occur during this period.

Three data collection methods were utilised in this mixed methods study: chart audits, semi-structured observations and semi-structured interviews. Two quantitative data collection methods were implemented: semi-structured observations conducted at 30-minute intervals over a continuous 24-hour period, and retrospective chart audits of the medical files and nursing care plans. Semi-structured interviews were used to collect the qualitative data.
The development of the semi-structured observational and chart audit tools were informed by the PIP clinical practice guidelines (Australian Wound Management Association, 2011; European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010) and the PI risk factors reported in the literature (Gunningberg & Ehrenberg, 2004; Halfens & Eggink, 1995). A data dictionary (Appendix H) developed during the research design phase, provides evidence-based justification for each variable in the qualitative phase. The semi-structured interview guide was informed by relevant patient-centred care and patient participation literature (Brownlea, 1987; Flach et al., 2004; Luxford et al., 2011). The design, development and testing of these data collection tools occurred over a three-month period from August to October 2011.

3.7.1 Chart audit tool

The retrospective chart audit tool collected demographic, clinical and planned PIP strategy data from the patient medical file (paper-based or electronic) and the end-of-bed nursing care plan. The demographic and clinical data included patient age, gender, hospital, medical unit, HLOS at data collection, number of comorbidities, PI history, and medical diagnosis. Patient PIP education data were collected from documentation in the medical file. Participants’ actual LOS was not collected. The tool was informed by a range of PIP evidence as outlined in the data dictionary (Appendix H) (Australian Institute of Health and Welfare, 2009; European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010; Joanna Briggs Institute, 2008; Moore & Cowman, 2009b; Moore et al., 2011; National Pressure Ulcer Advisory Panel, 2007; Queensland Health, 2009; Warms, 2006; Webster et al., 2011). Prior to its use, the chart audit tool underwent 11 refinements (Appendix I). The tool refinements were undertaken by my supervisors and me, occurring during the pre-data collection tool development meetings and the pre- and post-pilot studies.

3.7.2 Semi-structured observational tool

The semi-structured observational tool collected data on the patient’s body position (supine, HOB, lateral, walking, sitting) measured at 30-minute intervals over a continuous 24-hour period, with 48 observations recorded for each recruited patient. Other data included the implemented PIP strategies, PI risk factors, skin care, and continence management. The tool variables were informed by published PI research as contained in the data dictionary (Appendix H) (Australian Wound Management Association, 2011; European Pressure Ulcer Advisory Panel, 1998; European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010; Joanna Briggs...
Prior to its implementation, the tool was developed over 10 iterations (Appendix J) by my supervisors and me during the pre-data collection tool development meetings and the pre- and post-pilot studies.

3.7.3 Semi-structured interviews

Semi-structured interviews were conducted with recruited participants, who had on the previous day, participated in the quantitative phase (i.e. semi-structured observations and chart audit). To reduce the possibility of information bias, the interviews were conducted after the quantitative data collection. The informal interviews were conducted in a quiet area of the medical unit. Using an interview guide and open-ended questions, patient perceptions of their role in PIP were explored. Interviews lasted 10–15 minutes, with a small number continuing for 20–40 minutes. The interviews were digitally recorded, with the exception of one, which for cultural reasons were transcribed by hand.

A semi-structured interview guide was used in all interviews. My supervisors and I undertook the development of the interview guide, with six iterations prior to its use (Appendix K). The interview questions were informed by the research questions of this study and the available research on patient-centred care (Flach et al., 2004; Luxford et al., 2011), patient participation (Brownlea, 1987; Larsson et al., 2007) and patient decision-making (Hudak et al., 2008; Sepucha & Mulley, 2009). The final semi-structured interview guide contained 11 questions. Each interview began by establishing the participant’s understanding of the term ‘pressure sore’ or ‘bed sore’. The term PI was not used because it was thought participants may not be familiar it. Participants’ experience of skin soreness or PI was then explored.

These introductory questions were vital to determine their understanding of PIP. For participants with any PI experience, the physical, emotional, financial, social and relationship impacts were explored. Participants were asked about their perceptions of their current and future role the prevention of PI. This was followed by an exploration of the type of PIP strategies that were implemented as part of their care. These included appropriate support surfaces, repositioning (particularly at night), PIP education, and their perceived level of involvement in decisions made about their healthcare. Throughout the interview the following probing statements were used as appropriate to illicit deeper responses from the patient:
3.7.4 Validity and reliability of the data collection tools

For the quantitative phase, it was important to establish the validity and reliability of the audit tools so that possible biases were reduced and the rigor of the study augmented (Gearing et al., 2006). Validity refers to the ability of a data collection tool to measure the variables it was designed for (Polit & Beck, 2010). Reliability is the tool’s ability to measure data consistently across repeated data collection episodes (Polit & Beck, 2010). For this study, the following strategies ensured the validity and reliability of the data collection tools. To ensure content validity of the tools, a comprehensive literature review provided current evidence-based information on previous research in this area. During their development, a panel of experts in this field, including national and international academics, assessed the tools for accuracy. All tools were rigorously tested through pilot, inter-rater and intra-rater reliability studies.

One month prior to data collection (October 2011), a pre- and post-pilot study was conducted to test the reliability of the chart audit tool and semi-structured observational tool (Allison et al., 2000; Gearing et al., 2006). A research assistant (RA) and myself conducted this pilot study. The results of the pre- and post-pilot tests are outlined in Table 8. Following minor adjustments to the data collection tools and the post-pilot study results, it was determined the tools collected the required data for this study and were ready for use.
Table 8 Pre- and Post-pilot Testing of the Quantitative Data Collection Tools

<table>
<thead>
<tr>
<th>Tool</th>
<th>Pre pilot study</th>
<th>Inter-rater reliability</th>
<th>Changes to tool</th>
<th>Post pilot study</th>
<th>Inter-rater reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chart audit</td>
<td>5 patient* charts audited by each data collector</td>
<td>92%</td>
<td>Addition of ‘not applicable’ to some questions. Four questions removed: peripheral pulses assessed and documented, reactive hyperaemia, wound clinic referral</td>
<td>5 patient charts* audited twice by each data collector</td>
<td></td>
</tr>
<tr>
<td>Semi-structured observations</td>
<td>10 patients* observed</td>
<td>95%</td>
<td>Addition of ‘nil’ to some questions</td>
<td>4 patients* observed twice by each data collector</td>
<td></td>
</tr>
</tbody>
</table>

*Patient met study inclusion criteria

The data collection for the entire study was undertaken by me and three RAs; all healthcare professionals, and two with Master’s level qualifications (Allison et al., 2000). On data collection days, one RA and I alternated in the collection of the chart audit and semi-structured observational data during the 0700–1459 period. The remaining two RAs collected the semi-structured observational data from 1500–2259 and 2300–0659; with one RA rostered per shift. To increase the objectivity of the data collection, the RAs were not informed of the study’s research questions and hypothesis during the data extraction process (Gearing et al., 2006).

The use of four data collectors is recommended to ensure inter-rater reliability (Allison et al., 2000). To enhance the inter-rater reliability between the data collectors, each RA received 10 hours of data collection training over several days (Gearing et al., 2006). The training commenced with orientation to the chart audit and the semi-structured observational data collection tools. Following this, I spent eight hours collecting observational data with each of the RAs. After the first hour of data collection, the data were compared to ensure consistency. For the remaining seven hours, the semi-structured observational data collection continued, with informal discussions held whenever anomalies were noted.
Following this training period, consensus between the four data collectors was tested. Semi-structured observational data were collected on five new patients who met the study inclusion criteria, with a 92% inter-rater reliability achieved. One week later, semi-structured observational data was collected on five different patients, with a 96% intra-rater reliability score achieved. Intra-rater reliability for each data collector was also tested to ensure the same data was collected on repeated administrations of the tool, with a 99% score achieved. These percentages were obtained by counting the frequencies of the variables on the data collection tool between the raters, identifying similarities and variations until consensus was reached.

3.7.5 Rigour

In qualitative research, the researcher’s prior knowledge, clinical experience, and understanding of the PIP literature informs the data collection process (Hsieh & Shannon, 2005). For this research three processes are needed to establish trustworthiness; these are credibility, dependability, and auditability (Guba, 1981; Guba & Lincoln, 1985; Taylor et al., 2006). For this study, purposive sampling and the context selection allowed the researchers to gather a diverse range of participant perceptions, thus establishing credibility (Graneheim & Lundman, 2004). Dependability was achieved by using a semi-structured interview guide, ensuring consistency in the data collection process (Graneheim & Lundman, 2004). During data analysis, the research team met regularly to clarify questions during data analysis, with decisions made by consensus (Graneheim & Lundman, 2004). The use of a codebook throughout data analysis provided an audit trail during data condensations, helping to achieve auditability (Graneheim & Lundman, 2004).

The semi-structured interview guide was tested in the following manner. Two participants were interviewed using the developed interview guide. The data were then transcribed by a trained RA and analysed by the research team. Minor adjustments were made to three interview questions; for example, using the term pressure sore, rather than PI. Following this process, the research team determined the semi-structured interview guide was ready for use. During data collection, a number of participants described similar experiences, indicating data saturation at the points of sampling and data analysis (Sandelowski, 1995b). Regular co-researcher meetings during data collection and analysis helped to avoid bias through the examination of any taken-for-granted, preconceived assumptions.
3.8 Data analysis

Quantitative and qualitative data analysis were undertaken in this mixed methods study. Philosophically, the quantitative and qualitative study phases were viewed distinctly, thus the data were analysed separately. Data integration and synthesis occurred in the meta-synthesis and discussion of the findings (Andrew & Halcomb, 2009).

3.8.1 Quantitative data analysis

A trained RA entered the numerical study data into the IBM SPSS statistics software (version 22.0, Chicago, United States of America, 2013). Regular discussions were held between the RA and I to maximise the clarity during data entry. Missing data in data collection tools can result in a bias in the validity of the results (Worster & Haines, 2004). To minimise this, all missing data were coded as ‘99’ in the dataset (Field, 2013; Gearing et al., 2006). A random sample of 24 (10%) data collection tools (semi-structured observation and chart audit tools) were selected for a data entry accuracy check. Comparisons of the completed data collection tools against the corresponding SPSS dataset yielded a 99.2% accuracy. Once data entry was finalised, the data were cleaned and errors corrected. Prior to data analysis, the categorical and dichotomous variables were dummy coded (e.g. 0 = patient not at risk of PI development; 1 = patient at risk of PI development). A detailed manual was kept during data entry and analysis (Gearing et al., 2006). This strategy outlined the rationale for decisions made about the data (e.g. recoding variables), how missing data were managed, and provided an audit trail (Gearing et al., 2006).

A univariate analysis, including the level of distribution of the continuous variables, was the first step in data analysis (Field, 2013). The assumptions for the statistical tests were checked and any violations addressed (Field, 2013; Polit, 2010). The assumptions included checks for normality, multicollinearity, outliers and homogeneity of variances (Field, 2013; Polit, 2010). Using descriptive statistics, the study sample characteristics were described including the frequency, mean, standard deviation, median and inter-quartile range (IQR). Inferential statistical testing was used to answer the research questions and test the hypotheses (Field, 2013; Polit, 2010). Inferential test selection was guided by the research question, the distribution of the data and the level of measurement (e.g. continuous, categorical, dichotomous) (Field, 2013; Polit, 2010). Table 9 outlines the statistical testing undertaken for the quantitative phase, including the independent and dependent variables and their level of measure. Chi-square ($\chi^2$), one-way repeated measures analysis of variance (ANOVA), multiple
regression and multiple logistic regression were used to test the hypotheses. The level of statistical significance set for the hypotheses testing was $p < 0.05$ (Field, 2013; Polit, 2010). Confidence intervals of 95% were used for the regression analysis.
<table>
<thead>
<tr>
<th>Research question</th>
<th>Statistical test</th>
<th>Independent variables</th>
<th>Level of measure</th>
<th>Dependent variables</th>
<th>Manuscript</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the planned and implemented PIP strategies in hospitalised adult medical patients with reduced mobility?</td>
<td>Freq (%), $\bar{x}$ $(SD), Md$ (IQR)</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>What is the relationship between the planned and implemented PIP strategies of support surfaces and regular repositioning in hospitalised adult medical patients with reduced mobility?</td>
<td>Chi-square</td>
<td>Completed PI risk assessment on admission, at risk of PI on admission, PIP management plan, planned support surface, planned regular repositioning, planned participant PIP education, planned support surfaces (pressure-relieving mattresses, seating cushions, foam wedges, pillows, and bandages to protect limbs from friction)</td>
<td>Dichotomous</td>
<td>Implemented support surfaces, observed regular repositioning, delivered patient education</td>
<td>1</td>
</tr>
<tr>
<td>Research question</td>
<td>Statistical test</td>
<td>Independent variables</td>
<td>Level of measure</td>
<td>Dependent variables</td>
<td>Manuscript</td>
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<td>---------------------------------------------------------------------------------</td>
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<td>-------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>What patient, clinical and contextual factors predict the implementation of PIP</td>
<td>Multiple Regression</td>
<td>Age, participant 24 hour activity, HLOS and number of comorbidities</td>
<td>Continuous</td>
<td>Number of implemented PIP strategies</td>
<td>2</td>
</tr>
<tr>
<td>strategies in hospitalised adult medical patients with reduced mobility?</td>
<td>Multiple Logistic Regression</td>
<td>Gender, PI risk assessment on admission, identified at PI risk during admission, and hospital</td>
<td>Dichotomous</td>
<td>Implemented support surfaces, observed regular repositioning, delivered participant PIP education</td>
<td>3</td>
</tr>
<tr>
<td>What are the observed body positions, and frequency of repositioning in</td>
<td>Freq (%), $\bar{x}$ ($SD)$, $Md$ (IQR)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>hospitalised adult medical patients with reduced mobility over three consecutive</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>nursing shifts (day, evening and night)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research question</td>
<td>Statistical test</td>
<td>Independent variables</td>
<td>Level of measure</td>
<td>Dependent variables</td>
<td>Manuscript</td>
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<tr>
<td>----------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>What is the difference in the repositioning frequency in hospitalised adult medical patients with reduced mobility over three consecutive nursing shifts (day, evening and night)?</td>
<td>Analysis of Variance</td>
<td>Day shift, evening shift, night shift</td>
<td>Dichotomous</td>
<td>Frequency of repositioning</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(ANOVA)</td>
<td></td>
<td>Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What are the factors that predict the frequency of repositioning in hospitalised adult medical patients with reduced mobility?</td>
<td>Multiple Regression</td>
<td>Age, weight, HLOS</td>
<td>Continuous</td>
<td>Frequency of repositioning</td>
<td>3</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>Gender, identified at PI risk during admission, sedative medication, narcotic medication, sedative and narcotic medication, current or previous PI, observed skin assessment, support surface, hospital</td>
<td></td>
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</tbody>
</table>
A two-step model building approach was used for the multiple regression analysis. Figure 3 outlines this approach; with each step providing the foundation for the next phase of the analysis. The first step was a simple linear univariate analysis of the continuous level of measurement dependent variable (DV) or outcome variable and the independent variables (IV) or predictor variables. In the second step, the statistically significant predictors were simultaneously entered into the multiple regression analysis. The same model building approach was used for the multiple logistic regression analysis. This analysis involved a dichotomous DV and multiple IV or predictor variables. Univariate analysis was first undertaken, with all statistically significant IV simultaneously entered into the multiple logistic regression model. Both approaches allowed the researcher to select the predictors suitable for analysis based on previous research and their clinical judgement; and does not rely on the researcher selecting the order the variables are entered in the model (Field, 2013). This approach is suitable for areas where little previous research exists (Field, 2013).

Figure 3. Multiple regression and multiple logistic regression model building approach
3.8.2 Qualitative data analysis

Semi-structured interviews were used to collect the qualitative data. For qualitative data it is acknowledged that inductive reasoning is used to interpret and give meaning to the data (Thorne, 2000). While a number of qualitative data analysis approaches exist, the study research question should be used to determine the chosen approach (Taylor et al., 2006). Selected for this study, content analysis is a social scientific methodology (Potter & Levine-Donnerstein, 1999) that allows researchers to make valid interpretations of the data meaning and intentions as well as its context (Downe-Wamboldt, 1992; Krippendorff, 1980). Content analysis focuses on human communication, making it an appropriate analysis method of nursing clinical data (Downe-Wamboldt, 1992; Graneheim & Lundman, 2004; McCain, 1988). Flexibility is the major advantage of this approach (V. Wilson, 2011). However, criticisms of its reliability and trustworthiness have been raised (Elo & Kyngäs, 2008; Potter & Levine-Donnerstein, 1999; V. Wilson, 2011). Therefore, a codebook was used to provide an audit trail, improving the data stability (V. Wilson, 2011). Content analysis has been previously used to explore patients’ experience of PI (Langemo, Melland, Hanson, Olson, & Hunter, 2000) and perceptions of their care (Larsson et al., 2011), confirming its suitability for this study’s data analysis.

Three content analysis approaches exist: conventional, directed and summative (Hsieh & Shannon, 2005). The first, conventional content analysis allows the researcher to describe a phenomenon when there is limited research on the topic (Hsieh & Shannon, 2005). The second approach, directed content analysis, is guided by more structured processes, using existing theory or prior research with operational definitions derived from this theory (Hsieh & Shannon, 2005). The third, summative content analysis identifies and quantifies content and words in text in an effort to explore usage rather than assign meaning (Hsieh & Shannon, 2005). For this study, conventional content analysis was chosen to analyse the interview data.

Conventional content analysis is appropriate for studies where qualitative data is collected using interviews with open-ended questions and additional probing statements are used in this study (Hsieh & Shannon, 2005). During data analysis, the researcher derives codes from the text, with ongoing code analysis resulting in the emergence of categories and sub-categories from the data (Hsieh & Shannon, 2005). Following the development of category and sub-category definitions, relationships between the categories and sub-categories may emerge (Hsieh & Shannon, 2005). The
The semi-structured interviews were conducted in the same manner whereby participants were asked questions in the same order. A trained RA transcribed the interviews verbatim. The transcription accuracy was checked by listening to the interviews and concurrently reading the transcripts. Prior to the data analysis the researcher decides if the analysis should focus on the manifest or latent content (Downe-Wamboldt, 1992; Kondracki, Wellman, & Amundson, 2002). Manifest content analysis focuses on the visible and apparent components in the text, whereas latent content analysis examines the relationships and underlying meaning of the text (Downe-Wamboldt, 1992; Kondracki et al., 2002). Latent content analysis was chosen for this study because examination of the relationships and meaning of the text would result in a deep and rich data analysis (Graneheim & Lundman, 2004) that would answer the research questions.

Graneheim and Lundman’s (2004) content analysis process was followed. First, each transcript was read several times and the corresponding audio files listened to on multiple occasions. Data immersion allowed me to gain an overview of the whole data (Graneheim & Lundman, 2004). This first step was not rushed. Sufficient time was set aside for data immersion to occur simultaneously with my thoughts and a revision of the current literature (Sandelowski, 1995a). Second, using coloured pens, individual analysis of the interview transcripts was undertaken, with the meaning units (phrases) (Graneheim & Lundman, 2004; Tesch, 1990) identified in the text. Through condensation of phrases, codes were then assigned. Third, similar codes within and across the interviews were grouped together and subsequently labelled a sub-category. Next, similar sub-categories were condensed into categories. Finally, each category was assigned a definition based on the supporting data. This process of deconstructing and reconstructing the data allowed me to view the data, and the topic being researched, in a new and unique way (Sandelowski, 1995a). This data analysis process was conducted by myself and my supervisors, and continued until consensus was reached (Graneheim & Lundman, 2004).

3.8.3 Quantitative and qualitative data meta-synthesis

The aim of this mixed methods study was to describe the planned and implemented PIP strategies in hospitalised acute medical patients with reduced mobility, explore patient perceptions of their role in PIP care, and to develop a conceptual model of patient participation in pressure injury prevention based on the characteristics of conventional content analysis justify its selection as an appropriate data analysis method for the qualitative phase of this study.
meta-synthesis of the qualitative and quantitative research findings. This section describes the approach and process undertaken in the meta-synthesis of the quantitative and qualitative data, and the development of a conceptual model. These quantitative and qualitative study findings are significant on their own. However, synthesising the results allows the researcher to simultaneously interrogate the data, yielding a deeper understanding of the research phenomenon (Sandelowski et al., 2006) and providing a unique view of the research topic (Dixon-Woods et al., 2006; Harden et al., 2004; Sandelowski et al., 2006). The synthesis of quantitative and qualitative results from a mixed-method study is a “type of systematic review aimed at the integration of results from both qualitative and quantitative studies in a shared domain of empirical research” (Sandelowski et al., 2006, p. 29).

Although relatively new, mixed-method synthesis has been used in healthcare related research (Sandelowski, Voils, Leeman, & Crandell, 2012). There is a lack of consensus on how data synthesis should occur, with two broad synthesis approaches suggested: meta-summary and meta-synthesis (Sandelowski et al., 2012). Meta-summary allows the researcher to examine the data in terms of the frequency of each finding, resulting in surface penetration of the data (Sandelowski & Barroso, 2007). Through meta-synthesis the researcher can integrate the data and provide a more meaningful interpretation of the results (Sandelowski & Barroso, 2007). This current study used a descriptive and interpretive research design, so a meta-synthesis approach was appropriate to examine the entire study results.

Sandelowski et al. (2012) outlines two meta-synthesis approaches: aggregation and configuration. The attributes of aggregation include thematically similar findings, confirmatory (repetition) findings, study or subject level integration, averaging or merging of results and the end product is a pooled summary (Sandelowski et al., 2012). Synthesising data by aggregation relies on the researcher to find the same relationship repeatedly among the results (Sandelowski et al., 2012). Configuration has the defining features of thematically dissimilar findings, a complementary relationship between the findings, inductive (bottom up) and data-driven direction of integration, linking of results and conceptualisation of a model (Sandelowski et al., 2012). Synthesising data by configuration allows the researcher to link thematically diverse findings into a clear and unique theoretical perspective that takes into account both similar and contrasting results (Sandelowski et al., 2012). While neither approach is deemed superior, the nature of the research findings governs the selection of the meta-synthesis approach (Sandelowski et al., 2012). The quantitative and qualitative findings in this current study
are diverse – reflecting the complex nature of PIP care and the numerous stakeholders involved. Thus, the selection of configuration to synthesis the data is appropriate. Configuration permits the researcher to determine which findings will be linked (Voils, Sandelowski, Barroso, & Hasselblad, 2008) and allows for the generation of a theory or model (Sandelowski et al., 2012) in the area under investigation (Dixon-Woods, Agarwal, Jones, Young, & Sutton, 2005; Sandelowski et al., 2012). In developing the conceptual model, current empirical studies and theories will be used (Sandelowski et al., 2012). No other patient participation in PIP conceptual models were found. Finally, this process allows the researcher to generate a new or modified model or theory of the area under investigation (Dixon-Woods et al., 2005; Sandelowski et al., 2012).

In this study, the meta-synthesis process outlined by Voils et al. (2008) was followed. Step one involves constructing a narrative of the quantitative findings (Voils et al., 2008). Step two encompasses a narrative summary of the qualitative findings (Voils et al., 2008). Step three includes the process of looking for and interpreting the relationships between the summarised findings, and synthesising them into a coherent complementary narrative, with equal importance conferred on the quantitative and qualitative findings (Sandelowski et al., 2006; Voils et al., 2008). The synthesised findings were then arranged into a conceptual model (Voils et al., 2008) allowing the researcher to provide a unique perspective on the research area (Sandelowski et al., 2012).

A conceptual model is a set of abstract concepts that allow the researcher to describe and explain aspects of the area under investigation, gaining a better understanding of it (Borgida & Mylopoulos, 2009; Fawcett, 2000; Fawcett & Desanto-Madeya, 2013). Researchers utilise conceptual models to explain a phenomenon being studied, especially when a paucity of models exist (Sandelowski & Barroso, 2007). These models can inform thinking about clinical practice and future nursing research (Fawcett & Gigliotti, 2001). The conceptual model contained in this thesis was developed inductively and data driven (Voils et al., 2008).

Using Fawcett’s (1980, 2000) conceptual model analysis and evaluation framework, a number of steps were undertaken in the development of the proposed model. Firstly, using the meta-synthesis results, a number of abstract core concepts were identified. Secondly, based on the study research data, definitions were developed for these core concepts. Next, propositions, which are relationships between two core concepts, were identified. Finally, proposition statements that define the relationship between two core concepts were developed.
Fawcett and Desanto-Madeya (2013) developed a framework that has been frequently used in nursing research to determine the robustness of the conceptual model. This framework includes examining the conceptual models origins, unique focus, and content (Fawcett & Desanto-Madeya, 2013). The conceptual model presented in this thesis requires testing in clinical practice.

3.9 Ethical considerations

This study was classified as ‘low risk’ because participants might experience psychological discomfort or inconvenience during the observation phase or interviews (National Health and Medical Research Council, Australian Research Council, & Australian Vice-Chancellors' Committee, 2007). While the severity of any participant harm was assessed as low, the plain language statement contained the contact details of the ethics managers, so any participant concerns could be addressed (National Health and Medical Research Council et al., 2007). The strategies implemented to minimise the study risks were outlined in the research design and data collection sections of this chapter. This study upheld the guidelines for the conduct of ethical research developed by the National Health and Medical Research Council (NHMRC) (2007).

Four ethical values underpinned this study: research merit and integrity, respect, justice and beneficence (National Health and Medical Research Council et al., 2007). Central to all Australian studies is research merit and integrity. Research merit relates to the benefit of conducting the research while respecting the participants (National Health and Medical Research Council et al., 2007). The value of respect encompasses the individual’s right to autonomy through participation decision-making, and sensitivities around privacy, confidentiality, culture, beliefs and welfare (National Health and Medical Research Council et al., 2007). Justice includes fairness of the research recruitment process, participant burden and access to the benefits of the research project (National Health and Medical Research Council et al., 2007). Finally, the application of beneficence ensures the research project benefits must outweigh any participant harm or discomfort (National Health and Medical Research Council et al., 2007).

The values of consent applied to this study included autonomy, benefits and risk, and confidentiality (National Health and Medical Research Council et al., 2007). For consent to be valid, it needed to be informed, voluntary, specific to parts of the study and the participant needed to have capacity to provide the consent (National Health and Medical Research Council et al., 2007).
Each data collection day, the RN in charge of the medical unit provided advice on potential participants’ capacity to provide consent. Consent and autonomy were upheld by providing potential participants with a verbal overview of the study, open disclosure of the aims and data usage, and the opportunity to ask clarifying questions. The study benefits and risks were also explained. A plain language patient information sheet was provided to those willing to participate and a signed and witnessed consent form completed. Confidentiality was maintained by assigning each participant with a unique study identification code and no identifying information was collected. The chart auditing occurred in a quiet area of the medical unit. During data collection the researchers maintained possession of the data collection tools. Participants recruited to the qualitative study were only identified in the semi-structured interviews by their study code (e.g. Hospital A: participant 164). Participants were not identified in any research publication or conference presentation.

Data handling, storage and destruction align with the NHMRC guidelines (National Health and Medical Research Council et al., 2007). All completed data tools, interview recordings and the IBM SPSS dataset were securely stored in a locked cupboard, in a limited access room, at Griffith University. At the completion of the data collection period, only the research team were able to access the data. Following data analysis and the publication of any findings, the chief investigator will retain the research data for a period of seven years post-data collection (March 2019). Following this period, all research data will be destroyed: hardcopies will be shredded, audio files and computer files will be deleted (National Health and Medical Research Council et al., 2007).

Ethics approval for the study was sought from the research sites and the university. A multi-site National Ethics Approval Form (NEAF) were submitted to QH, and ethics approval obtained from their Human Research Ethics Committee (HREC) (HREC/11/QTHS/111) (Appendix L). The Griffith University HREC (GU Ref No: NRS/40/11/HREC) also granted ethics approval for this study (Appendix M). Prior to the study commencement, site-specific assessment forms were completed for both hospitals, with ethical and governance approval granted (Appendix N & O).

3.10 Summary

This chapter outlined the study’s research questions and hypothesis. Conceptual and operational definitions were provided, followed by the study design and methodological approach. The development and testing of the data collection tools were
explained and the multi-site research setting, including their unique features, were summarised. The sampling plan was detailed in terms of sample size, power analysis and recruitment eligibility criteria. Participant recruitment for each phase of the study was clarified, including participant consent. Data analysis methods and the various types of collected data were detailed. Finally, the study ethical considerations were described. The next chapter contains three manuscripts containing the quantitative results of the chart audit and semi-structured observational data.
CHAPTER 4
Quantitative results

4.1 Introduction

The quantitative findings are outlined in this chapter, answering research questions 1 to 6 and testing the four study hypotheses. This quantitative phase had a number of aims. First, to better understand the planned and implemented pressure injury prevention (PIP) strategies among hospitalised adult patients with reduced mobility. Second, to examine the relationship between planned and implemented PIP strategies, and their predictors. Finally, to describe patient body positions during the day, evening and night shifts, and test for predictors.

Three submitted co-authored papers, two of which are published and the other accepted, report my study findings. This chapter provides an overview of participant characteristics, a summary of the quantitative findings and copies of three manuscripts reporting the quantitative results. A ‘signed statement of contribution’ outlining the bibliographic details of the papers, including my contribution, is inserted prior to each paper. The co-authors and principal supervisor have signed these statements.

4.2 Summary of the quantitative findings

This quantitative study sought to answer six research questions, as outlined in Chapter Three. Recruitment of a sample of 241 participants resulted in 241 chart audits, 5,784 hours of observation and 11,568 observation data collection points. Four medical units at the two hospitals were chosen to recruit the sample, with 165 (68.5%) participants from Hospital A, and 76 (31.5%) from Hospital B. More males were recruited \( (n = 142; 58.9\%) \) and the participant median age was 70 years (IQR: 25%: 56.0; 75%: 80.0). Almost two-fifths \( (n = 94; 39.0\%) \) of participants aged 55 years and older were at risk for pressure injuries (PI). The median hospital length of stay (HLOS) at time of data collection were similar in the hospital samples (Hospital A: 5.0 days; IQR: 25%: 3.0; 75%: 8.0; Hospital B: 6.0 days; IQR: 25%: 4.0; 75%: 11.0). Most participants had between one and six pre-existing medical comorbidities \( (n = 217; 90\%) \). At the time of data collection, PI were present in less than one-tenth of the sample \( (n = 17; 7.1\%) \). The majority of participants had one or two PIP strategies \( (n = 224; 92.9\%) \) implemented as part of their care, with regular repositioning utilised most frequently. Table 10 outlines a summary of the quantitative findings.
Table 10 Summary of the Quantitative Findings

<table>
<thead>
<tr>
<th>Paper number and title</th>
<th>Summary of quantitative results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paper 1:</strong> Pressure injury prevention strategies in acute medical inpatients: An observational study</td>
<td>There was low pressure injury risk assessment tool completion rates. Pressure injury prevention plans were in place for many participants. There is a relationship between the planning and implementation of support surfaces. There was no relationship between the planning and implementation of regular repositioning. Only a small number of participants received pressure injury prevention education.</td>
</tr>
<tr>
<td><strong>Paper 2:</strong> Predictors of pressure injury prevention strategies in at-risk medical patients: An Australian multi-centre study</td>
<td>Participants at risk of pressure injury were four times more likely to receive education. Participant identified at pressure injury risk were three times more likely to have a support surface implemented. As participants’ activity reduced, there was an increase in the implementation of support surfaces. ‘Participants identified at pressure injury risk’ was a predictor of the number of pressure injury prevention strategies implemented.</td>
</tr>
<tr>
<td><strong>Paper 3:</strong> The repositioning of hospitalised patients with reduced mobility: A prospective study</td>
<td>Participants spent the majority of their time on the bed with a 1-45° head of bed elevation. Older participants were repositioned less frequently than younger participants. Female participants were repositioned more frequently than males. Participants changed their body position on average once every 1.7 hours. Frequency of participant repositioning was less on night shift, but similar for the day and evening shift. Many participants were able to move about in their bed independently or with the use of equipment.</td>
</tr>
</tbody>
</table>

The aim of this first paper was to examine five planned and implemented PIP strategies in adult medical inpatients with reduced mobility. Subsequently, it examined if a relationship exists between planned and implemented PIP strategies (support surfaces and regular repositioning). This paper has been accepted for publication. To the best of my knowledge, these research results provide the latest evidence of PIP strategies in Australia; an important current clinical practice snapshot.

4.3 Statement of contribution to co-authored published paper 1

Below is a completed ‘Statement of contribution to co-authored published paper’ for Paper 1. Submitted to a peer-review journal, this paper was accepted for publication in May 2016.
STATEMENT OF CONTRIBUTION TO CO-AUTHORED PUBLISHED PAPER

This chapter includes a co-authored paper. The bibliographic details of the co-authored paper, including all authors, are:

doi:10.1080/10376178.2016.1190657

My contribution to the paper involved leading participant recruitment, data collection, data analysis, interpretation of the results, drafting and critical development of the paper.

(Signed) (Date) 01/06/2016
Sharon Latimer

(Countersigned) (Date) 01/06/2016
Corresponding author of paper: Professor Brigid Gillespie

(Countersigned) (Date) 01/06/2016
Corresponding author of paper: Professor Wendy Chaboyer

(Countersigned) (Date) 01/06/2016
Principal Supervisor: Professor Wendy Chaboyer
4.3.1 Pressure injury prevention strategies in acute medical inpatients: An observational study (Paper 1)

Introduction

Pressure injuries cause pain and discomfort for patients (Latimer, Chaboyer, & Gillespie, 2014) and are a quality care indicator and a patient safety issue (Gorecki et al., 2009; Gunningberg et al., 2011; Theisen et al., 2012). Pressure injury prevention clinical practice guidelines have been available internationally for over two decades (National Pressure Ulcer Advisory Panel, 1989). Guidelines have been available in Australia for more than ten years (Australian Wound Management Association, 2011), with the most recent international guidelines published in 2014 (National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, & Pan Pacific Pressure Injury Alliance [NPUAP/EPUAP/PPPIA], 2014). It is widely accepted that the appropriate planning and implementation of pressure injury prevention strategies, as outlined in these guidelines (NPUAP/EPUAP/PPPIA, 2014), may help prevent pressure injury development (Barker et al., 2013).

In Australia, pressure injury prevention forms part of the national safety and quality healthcare standards required for accreditation (Australian Commission on Safety and Quality in Health Care, 2014). However, international evidence suggests nurses’ planning of pressure injury prevention strategies does not reflect current clinical practice guidelines (Gunningberg, 2005; Thoroddsen et al., 2013). Others also report nurses do not consistently implement pressure injury prevention strategies (Clarke et al., 2005; Gunningberg, Donaldson, et al., 2012; Sharp et al., 2000). Pressure injury prevalence rates are reported internationally (Bååth et al., 2014; Moore et al., 2013a) and nationally (Mulligan et al., 2011). Yet, despite increasing pressure injury prevention resources in many clinical settings (Moore, 2013), pressure injury prevalence rates remain at suboptimal levels (Beitz, 2011; Gunningberg et al., 2011; Shahin, Dassen, & Halfens, 2008). Little is known about the planning, and subsequent implementation, of pressure injury prevention strategies by nurses, which is the focus of this study. This knowledge may offer insights into current pressure injury prevention practices and inform recommendations for clinical practice, research, and education.

Clinical practice guidelines for the prevention of pressure injuries (NPUAP/EPUAP/PPPIA, 2014) reflect the best evidence to date (Clarke et al., 2005). These strategies include pressure injury risk assessment, prevention management plan, appropriate use of support surfaces, regular repositioning, continence management, patient education, skin protection, nutritional assessment and adequate nutrition.
The first step in pressure injury prevention is a comprehensive pressure injury risk assessment using either a standardised tool (Braden & Bergstrom, 1988; Norton, 1962; Waterlow, 2005) or clinical judgement (Balzer et al., 2014; Webster et al., 2011). Following this assessment, careful planning and implementation of prevention strategies should be undertaken, with ongoing evaluation needed to monitor their effectiveness and the patient’s ongoing pressure injury risk (NPUAP/EPUAP/PPPIA, 2014).

Planning involves setting goals and identifying strategies to meet patient healthcare needs (M. Leach, 2008). Planning occurs after a nursing assessment and diagnosis, and prior to the implementation and evaluation phases of care (M. Leach, 2008). Planned nursing care should be documented in the medical and nursing record (Estes, 2013). Nursing care plans should outline specific strategies to both prevent and treat current pressure injuries (Australian Commission on Safety and Quality in Health Care, 2014). Yet, some studies highlight nurses’ poor compliance with care planning (Gunningberg, Lindholm, Carlsson, & Sjoden, 2001; Moore et al., 2013b; O’Brien & Cowman, 2011) that “can jeopardise patient safety, continuity, and quality of care” (Thoroddsen et al., 2013, p. 90).

The implementation of pressure injury prevention strategies extends beyond the ‘doing’ of a planned activity. It is multi-faceted, requiring human, equipment and educational resources, as well as a commitment from the organisation, nurses (Clarke et al., 2005), patients (Latimer et al., 2014) and their families (NPUAP/EPUAP/PPPIA, 2014). Recent studies into patient participation in their pressure injury prevention care have yielded equivocal results. For example, some researchers report patients voiced a desire to participate in this aspect of their care (Latimer et al., 2014), yet a pilot study found mixed patient engagement in a pressure injury prevention care bundle training resource (Gillespie, Chaboyer, Sykes, et al., 2014).

Complexities exist around nurses’ implementation of pressure injury prevention strategies, with researchers reporting conflicting findings. In one study, regular repositioning was the most frequently implemented prevention strategy by nurses, yet pressure injury risk assessment completion was poor (Sharp et al., 2000). Another study reported nurses conducted regular skin assessments but were less compliant with the implementation of support surfaces, regular repositioning and pressure injury risk assessment (Lyder et al., 2001). Finally, other researchers found that while nurses possessed a high level of pressure injury prevention knowledge, this did not translate
into the implementation of appropriate prevention strategies (Pancorbo-Hidalgo et al., 2007).

Aim

Given this mixed evidence, this study was designed to describe five of the core planned and implemented pressure injury prevention strategies in a sample of adult medical inpatients with reduced mobility and a subsample of patients assessed at risk for pressure injury, at two large Australian hospitals. The five prevention strategies described were pressure injury risk assessment, prevention management plan, appropriate support surfaces, regular repositioning and patient education. Subsumed within this aim, this current study sought to identify relationships between the planned and implemented pressure injury prevention strategies of support surfaces and regular repositioning in the sample and subsample. These two pressure injury prevention strategies were selected on the basis that, at the time of the study conception, they were recommended clinical practice guidelines both internationally (European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010) and across the Pan Pacific (Australian Wound Management Association, 2011). In addition, they form part of the Australian national safety and quality healthcare standards (Australian Commission on Safety and Quality in Health Care, 2014).

Method

This observational study collected data using chart audits and semi-structured observations. Demographic data were collected from the medical records. Data on the planned pressure injury prevention strategies were collected from the medical record and nursing care plans. Observations of the implemented pressure injury prevention strategies occurred at the bedside/in the medical unit, or in the case of patient education, data were gathered from documentation in the medical record, nursing care plan, or observed at the bedside. Data were collected over 28 days from November 2011 to February 2012; spending seven randomly selected days in each medical unit. The sequence of data collection days was randomly selected using computer software. Ethics approval was given by the hospitals (HREC/11/QTHS/111) and the university (NRS/40/11/HREC).
Setting

This study was conducted in four medical units at two large Australian metropolitan hospitals (Hospital A and B); two units in each facility. The selection of the hospitals and medical units were carefully considered. Both hospitals were active in pressure injury prevention, with specialised nurses and committees focussed on this area. This study required access to a large patient population, so the bed capacities of the medical units (ranging from 25–40 beds) increased the likelihood of recruiting the required sample size.

Sample

A consecutive sample of participants with reduced mobility was drawn from the hospitals. From this sample, a subsample of participants was drawn, all of whom needed to meet the following two criteria: completed pressure injury risk assessments tool on admission and assessed at pressure injury risk (Figure 1). Nurses at Hospital A assessed participant pressure injury risk using a hospital-specific clinical judgement tool. This tool had two assessment outcomes: ‘at pressure injury risk’ and ‘not at pressure injury risk’. At Hospital B, nurses used a Waterlow risk assessment tool to assess participant pressure injury risk. This tool measures a range of factors that increase the patient’s risk of pressure injury, with a score of 10 or greater indicating the patient was at risk (Waterlow, 2005). Potential study participants needed to meet the following inclusion criteria: aged ≥18 years, hospital length of stay prior to recruitment of ≥3 days, able to provide informed consent and reduced mobility. Participants were recruited once to the study and were given a verbal and written study overview, with a written consent obtained from willing participants.

Data collection

Using data collection tools, two data collection methods were implemented: semi-structured observations and chart audits. The semi-structured observations were conducted at 30-minute intervals over a continuous 24-hour period (0700 to 0659). Four researchers were involved in data collection. One researcher conducted the chart audits, collecting participant demographic and planned pressure injury prevention data. The three remaining researchers collected observational data, each completing an eight-hour observation period, with three observation periods per data collection day (0700–1459; 1500–2259 and 2300–0659).
The development of the data collection tools were informed by the recommended pressure injury prevention strategies outlined in clinical practice guidelines (Australian Wound Management Association, 2011; European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010), and pressure injury risk factors reported in the literature (Gunningberg & Ehrenberg, 2004; Halfens & Eggink, 1995; Sving, Gunningberg, Högman, & Mamhidir, 2012; Sving et al., 2014). Pre- and post-pilot tests were conducted to assess the reliability of the data collection tools and consensus between the four researchers. Pre-pilot chart audit and observational data were collected on five participants. A 92% inter-rater reliability was achieved between the data collectors. Minor tool adjustments were made such as adding ‘not applicable’ to some questions. One week later, a post-pilot study on five different participants yielded a 96% intra-rater reliability score between the same data collectors. These results were obtained by counting the frequencies of the variables on the data collection tool between the raters, identifying similarities and minor variations until consensus was reached.

The following definitions applied to this study:

**Completed pressure injury risk assessment tool on admission:** the assessment was completed on the admission date and the tool deemed complete if all of the risk assessment tool items had a documented response (Hospital A: clinical judgement tool; 1 item, Hospital B: Waterlow (2005) risk assessment tool; 10 items). A completed pressure injury risk assessment tool was one of the eligibility criteria for participant inclusion in the subsample.

**Partially completed pressure injury risk assessment tool on admission:** the assessment was deemed partially complete if one or more of the documented responses on the risk assessment was omitted (Hospital A: clinical judgement tool; 1 item, Hospital B: Waterlow (2005) risk assessment tool; 10 items).

**Planned:** pressure injury prevention strategies (e.g. pressure-relieving device or support surface) documented in the medical/nursing record (Australian Wound Management Association, 2011; European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010).

**Implemented:** pressure injury prevention strategies (e.g. regular repositioning) implemented by staff/participant (Australian Wound Management Association, 2011; European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010). This was either observed by the researcher or documented as being implemented in the medical/nursing record.
Using chart audits, demographic data were collected from the medical records. Age, hospital length of stay at data collection, number of comorbidities and pressure injury history were measured as continuous variables. Gender, hospital and medical diagnosis were measured as categorical variables. Participants’ actual hospital length of stay was not collected. Planned pressure injury prevention strategy data were collected using chart audits of the medical/nursing record. These binary (coded: 0 = no, 1 = yes) independent variables were: completed pressure injury risk assessment on admission, at risk of pressure injury on admission, prevention management plan, planned support surface, planned regular repositioning and planned patient education. Planned support surfaces included pressure-relieving mattresses, seating cushions, foam wedges, pillows and bandages to protect limbs from friction.

Using semi-structured observations, implemented pressure injury prevention strategy data were collected at the patient’s bedside or in the medical unit. Data on patient education were collected through observation or documentation in the medical file that this strategy had been implemented. These binary (coded: 0 = no, 1 = yes) dependent variables were: observed support surfaces, observed regular repositioning and delivered patient education. Regular repositioning occurred if the patient’s position changed at least every four hours (Defloor et al., 2005).

**Data analysis**

Data, entered into IBM SPSS statistics (version 22) software, were cleaned and checked for accuracy. The data’s level and distribution determined the statistical tests used for analysis. To determine whether data pooling was appropriate, a comparison of the data between the hospitals was undertaken to identify if differences existed between the groups (hospitals and medical units). The hospital samples, subsamples, and pressure injury prevention strategies were described using descriptive statistics. Chi-square ($\chi^2$) tests, with a level of significance set at $p < 0.05$, were used to assess relationships between the planned and implemented pressure injury prevention strategies of support surfaces and regular repositioning.

**Results**

Overall, 241 participants were recruited to the study: 165 (68.5%) at Hospital A, and 76 (31.5%) at Hospital B. From this sample, 45 participants who met the eligibility criteria were included in the subsample (Figure 1). Due to differences between the hospital samples, data were not pooled. The results presented are for each hospital.
**Figure 1.** Sample and subsample at each hospital site

**Participant characteristics**

At both hospitals, the sample participants’ median age was the same (70 years) and they were predominantly male (Table 1). The median hospital length of stay at time of data collection for the sample was also similar at each hospital (Hospital A: 5.0 days; IQR: 25%; 3.0; 75%; 8.0; Hospital B: 6.0 days; IQR: 25%; 4.0; 75%; 11.0).
Table 1  Participant characteristics by sample and subsample at each hospital

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Sample (n = 241)</th>
<th></th>
<th>Subsample (n = 45)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hospital A (n = 163)</td>
<td>Hospital B (n = 76)</td>
<td>Hospital A (n = 11)</td>
<td>Hospital B (n = 34)</td>
</tr>
<tr>
<td></td>
<td>n (%) range Md (IQR)</td>
<td>n (%) range Md (IQR)</td>
<td>n (%) range Md (IQR)</td>
<td>n (%) range Md (IQR)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>90 (54.5%) 18-94 (56-80)</td>
<td>52 (68.4%) 25-93 (59.2-81.0)</td>
<td>5 (45.5%) 25-84 (56-80)</td>
<td>22 (64.7%) 25-91 (58.7-84.0)</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>18-94 70.0 (56-80)</td>
<td>25-93 70.0 (59.2-81.0)</td>
<td>25-84 70.0 (56-80)</td>
<td>25-91 73.5 (58.7-84.0)</td>
</tr>
<tr>
<td>Hospital length of stay at data</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>collection (days)</td>
<td>3-60 5.0 (3.0-8.0)</td>
<td>3-110 6.0 (4.0-11.0)</td>
<td>3-18 4.0 (3.0-8.0)</td>
<td>3-110 6.5 (4.0-11.3)</td>
</tr>
<tr>
<td>Diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac</td>
<td>13 (7.9%)</td>
<td>5 (6.6%)</td>
<td>0 (0.0%)</td>
<td>2 (5.9%)</td>
</tr>
<tr>
<td>Dermatological</td>
<td>6 (3.6%)</td>
<td>3 (3.9%)</td>
<td>0 (0.0%)</td>
<td>2 (5.9%)</td>
</tr>
<tr>
<td>Endocrine</td>
<td>4 (2.4%)</td>
<td>3 (3.9%)</td>
<td>1 (9.1%)</td>
<td>3 (8.8%)</td>
</tr>
<tr>
<td>Falls</td>
<td>13 (7.9%)</td>
<td>2 (2.6%)</td>
<td>0 (0.0%)</td>
<td>1 (2.2%)</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>9 (5.5%)</td>
<td>5 (6.6%)</td>
<td>1 (9.1%)</td>
<td>2 (5.9%)</td>
</tr>
<tr>
<td>Haematological</td>
<td>1 (0.6%)</td>
<td>1 (1.3%)</td>
<td>0 (0.0%)</td>
<td>1 (2.9%)</td>
</tr>
<tr>
<td>Infection</td>
<td>21 (12.7%)</td>
<td>18 (23.7%)</td>
<td>0 (0.0%)</td>
<td>6 (17.6%)</td>
</tr>
<tr>
<td>Neurological</td>
<td>8 (4.8%)</td>
<td>1 (1.3%)</td>
<td>0 (0.0%)</td>
<td>1 (2.9%)</td>
</tr>
<tr>
<td>Orthopaedic</td>
<td>5 (3.0%)</td>
<td>4 (5.3%)</td>
<td>0 (0.0%)</td>
<td>2 (5.9%)</td>
</tr>
<tr>
<td>Renal</td>
<td>8 (4.8%)</td>
<td>13 (17.1%)</td>
<td>0 (0.0%)</td>
<td>2 (5.9%)</td>
</tr>
<tr>
<td>Respiratory</td>
<td>37 (22.4%)</td>
<td>5 (6.6%)</td>
<td>6 (54.5%)</td>
<td>1 (2.9%)</td>
</tr>
<tr>
<td>Surgery</td>
<td>3 (1.8%)</td>
<td>4 (5.3%)</td>
<td>0 (0.0%)</td>
<td>2 (5.9%)</td>
</tr>
<tr>
<td>Vascular</td>
<td>13 (7.9%)</td>
<td>9 (11.8%)</td>
<td>3 (27.3%)</td>
<td>7 (20.6%)</td>
</tr>
<tr>
<td>Other</td>
<td>15 (9.1%)</td>
<td>3 (3.5%)</td>
<td>0 (0.0%)</td>
<td>2 (5.9%)</td>
</tr>
<tr>
<td>Characteristic</td>
<td>Sample (n = 241)</td>
<td>Subsample (n = 45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>------------------</td>
<td>--------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of comorbidities per patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>5 (3.0%)</td>
<td>1 (1.8%)</td>
<td>0 (0.0%)</td>
<td>1 (2.9%)</td>
</tr>
<tr>
<td>1-3</td>
<td>82 (49.7%)</td>
<td>30 (39.5%)</td>
<td>5 (45.5%)</td>
<td>8 (23.5%)</td>
</tr>
<tr>
<td>4-6</td>
<td>70 (42.7%)</td>
<td>35 (46.1%)</td>
<td>6 (54.5%)</td>
<td>20 (58.8%)</td>
</tr>
<tr>
<td>7-9</td>
<td>7 (4.2%)</td>
<td>9 (11.8%)</td>
<td>0 (0.0%)</td>
<td>5 (14.7%)</td>
</tr>
<tr>
<td>≥10</td>
<td>1 (0.6%)</td>
<td>1 (1.3%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>History of pressure injuries</td>
<td>13 (7.9%)</td>
<td>4 (5.3%)</td>
<td>0 (0.0%)</td>
<td>2 (5.9%)</td>
</tr>
</tbody>
</table>
Planned and implemented pressure injury prevention strategies

Figure 1 illustrates the completion rates of pressure injury risk assessment on admission at each hospital. The subsample selection was based on the outcome of this assessment. Pressure injury risk assessment completion rates at each hospital were relatively low, with many of the Hospital A participants \((n = 118; 71.5\%)\) not assessed. At Hospital A, prevention management plans were evident in more than two-fifths \((n = 73; 44.2\%)\) of the sample, and the majority of the subsample \((n = 9; 82\%)\). Most of the Hospital B sample \((n = 68; 89.5\%)\) and subsample \((n = 32; 94.1\%)\) had a prevention management plan.

Table 2 contains the frequencies of the planned and implemented pressure injury prevention strategies of support surfaces and regular repositioning. A number of Hospital B participants were observed with a support surface in situ. There were similar rates of regular repositioning at each hospital. Approximately 10% of the Hospital A sample \((n = 16; 9.7\%)\) and subsample \((n = 1; 9.1\%)\) received pressure injury prevention patient education, with these rates higher at Hospital B (sample: \(n = 11; 14.5\%\); subsample: \(n = 9; 26.5\%)\).

<table>
<thead>
<tr>
<th>Hospital</th>
<th>PIP strategy</th>
<th>Support surfaces</th>
<th>Regular repositioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Sample ((n = 241))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital A ((n = 165))</td>
<td>Planned</td>
<td>14 (8.5%)</td>
<td>39 (23.6%)</td>
</tr>
<tr>
<td></td>
<td>Implemented</td>
<td>24 (14.5%)</td>
<td>148 (89.7%)</td>
</tr>
<tr>
<td>Hospital B ((n = 76))</td>
<td>Planned</td>
<td>27 (35.5%)</td>
<td>22 (28.9%)</td>
</tr>
<tr>
<td></td>
<td>Implemented</td>
<td>33 (43.5%)</td>
<td>68 (89.5%)</td>
</tr>
<tr>
<td>Sub-sample ((n = 45))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital A ((n = 11))</td>
<td>Planned</td>
<td>0 (0.0%)</td>
<td>5 (45.5%)</td>
</tr>
<tr>
<td></td>
<td>Implemented</td>
<td>3 (27.3%)</td>
<td>10 (90.9%)</td>
</tr>
<tr>
<td>Hospital B ((n = 34))</td>
<td>Planned</td>
<td>14 (41.2%)</td>
<td>16 (47.1%)</td>
</tr>
<tr>
<td></td>
<td>Implemented</td>
<td>19 (55.9%)</td>
<td>30 (88.2%)</td>
</tr>
</tbody>
</table>

An analysis of the relationship between the planned and implemented support surfaces and regular repositioning for each hospital are presented in Table 3. There was a statistically significant relationship between the planning and implementation of support surfaces in the samples at Hospital A \((X^2 = 40.725; df = 2; p < 0.0001)\) and Hospital B \((X^2 = 31.602; df = 2; p < 0.0001)\). In other words, planned support surfaces
were implemented at each hospital. A chi-square analysis of planned and implemented support surfaces was not possible for the Hospital A subsample because no participants had a planned support surface. Subsample participants at Hospital B had their planned support surfaces implemented, which was statistically significant ($X^2 = 13.198; df = 1; p < 0.0001$).

Subsample participants at Hospital B had their planned support surfaces implemented, which was statistically significant ($X^2 = 13.198; df = 1; p < 0.0001$).

No relationship was found between the variables of planned and implemented regular repositioning in the samples and subsamples at Hospital A (sample: $X^2 = 3.971; df = 1; p = 0.137$; subsample: $X^2 = 1.320; df = 2; p = 0.517$) or Hospital B (sample: $X^2 = 5.115; df = 2; p = 0.077$; subsample: $X^2 = 5.1000; df = 2; p = 0.078$). For the subsample, the variables of pressure injury risk assessment, prevention management plan and patient education lacked variability, precluding a chi-square analysis.

**Discussion**

These study findings indicated suboptimal completion rates of pressure injury risk assessment on admission for both hospitals. This suggests some at-risk patients are not being identified; yet pressure injury risk assessment is pivotal for prevention (NPUAP/EPUAP/PPPIA, 2014). This current study supports the earlier findings of studies conducted over the past 20 years that have highlighted low completion rates of

<table>
<thead>
<tr>
<th>Hospital</th>
<th>PIP strategy</th>
<th>Support surfaces</th>
<th>Regular repositioning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Sample</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>n = 241</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital A</td>
<td>Planned</td>
<td>14 (8.5%)</td>
<td>39 (23.1%)</td>
</tr>
<tr>
<td><em>(n = 165)</em></td>
<td>Implemented</td>
<td>10 (6.1%)</td>
<td>32 (18.9%)</td>
</tr>
<tr>
<td>$p$ value</td>
<td>&lt; 0.0001</td>
<td>0.137</td>
<td></td>
</tr>
<tr>
<td>Hospital B</td>
<td>Planned</td>
<td>27 (35.5%)</td>
<td>22 (28.9%)</td>
</tr>
<tr>
<td><em>(n = 76)</em></td>
<td>Implemented</td>
<td>23 (30.1%)</td>
<td>17 (22.4%)</td>
</tr>
<tr>
<td>$p$ value</td>
<td>&lt; 0.0001</td>
<td>0.077</td>
<td></td>
</tr>
<tr>
<td><strong>Subsample</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>n = 45</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital A</td>
<td>Planned</td>
<td>0 (0.0%)</td>
<td>5 (45.5%)</td>
</tr>
<tr>
<td><em>(n = 11)</em></td>
<td>Implemented</td>
<td>3 (27.3%)</td>
<td>4 (36.6%)</td>
</tr>
<tr>
<td>$p$ value</td>
<td>-†</td>
<td>0.517*</td>
<td></td>
</tr>
<tr>
<td>Hospital B</td>
<td>Planned</td>
<td>14 (41.2%)</td>
<td>16 (47.1%)</td>
</tr>
<tr>
<td><em>(n = 34)</em></td>
<td>Implemented</td>
<td>13 (38.2%)</td>
<td>12 (35.3%)</td>
</tr>
<tr>
<td>$p$ value</td>
<td>&lt; 0.0001</td>
<td>0.078</td>
<td></td>
</tr>
</tbody>
</table>

*no statistics computed because the variable planned support surface is a constant
* 100% cells have an expected count <5
pressure injury risk assessment and/or documentation as an ongoing clinical practice issue (Barker et al., 2013; Gunningberg & Ehrenberg, 2004; Sving et al., 2012) and patient safety concern (Thoroddsen et al., 2013). Nurses’ varying level of knowledge on the use of pressure injury risk assessment tools might explain these results (Pancorbo-Hidalgo et al., 2007), or these non-compliant behaviours may be influenced by an individual’s attitude (Moore et al., 2013b). Nurses’ use of these tools might also be influenced by the ongoing debate about the reliability of risk assessments to accurately predict a patient’s pressure injury risk (Anthony et al., 2008; Fulbrook & Anderson, 2016; Walsh & Dempsey, 2011; Webster et al., 2010). The first step in the delivery of quality patient care can only occur with an accurate assessment (Gunningberg & Ehrenberg, 2004; Jankowski & Nadzam, 2011) completed early in hospitalisation (Gunningberg & Stotts, 2008).

Clinical practice guidelines recommend all patients, regardless of their pressure injury risk, should have a prevention management plan (NPUAP/EPUAP/PPPIA, 2014) completed soon after admission (Gunningberg & Stotts, 2008). In this current study, most of the Hospital A sample did not have such a plan, with others reporting similar findings (Buttery & Phillips, 2009; Gunningberg, Donaldson, et al., 2012; Sving et al., 2012). Conversely, most participants in the subsamples at both hospitals had a prevention management plan. The varied findings in this current study may be attributed to the differences in the completion rates of the pressure injury risk assessment. For example, most of the sample did not have a pressure injury risk assessment completed, and nor was a prevention management plan developed. Yet, all of the subsample had a pressure injury risk assessment completed, were identified at risk, and most had a prevention management plan in place. It could be the use of a pressure injury risk assessment tool provides nurses with a visual reminder to document pressure injury prevention practices, although Moore et al. (2013b) suggest this may not be the case. Other factors including staff experience, pressure injury prevention knowledge, and busy workloads (Clarke et al., 2005; Moore & Price, 2004; Sharp et al., 2000) have been found to contribute to poor prevention management planning practices. Furthermore, M. Leach (2008) asserts planning care involves a level of skill, which takes time to develop.

In this current study, support surfaces were often implemented in the sample and subsample of both hospitals, however this strategy was frequently not planned. The study results are in contrast to earlier international studies, which report many at risk patients did not receive appropriate support mattresses (Bours, Halfens, Abu-Saad, &
Grol, 2002; Vanderwee, Clark, Dealey, Gunningberg, & Defloor, 2007). Poor nursing documentation practices of planned support surfaces might explain the study results (Gunningberg & Ehrenberg, 2004; Gunningberg et al., 2001; Moore et al., 2013b), with a Swedish study reporting only 25.4% of patient records had the proper documentation of planned pressure-relieving mattresses (Gunningberg & Ehrenberg, 2004). The ease of access to pressure injury prevention resources may also explain this result. For example, nurses at Hospital B used the Waterlow risk assessment score to justify the procurement of pressure-relieving mattresses for at risk patients. Accurate pressure injury risk assessment, and planned pressure injury prevention care is more likely to result in the appropriate use of pressure injury prevention resources; potentially reducing healthcare costs (Graves et al., 2005b).

Significantly, in both of the hospital samples and Hospital B subsample, most participants who had a support surface planned as part of their pressure injury prevention care, also had this strategy implemented. The findings of this current study contradict those of another Australian study (Barker et al., 2013) and a Norwegian study (Bours et al., 2002) that reported an underutilisation of this strategy. In the current study, almost all of the Hospital B subsample participants at risk of pressure injury received their planned support surface. Similar findings have been reported in Europe (Bours et al., 2002; Gunningberg, 2005). Conversely, none of the Hospital A subsample had a support surface planned, even though three participants had this strategy implemented. While pleasing, poor documentation of planned support surfaces has implications for the patient’s continuity of care. It might also affect how the prevention management plan is implemented and evaluated; an issue reported elsewhere (Gunningberg & Ehrenberg, 2004; Gunningberg et al., 2001; Moore et al., 2013b).

For regular repositioning, the study participants were changing their position more frequently than was planned. Participants current position was checked every 30 minutes, with the observed position changes occurring with the assistance of nurses, equipment such as bed mechanics (grab rail) or a mobility aid (walking frame). While regular repositioning is the most frequently planned and implemented pressure injury prevention strategy (Bergstrom et al., 1996; Chaboyer et al., 2013; Sharp et al., 2000), significant documentation gaps exist (Gunningberg & Ehrenberg, 2004; Moore et al., 2013b; O’Brien & Cowman, 2011), which may explain the study results. Others have found limited implementation of strategies surrounding regular repositioning (Bours et al., 2002; Demarré et al., 2012), suggesting more research is needed to gain a better understanding of hospital patients’ activity patterns.
No relationship was found between the planning and implementation of regular repositioning in either of the samples or subsamples in this study, placing the safety of patients at risk. Targeted annual pressure injury prevention nursing education may be a starting point in reversing the current lack of pressure injury prevention strategy implementation (Chicano & Drolshagen, 2009).

All patients should receive pressure injury prevention education (NPUAP/EPUAP/PPPIA, 2014), yet poor implementation amongst nurses is reported in international studies (Clarke et al., 2005; Demarré et al., 2012; Moore, 2013). Most participants in this current study, including those at risk of pressure injury, did not have documented evidence that patient education had occurred; reflecting the findings of others (Bours et al., 2002; Gunningberg et al., 2001; Latimer et al., 2014). Again, poor documentation practices may partly explain these results (Gunningberg et al., 2001), however a qualitative study found patients reported nurses did not engage them in pressure injury prevention education (Latimer et al., 2014). Furthermore, these patients want an active role in pressure injury prevention, yet one barrier was a lack of access to education (Latimer et al., 2014). Generally, nurses have a positive attitude toward pressure injury prevention (Moore & Price, 2004; O’Brien, 2009), which significantly correlates with pressure injury prevention implementation (Demarré et al., 2012). Yet, Belgian researchers suggest nurses have limited pressure injury prevention knowledge (Demarré et al., 2012), reinforcing the importance of ongoing nursing education (Moore & Price, 2004). These shortfalls could result in patients receiving limited pressure injury prevention education.

It is widely accepted that patient education contributes to health literacy by giving patients the information they need to make appropriate healthcare decisions; allowing them to actively participate in their care (Institute of Medicine, 2004). Poor health literacy is a significant issue affecting adult patients (Australian Commission on Safety and Quality in Health Care, 2013; Institute of Medicine, 2004); an area nurses should be informed about (Rudd, 2013). Recent studies have found patients have some pressure injury and pressure injury prevention knowledge (Latimer et al., 2014), however there is a need for increased patient education (Gorecki et al., 2011; Latimer et al., 2014); with nurses in the optimal position to provide it.

Limitations

While this study examined planned and implemented pressure injury prevention strategies, some limitations exist. Firstly, this study focuses on medical patients with
reduced mobility, so the findings cannot be generalised to other patient groups. However, efforts were made to achieve representation in the sample by collecting data from two hospitals. Secondly, the dissimilarities between the samples means the results are hospital specific; thus caution is recommended when interpreting the results. Finally, the reasons why pressure injury prevention strategies were not planned or implemented was not examined, however this could be the focus of a future study.

Conclusion

International clinical practice guidelines recommend all patients, regardless of their risk, have a pressure injury risk assessment, prevention management plan and education. The results of this current study indicate many patients were not assessed for pressure injury risk and significant gaps were evident in the planning and implementation of pressure injury prevention strategies. While patients had their planned support surfaces implemented, this was not the case for regular repositioning. Despite significant research and financial investment in pressure injury prevention, there is a need to close the gap between planning and implementing these strategies.

References


Published in 2015, the aim of the next peer-reviewed paper was to determine whether patient, clinical, and contextual factors predicted the implementation of PIP strategies in adult medical inpatients with reduced mobility. This research adds new knowledge in the area of PIP, and confirms the need for nurses to implement a suite of PIP strategies.

4.4 Statement of contribution to co-authored published paper 2

Below is a completed ‘Statement of contribution to co-authored published paper’ for Paper 2; published in a peer-review journal.

**STATEMENT OF CONTRIBUTION TO CO-AUTHORED PUBLISHED PAPER**

This chapter includes a co-authored paper. The bibliographic details of the co-authored paper, including all authors, are:


My contribution to the paper involved leading participant recruitment, data collection, data analysis, interpretation of the results, drafting and critical development of the paper.

(Signed) (Date) 01/06/2016

Sharon Latimer

(Countersigned) (Date) 01/06/2016

Corresponding author of paper: Professor Brigid Gillespie

(Countersigned) (Date) 01/06/2016

Corresponding author of paper: Professor Wendy Chaboyer

(Countersigned) (Date) 01/06/2016

Principal Supervisor: Professor Wendy Chaboyer

4.1 Predictors of pressure injury prevention strategies in at-risk medical patients: An Australian multi-centre study (Paper 2)

In order to comply with copyright this article has been removed.
Thus far, two papers containing some of the quantitative results of this study have been presented in this chapter. The third peer-reviewed paper published in 2015, aimed to describe the repositioning patterns of adult medical hospital patients with reduced mobility, and to test their predictors. A number of new PIP findings arose from this research.

4.5 Statement of contribution to co-authored published paper 3

Below is a completed ‘Statement of contribution to co-authored published paper’ for Paper 3.

STATEMENT OF CONTRIBUTION TO CO-AUTHORED PUBLISHED PAPER

This chapter includes a co-authored paper. The bibliographic details of the co-authored paper, including all authors, are:


My contribution to the paper involved leading participant recruitment, data collection, data analysis, interpretation of the results, drafting and critical development of the paper.

(Signed) (Date) 01/06/2016
Sharon Latimer

(Countersigned) / (Date) 01/06/2016
Corresponding author of paper: Professor Wendy Chaboyer

(Countersigned) / (Date) 01/06/2016
Corresponding author of paper: Professor Brigid Gillespie

(Countersigned) / (Date) 01/06/2016
Principal Supervisor: Professor Wendy Chaboyer

4.5.1 The repositioning of hospitalised patients with reduced mobility: A prospective study (Paper 3)
The repositioning of hospitalized patients with reduced mobility: a prospective study

Sharon Latimer¹, Wendy Chaboyer² & Brigid M. Gillespie²

¹Griffith University, School of Nursing and Midwifery, Meadowbrook, Queensland, Australia
²Griffith University, NHMRC Research Centre for Excellence in Nursing Interventions (NCRIN), Gold Coast, Queensland, Australia

Keywords
Nursing practice, nursing shift, predictors, pressure injuries, repositioning

Abstract

Aim
To determine the frequency of patient repositioning across three consecutive nursing shifts (day, evening and night) and to identify predictors of repositioning frequency.

Background
Patient repositioning is a frequently implemented pressure injury prevention strategy. Yet, little is known about how often it should be implemented, or the frequency of movement among hospitalized patients with reduced mobility.

Design
An observational prospective study.

Methods
Chart audits were used to gather clinical and demographic data. Semi-structured observations were conducted every 30 minutes for a continuous 24-hour period. Observational data included the patient's body position, the frequency of repositioning, assistance require to reposition and the use of support surfaces.

Results
Patients were repositioned frequently during the day and evening and least at night time. Elevation of the head of the bed (1–45°) was the most frequently adopted position. The independent predictors of repositioning frequency were age and gender, with older patients and males repositioned less frequently.

Introduction
Pressure injuries (PI) or pressure ulcers are a significant patient safety and quality healthcare issue (Moore et al. 2011); many of which are avoidable (Black et al. 2011). A range of prevention strategies is recommended in clinical practice guidelines (CPG) for the pressure injury prevention (PIP), with repositioning a core component (NPUAP/EP(UAP/PPPIA 2014). Current evidence into the effectiveness and timing of repositioning as a PIP strategy is not only limited, but also lacks consensus (Miles et al. 2013, Gillespie et al. 2014). Furthermore, little is known about the body positions of hospital patients (Chaboyer et al. 2013). Because of this gap in understanding, a study was undertaken to describe the repositioning of medical patients over a continuous 24-hour period.

Background
PI are an adverse event caused by the mechanical factors of pressure, shearing and/or friction, resulting in localized damage to either the skin and/or underlying tissue (Coleman et al. 2014, NPUAP/EP(UAP/PPPIA 2014). Internationally, the prevalence of hospital acquired pressure injuries (HAPI) varies with the most recent figures ranging from 7-4% in Australia (Mulligan et al. 2011), 12-3%
in the US (VanGilder et al. 2009) to 25% in Sweden (Moore et al. 2013). PI have negative impacts for patients, healthcare staff and organizations such as emotional and physical distress (Latimer et al. 2014) and increased workload (Moore & Price 2004, Chaboyer & Gillespie 2014). For the period in 2012–2013, it was estimated to cost A$993 million per annum to treat all of the PI in Australian public hospitals (Nguyen et al. 2014). As a result, the prevention and management of PI is a priority healthcare area (Institute of Medicine 2012, National Health Service Commissioning Board 2013, Australian Commission on Safety and Quality in Health Care 2012).

Current CPG outline several PIP strategies, including PI risk assessment, PIP management plan, the appropriate use of support surfaces, continence management, patient education, skin protection, nutritional assessment, adequate nutrition and regular repositioning (NPDUAP/EPUAP/PPPIA 2014). While the assessment of a patient’s PI risk is the first step in prevention (NPDUAP/EPUAP/PPPIA 2014), repositioning is viewed as a cornerstone PIP strategy (Moore & Cowman 2012, NPDUAP/EPUAP/PPPIA 2014). Repositioning is defined as the movement of patients from one position to another in an effort to alleviate or redistribute any pressure exerted on the body tissues (Gillespie et al. 2014).

There are significant complexities around how repositioning is used to prevent PI. For example, many nurses implement 2-4 hourly repositioning for PIP (Miles et al. 2013), although there is little evidence supporting this practice (Young 2004, Moore et al. 2011, Coleman et al. 2014). Furthermore, PIP researchers and clinical experts are yet to agree on the ideal frequency of repositioning to prevent PI, adding to this uncertainty (Miles et al. 2013, Gillespie et al. 2014). Compounding this is the patient’s contribution to repositioning through their own movement. For example, one study found more than half of participants changed their position in between the scheduled repositioning by nurses (Young 2004), with many patients adopting positions that increase their PI risk (McInnes et al. 2013).

During hospitalization, patients are placed in, or adopt several body positions including supine, degree of tilt (left or right lateral), head of bed elevation (HOBE) between 1-90°, sitting or walking (Moore et al. 2011, McInnes et al. 2013). The use of a 30° of tilt to reduce PI has been found to reduce PI incidence compared with usual PIP care (Moore et al. 2011). This position is achieved by rolling the patient laterally to a slightly tilted 30° position and supported in this position by pillows (Moore et al. 2011). When patients are in bed, the HOBE or the angle the bed head is raised, can increase the pressure placed on the coccyx, placing them at greater PI risk (Wilson 2008, Moore et al. 2011). CPG recommend HOBE should be maintained at, or below 30°, or the lowest elevation congruent to the patient’s medical condition (NPDUAP/EPUAP/PPPIA 2014). A recent observational study reported participants often adopted positions that placed them at an increased risk of PI, with a HOBE ranging between 1-90° (Chaboyer et al. 2013, McInnes et al. 2013). Our study has three aims; first to determine the patient’s body position and frequency of repositioning among hospitalized patients with reduced mobility, across three consecutive nursing shifts (day, evening and night), second, to determine if there is a difference in the repositioning frequency across the three nursing shifts, finally, to identify factors that predict repositioning frequency.

Method

Design

This observational study incorporated two data collection methods: chart audits and semi-structured observations. Figure 1 depicts an overview of the study, data collection methods and the predictors selected for testing.

Previous PIP research (Delloor et al. 2005, Nixon et al. 2007, Brown et al. 2009, Coleman et al. 2013, McInnes et al. 2013, Miles et al. 2013) and the clinical judgement of the research team informed the selection of the 12 predictor variables for this study (age, gender, hospital, hospital length of stay (HLOS) at data collection, identified at PI risk during admission, sedation medication, narcotic medication, sedative and narcotic medication, weight, previous or current PI, observed skin assessment, support surface).

Participant recruitment

Using a consecutive sampling plan, participants were recruited from four medical units located at two large Australian hospitals (Hospital A: 986 beds and Hospital B: 450 beds) (Queensland Health 2012). Both are public hospitals, offering a wide range of inpatient and specialist clinical services (Queensland Health 2012). All aspects of patient care, including repositioning, were planned by the Registered Nurse (RN) and implemented by either the RN, Endorsed Enrolled Nurses, Enrolled Nurses or Assistants in Nursing. The study inclusion criteria were: aged ≥18 years; a HLOS at time of recruitment of ≥3 days; ability to provide an informed consent; and reduced mobility (equipment and/or staff needed to ambulate/reposition in bed). During recruitment, verbal and written overviews of the study were provided to potential participants. Written consent was obtained from those
willing to participate. Individuals could only be recruited once to the study. To increase model stability and generalizability and to increase the robustness of the regression analysis, we aimed to recruit 240 participants, or a minimum of 20 participants per predictor as recommended (Polit 2010, Field 2013).

Data collection

Data collection was undertaken by the research team on 28 randomly selected days from November 2011–February 2012. Seven days were spent in each of the four medical units, totalling 28 days. The sequence of data collection days was randomly selected using computer software to ensure that data collection occurred in each medical unit, on each day of the week. Development of the data collection tools were informed by current CPG for PIP (NPUAP/EPUAP/PPIA 2014) and the results of previous research (Defloor et al. 2005, Webster et al. 2011). The data collection methods and level of measurement of the variables are outlined in Figure 1. The following data were collected from the medical chart: patient age and gender, hospital, HLOS at data collection, diagnosis, comorbidities, identified at pressure injury risk during admission and current or previous PI. Pressure injury risk assessment, sedative medication, narcotic medication and patient weight data were collected from the nursing care plan.

The research team collected semi-structured observational data (Figure 1) at 30-minute intervals over a continuous 24-hour period (0700-0659). These observational data were collected across three data collection periods coinciding with the scheduled nursing shift periods (i.e. 0700-1459, 1500-2259 and 2300-0659). There were 16 separate observation points per shift, totalling 48 observations per participant in a 24-hour period (Figure 1).

Observational data collected on the participant’s body position included supine, HOB, lateral (left or right), sitting, walking or unable to observe. Participants observed with a HOB also had the degree of elevation (1-90°) recorded. There were times when participants could not be observed, for example, during showering or having procedures in another department. When this occurred, ‘unable to observe’ was recorded at the data collection point. The level of observed assistance provided to reposition participants was also documented in terms of participant independently repositioned, with human (staff/family) assistance, with the use of equipment, or not observed.

In this study, repositioning was defined as any observed body position change, which results in pressure alleviation.
or redistribution in a body part (McInnes et al. 2013, Gillespie et al. 2014). Repositioning ranges from small positional shifts executed independently by the patient, to repositioning performed by the healthcare staff on behalf of the patient (Wilson 2008, Moore & Cowman 2012), with or without equipment such as a slide sheet or hoist (McInnes et al. 2013). At each 30-minute interval, the participants’ body position was noted, along with any observed assistance/equipment. For example, repositioning occurred if the participant’s position was observed to change from supine to HOB of 45°. If the participant then remained at a HOB of 45° for the next three observation periods (one and a half hours), then HOB 45° was recorded, but no change to their body position was deemed to have occurred. The four repositioning outcome variables (frequency of all repositioning, day, evening, night shift observations) were continuous.

The implementation of support surfaces included one or more of the following pressure relieving mattress, seating cushions, foam wedges, pillows, sheepskins, bandages used to protect limbs from friction. The visible areas of the participant’s skin (usually arms and lower legs) were observed and recorded as being healthy, clammy, discoloured, thin and frail, dry or a combination, such as dry and discoloured.

The reliability of the data collection tools was tested through the conduction of a pre and post pilot study. Inter-rater testing was also used to test the consensus between the research team involved in data collection. In the pre-pilot study, chart and semi-structured observational data were collected on five participants, with a 92% inter-rater reliability achieved. Following this, minor tool adjustments were made (e.g. adding ‘not applicable’ to some questions). A subsequent post pilot study conducted on five different participants was undertaken, yielding a 96% intra-rater reliability result.

Prior to the commencement of the data collection, ethics approval was granted by the Human Research Ethics Committees at both hospitals (HREC/11/QTHS/111) and the university (NRS/40/11/HREC).

### Data analysis

The data were entered into the IBM SPSS statistics software (version 22.0, Chicago, IL, USA, 2013), then cleaned and checked for accuracy. Univariate analysis was undertaken, with level of distribution of the continuous data checked. All dichotomous predictor variables were dummy coded (i.e., 0, 1). The assumptions for the statistical tests of a one way repeated measures analysis of variance (ANOVA) and multiple regression were checked. For the multiple regression analysis, a model building approach was used. Simple linear univariate analysis was first undertaken for the continuous outcome variable, frequency of repositioning and the 12 predictor variables. Following this, all statistically significant predictors ($P < 0.05$) were simultaneously entered into a multiple regression analysis for the outcome variable, frequency of repositioning.

### Results

Table 1 outlines the demographic and clinical characteristics of the participants. The sample ($n = 241$) consisted of more males than females and the median age was 70 years. Almost two-fifths ($n = 94; 39.0\%$) of participants aged 55 years and older were identified as PI risk during their hospitalization. Sedatives or narcotics were prescribed for half of the participants.

Table 2 contains the frequency of the observed participants’ body position data. Participants were mostly observed in or around their hospital bed, with very few seen walking. Across the three shift periods, HOB 1–45° was the most frequently adopted body position by participants. More than two-thirds of participants ($n = 166; 69.1\%$) were observed in bed, with a third of these being observed lying on their back, with their knees flexed. A significant proportion of participants ($n = 70; 29.0\%$) were observed sitting, with a third of these being in the chair at the bedside. A quarter of participants ($n = 58; 24.0\%$) were observed standing, with a third of these being observed in the wheelchair. A near quarter of participants ($n = 62; 25.7\%$) were observed lying on their abdomen, with a third of these being observed with their knees flexed. A significant proportion of participants ($n = 13; 5.4\%$) were observed lying on their side, with a third of these being observed with their knees flexed.

#### Table 1. Demographics of sample (n = 241)

<table>
<thead>
<tr>
<th>Demographic/clinical characteristic</th>
<th>n (%)</th>
<th>Range</th>
<th>Mid (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>19-94</td>
<td>79.0</td>
<td>(57.0-80.0)</td>
</tr>
<tr>
<td>Male</td>
<td>142 (58.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>165 (66.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>76  (31.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital length of stay at data collection (days)</td>
<td>3-110</td>
<td>5  (3-8)</td>
<td></td>
</tr>
<tr>
<td>Number of comorbidities</td>
<td>0-11</td>
<td>2   (2-5)</td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>43-158</td>
<td>75.3</td>
<td>(60.0-90.3)</td>
</tr>
<tr>
<td>Medications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sedatives</td>
<td>50 (20.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narcotics</td>
<td>70 (29.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sedatives and narcotics</td>
<td>17 (7.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identified at pressure injury risk during hospitalization</td>
<td>121 (50.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observed skin assessment category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than one category</td>
<td>167 (69.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthy</td>
<td>51 (21.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thin and frail</td>
<td>13 (5.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day</td>
<td>6 (2.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not observed</td>
<td>4 (1.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current or previous pressure injury</td>
<td>20 (8.3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Frequency of observed participant body position by shift \( (n = 241) \)

<table>
<thead>
<tr>
<th>Participant body position</th>
<th>AM ( n(%) )</th>
<th>PM ( n(%) )</th>
<th>ND ( n(%) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOHE* 1-45*</td>
<td>1009 (28.6%)</td>
<td>1282 (33.2%)</td>
<td>1428 (37.0%)</td>
</tr>
<tr>
<td>HOHE* 46-90*</td>
<td>360 (9.4%)</td>
<td>346 (9.0%)</td>
<td>158 (4.1%)</td>
</tr>
<tr>
<td>Sitting</td>
<td>1221 (32.0%)</td>
<td>670 (17.4%)</td>
<td>191 (5.0%)</td>
</tr>
<tr>
<td>Supine</td>
<td>103 (2.7%)</td>
<td>162 (4.2%)</td>
<td>187 (4.8%)</td>
</tr>
<tr>
<td>Walking</td>
<td>196 (5.1%)</td>
<td>114 (3.0%)</td>
<td>64 (1.7%)</td>
</tr>
<tr>
<td>Left Lateral</td>
<td>143 (3.7%)</td>
<td>273 (7.1%)</td>
<td>662 (17.2%)</td>
</tr>
<tr>
<td>Right Lateral</td>
<td>131 (3.4%)</td>
<td>342 (8.9%)</td>
<td>700 (18.2%)</td>
</tr>
<tr>
<td>Unable to observe</td>
<td>580 (15.1%)</td>
<td>657 (17.1%)</td>
<td>466 (12.0%)</td>
</tr>
</tbody>
</table>

*Head of bed elevation, ° Degrees.

66.4%) were able to move themselves in bed, either independently or with the assistance of bed mechanics such as a grab rail. When mobilizing out-of-bed, almost half of participants \( (n = 111; 46.1\%) \) used multiple mobility strategies such as walking sticks and wheelchairs.

The results of the one way repeated measures analysis of variance (ANOVA) on the difference in the repositioning frequency across the three nursing shifts are presented in Table 3. Participants were observed to be repositioned on average 15 times (M 14.5; SD 6.9) over a 24-hour period; 6-6 times an hour or the equivalent of once every 1.7 hours. Participants were repositioning on average 0.7, 0.6 and 0.5 times per hour on the respective day, evening and night shift. Put differently, on average participants were repositioned once every 1-4 hours on day shift, once every 1-7 hours on evening shift and once every 2 hours on night shift. Repositioning was similar during the day and evening shift, with fewer average repositionings observed at night. The Manchly’s test results indicate a violation of the assumption of sphericity \( (\chi^2 = 14.10; 6.00) \), consequently Greenhouse-Geisser corrected tests are reported \( (15.09; d.f. = 1.89, F = 16.09; P < 0.001) \). These results show there was a difference in the repositioning frequency across the three shift periods (Wilks’ Lambda 0.89, \( F(2,239) = 14.09; P < 0.001 \); multivariate partial squared = 0.105). The posthoc analysis shows participants were repositioned less frequently on the night shift compared with the morning \( (P < 0.001) \) and afternoon \( (P < 0.001) \) shifts.

Univariate analysis of the outcome variable frequency of participant repositioning and the 12 predictor variables showed two predictors were statistically significant: age \( (\beta = -0.054, 95\% CI = -0.104-0.003; P = 0.038) \) and gender \( (\beta = -2.666, 95\% CI = -3.830 to -1.302; P = 0.022) \). These two significant predictors were inserted into a multiple regression model using the simultaneous method. The results yielded an \( R^2 \) (Adjusted \( R^2 \) = 0.038; \( F = 4.663; P = 0.010 \)) suggesting the predictive ability of the model, albeit significant, accounted for a small 3.8% of the variance. Both predictor variables were statistically significant: age \( (\beta = -0.051, 95\% CI = -0.101 to 0.000; P = 0.048) \) and gender \( (\beta = -1.97, 95\% CI = -3.729 to -0.217; P = 0.028) \). Our results show that as the participants’ age increased, there was a decrease in the frequency of their repositioning. We also found females were more frequently repositioned compared with males. Multicollinearity between the predictor variables was checked, with none evident (tolerance 0.997; variance inflation factor 1.003).

**Discussion**

**Frequency of repositioning**

In this study, we found participants with reduced mobility were repositioned more frequently than might have been previously believed, with participants moving once every 1-7 hours. Our finding supports a growing body of literature that indicates hospital patients are moving (Chaboyer et al. 2013, McNees et al. 2013). Yet, although patient repositioning is occurring frequently, evidence suggests bed-ridden patients receiving a 2-hourly repositioning schedule and those with restricted movement, remain at high risk for PI (Peterson et al. 2013). This could be because the repositioning techniques do not sufficiently relieve the pressure experienced by the skin and underlying tissue (Peterson et al. 2013). This current study did not investigate this issue. Little robust evidence exists to support the timing of the frequency of repositioning to prevent PI (Gillespie et al. 2014). Adopting a targeted and individualized approach to repositioning (Springle & Sonenblum 2011, NPAPU/ EPUAP/PPFIA 2014, Chaboyer et al. 2015) is recommended as a way to better meet patients’ PIP needs. This can only be achieved with organizational support in terms of human and equipment resource provision (Gunningberg 2005).
Participant's body position

Repositioning positions for PIP include supine, degree of tilt (left or right lateral), HOBE, sitting and walking (NPUIAP/EPUAP/PPPIA 2014). Across all three shift periods (day, evening and night) participants in our study favoured the HOBE position of 1-45°. Other recent studies have reported similar findings, with patients preferring a HOBE position between 1-90° (Chaboyer et al. 2013, McInnes et al. 2013). A HOBE of 30° or greater, places the patient at greater risk of PI due to the increased friction and loading placed on the buttocks and sacrum (Wilson 2008, McInnes et al. 2013), with current CPG recommending a degree of tilt of less than 30° be used to prevent PI (NPUIAP/EPUAP/PPPIA 2014). In addition, previous repositioning studies report participants changed their positions independently, from the scheduled repositioning regime (Young 2004), with many patients placing themselves in a position that increased their PI risk (McInnes et al. 2013). Several studies have reported hospitalized patients spend a significant amount of time lying on their bed and very little time walking around the ward, despite their ability to do so (Brown et al. 2009, Kuys et al. 2012, McInnes et al. 2013). Our study had similar findings. There is a need for nurses to educate patients about PIP and prompt them to adopt body positions that reduce their PI risk.

Hospitalized patients experience several barriers to regular repositioning including the presence of medical equipment (e.g. in-dwelling catheters or intravenous lines), pain and weakness and a lack of staff availability to assist in ambulation (Brown et al. 2007). Encouraging patients to intermittently dangle their legs over the edge of the bed is an activity many patients can undertake independently. It has demonstrated benefits such as increased postoperative mobilization and improved pain management (Morris et al. 2010) and encourages patients to participate in their care (Chaboyer & Gillespie 2014, Latimer et al. 2014).

Difference in the frequency of repositioning across three nursing shifts

Our results show the frequency of participants repositioning declined from the morning to evening shift and then the night shift. Participants in our study were repositioned less frequently during the night shift compared with the morning and evening shift. These results mirror recent similar studies (Brown et al. 2009, Chaboyer et al. 2013, McInnes et al. 2013). There may be several reasons for reduced repositioning during night shift including the presence of less nursing staff to implement the strategy (Gillespie et al. 2014), the importance of rest and sleep in the healing process (Humphries 2008) and the influence of sedative and narcotic medication (Nijs et al. 2009, Gillespie et al. 2014). Our results confirm patients are not being repositioned as frequently as they are during the day, which may place them at greater risk of PI. However, it may be that during the night shift, nurses are using their clinical judgement to assess the patient’s PIP requirements (Webster et al. 2011); determining a reduced need for repositioning.

Predictors of the frequency of repositioning

Our study found that as the participant’s age increased, the frequency of their repositioning decreased. This finding is of concern, given that the majority of participants who were identified at risk for PI were aged 55 years and older. Our results contrast those of a study into various repositioning schedules (2-6 hourly experimental repositioning and standard care), which found there were no differences in the care received based on the patient’s age (Defloor et al. 2005). This difference in results may be due to the large differences in the sample sizes between the studies.

Nursing or patient factors could explain our results. Numerous studies have reported varied implementation of CPG by nurses (Sving et al. 2012, Moore 2013) including repositioning (Gunningberg 2005, Vanderwee et al. 2007). Two European studies report the majority of patients at risk of PI were not regularly repositioned (Gunningberg 2005, Vanderwee et al. 2007), suggesting that PIP strategies were either not appropriately allocated (Vanderwee et al. 2007) or were aimed at the bed-ridden patient (Gunningberg 2005). Several reasons may explain a lack of repositioning. Poor care planning has been identified as a contributing factor, with 70% of patients in one study, not having regular repositioning documented in their care plan (Leach 2008). It has also been suggested nurses’ poor attitude towards PI and not their PIP knowledge, significantly correlated with the poor delivery of PIP care (Demarré et al. 2012). Recent studies found nurses know about PIP and encouraging patient participation (Ilesanmi et al. 2012), however, it appears some nurses need support to implement these strategies into their clinical practice (Chaboyer & Gillespie 2014, Chaboyer et al. 2015).

Patient factors could also contribute to our findings. It could be that patients refused to be repositioned, because they were in a comfortable resting position; however, these data were not collected. It has also been found that many hospitalized patients are physically and psychologically inactive; spending a great deal of time in their bed doing little or nothing (Kuys et al. 2012). For many, their physical inactivity was not related to their ability to
mobilize (Brown et al. 2009, Kuys et al. 2012, McIntosh et al. 2013). Older hospitalized patients experience a fear of falling which significantly reduces their mobility and functional ability (Botza et al. 2014). Depression in older adults has also been found to increase their risk of falls (Turca et al. 2004). Coupled with this, frailty in older patients has also been associated with depression, increased levels of anxiety and a reduced sense of control (Dent & Hoogendijk 2014). While these factors could explain our findings, it may be simply that the patient’s bed is the most comfortable place for them (Brown et al. 2007). Patient education about PIP and patient participation in their care, should occur during the initial nursing PI risk assessment and continue throughout the patient’s hospitalization.

Gender differences in the delivery of nursing care have been reported in the areas of cardiology (Poisson et al. 2010) and medication errors (Latimer et al. 2011). Our study found male participants were less frequently repositioned compared with females. We also found more males were identified at PI risk than were females. Our findings contradict Defloor et al. (2005) who reported that gender was not a significant factor in repositioning schedules. Gender differences in the development of PI (Spector et al. 1988, Bergstrom et al. 1996) and the implementation of pressure reduction mattresses (Bergstrom et al. 1996) have been also reported. Perhaps male participants in our study did not receive the assistance required to reposition themselves, or it could be that nurses interpreted participants reduced repositioning, as them lacking the motivation to move (Brown et al. 2007).

Limitations

While we have used robust and systematic methods in this study, several limitations exist. The results presented in our study only relate to the participants at the research site, so care is advised when interpreting these results. The frequency of repositioning was measured every 30 minutes and did not include any patient repositioning, which may have occurred in between the observation periods. This study only examined predictors of the frequency of repositioning and not the causal factors that might relate to the patient, nurses and the organization. A deeper examination of these factors was beyond the scope of this study; however, this is an area that warrants further investigation.

Conclusion

In conclusion, this study found patients were more active than we might have thought, but they tend to adopt positions in bed that increase their risk of PI. Patients were repositioned less at night, than they were during the day; an issue compounded by reduced staffing. Older patients and males were repositioned less frequently, placing them at greater risk for PI development. Current PIP practice should be supplemented by the development of educational strategies that encourage a collaboration of nurses’ and patients in PIP.

Relevance to clinical practice

Considered a cornerstone of PIP, the implementation of repositioning is an area requiring attention by clinicians, managers and researchers. Patients who are able, should be encouraged to participate in their PIP care. On admission to hospital, nurses should educate patients about PIP and the benefits of their participation in their care. Targeted and individualized PIP management should be incorporated into clinical practice, however, this can only be achieved with nurses support and concurrent organizational support.

Conflict of interest

The authors report they have no conflict of interest.

References


4.6 Summary

The quantitative findings of this study were presented in a series of peer-reviewed papers: two published and another accepted for publication. Quantitative data from the 241 study participants were collected using chart audits and semi-structured observations. My findings show varied planning and implementation of PIP strategies, with a number of predictors identified. Overall, participants were quite active, however, when in bed, many adopted body positions that increased their PI risk. A number of new findings not previously known emerged from this study phase. The following chapter outlines the qualitative study findings, presented in a peer-reviewed published manuscript.
CHAPTER 5

Qualitative results

5.1 Introduction

This chapter contains my qualitative study findings that answer research question number seven, outlined in the methods chapter (Chapter Three). The aim of this interpretive study was to describe participants’ perceptions of their current and future role in pressure injury prevention (PIP). Presented first in this chapter is a brief summary of the study sample, data collection method, and qualitative study findings. Next, a ‘signed statement of contribution’ along with the bibliographic details of the manuscript and my contribution is provided. Finally, my findings are reported in a copy of the 2014 peer-reviewed paper.

Twenty participants, drawn from the study sample of 241, were recruited to this qualitative study phase. The sample demographics are outlined in the peer-reviewed paper contained in this chapter. Semi-structured interviews were conducted, resulting in three hours and 58 minutes of recorded interview data. Table 11 contains a summary of the qualitative findings, followed by a copy of the published peer-reviewed journal article. A number of new findings not previously published emerged through this research.

Table 11 Summary of the Qualitative Findings

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiencing pressure injuries</td>
<td>Feeling many emotions</td>
</tr>
<tr>
<td></td>
<td>Enduring pain</td>
</tr>
<tr>
<td></td>
<td>Relieving pressure</td>
</tr>
<tr>
<td></td>
<td>Smelling pressure injury odour</td>
</tr>
<tr>
<td></td>
<td>Remembering experiences</td>
</tr>
<tr>
<td>Participating in pressure injury prevention</td>
<td>Enabling me to participate</td>
</tr>
<tr>
<td></td>
<td>Understanding about pressure injuries</td>
</tr>
<tr>
<td></td>
<td>Involving me in care decisions</td>
</tr>
<tr>
<td></td>
<td>Being proactive</td>
</tr>
<tr>
<td>Resourcing pressure injury prevention and</td>
<td>Increasing expenses</td>
</tr>
<tr>
<td>treatment</td>
<td>Accessing pressure injury prevention information</td>
</tr>
<tr>
<td></td>
<td>Accessing care</td>
</tr>
<tr>
<td></td>
<td>Prolonged healing</td>
</tr>
</tbody>
</table>
5.2 Statement of contribution to co-authored published paper

Below is the completed ‘Statement of contribution to co-authored published paper’ for the manuscript (Paper 4) published in 2014.

STATEMENT OF CONTRIBUTION TO CO-AUTHORED PUBLISHED PAPER

This chapter includes a co-authored paper. The bibliographic details of the co-authored paper, including all authors, are:


My contribution to the paper involved leading participant recruitment, data collection, data analysis, interpretation of the results, drafting and critical development of the paper.

(Signed) (Date) 01/06/2016
Sharon Latimer

(Coauthorsigned) (Date) 01/06/2016
Corresponding author of paper: Professor Wendy Chaboyer

(Coauthorsigned) (Date) 01/06/2016
Corresponding author of paper: Professor Brigid Gillespie

(Coauthorsigned) (Date) 01/06/2016
Principal Supervisor: Professor Wendy Chaboyer

5.2.1 Patient participation in pressure injury prevention: Giving patients’ a voice? (Paper 4)

In order to comply with copyright this article has been removed.
5.3 Summary

This chapter contained my qualitative study findings, presented in a published peer-reviewed journal article. Using semi-structured interviews, qualitative data were collected from 20 participants. Three categories emerged from the data: experiencing pressure injuries (PI), participating in PIP, and resourcing PIP and treatment. Overall, participants expressed a willingness to participate in their PIP care. Most participants had experienced PI first-hand, or vicariously through others. Barriers and facilitators to participation were highlighted. The next chapter features a meta-synthesis of the quantitative and qualitative study findings, along with a proposed conceptual model of patient participation in PIP.
CHAPTER 6

Meta-synthesis of quantitative and qualitative results

6.1 Introduction

In order to gain a unique view of the study findings, a meta-synthesis of the quantitative and qualitative results was undertaken, which answer research questions number eight and nine, outlined in the methods chapter (Chapter Three). This chapter describes the meta-synthesis of the quantitative and qualitative results presented in Chapters Four and Five of this thesis. First, the meta-synthesis approach is briefly reviewed, followed by a summary of the meta-synthesis findings. Based on these findings, a preliminary conceptual model of patient participation in pressure injury prevention (PIP) is proposed and situated within relevant theories and research.

6.2 Meta-synthesis approach and process

The approach and process undertaken in the meta-synthesis of the qualitative and quantitative results, and the development of a conceptual model was described in the methods chapter (Chapter Three) of this thesis. A meta-synthesis allows the researcher to integrate the quantitative and qualitative results and provide a unique and new understanding of the area being studied (Dixon-Woods et al., 2006; Harden et al., 2004; Sandelowski et al., 2006). Using the configuration approach, the meta-synthesised data informed the development of a conceptual model to extend and build on the study results.

6.3 Meta-synthesis findings

A narrative of the meta-synthesis findings is presented below and organised under the four PIP strategies of pressure injury (PI) risk assessment, support surfaces, regular repositioning and patient PIP education.

PI risk assessment: Most participants were willing to participate in their PIP care. Nurses’ low completion rates of PI risk assessments were associated with participants not knowing they were at PI risk or possibly not receiving the recommended PIP care. This limits participants’ opportunity to engage in their care. The participants assessed at risk of PI were more likely to receive PIP education and multiple prevention strategies; mainly support surfaces and regular repositioning. This increased participants’ opportunity to participate in their PIP care.
Support surfaces: Participants identified at PI risk were more likely to receive support surfaces. Those not receiving this strategy may have also been at PI risk but may not have been identified because of the low risk assessment completion rates. Participants expressed difficulties when accessing support surfaces and perceived nurses either facilitated or hindered this process. Delayed access to support surfaces resulted in some participants stating they had to ‘compete’ with other patients for this ‘valued’ resource. Many participants became angry and frustrated by this delay and often disengaged with nurses and their care. Participants’ shared their frustrations about their delayed access to support surfaces with family members who often advocated for them. Participants defined their access to support surfaces as a ‘success’ or ‘failure’. Often participants thought their relationship with nurses influenced their access to support surfaces. Many participants stated they wanted to be ‘cared for’ by the nurses. Timely access to PIP resources was one way participants felt nurses demonstrated this care. Every participant who had an appropriate support surface planned as part of their PIP care received this resource. Timely access to support surfaces facilitated participation in their care.

Regular repositioning: Participants viewed nurses as PIP care facilitators or direct care providers. Regular repositioning was the most frequently implemented PIP strategy by participants and nurses. Participant repositioning occurred less frequently at night, compared to the morning and afternoon shifts. Although many participants could implement this strategy with little or no nursing assistance (using bed grab rails or mobility aids), numerous adopted body positions that placed them at greater risk of PI. Participants who repositioned themselves independently experienced greater autonomy and participation in their PIP care. Pain was a major trigger for independent participant repositioning. Participants with limited mobility were able to redistribute their body position, even slightly, to alleviate their discomfort, even if only minimal repositioning was achieved. Participation in PIP care, however limited, provided participants with feelings of success, independence and empowerment. Participants who were unable to reposition themselves relied on nurses to provide this care, despite their desire to participate.

Participants’ age and gender were predictors of the frequency of regular repositioning. As the participants’ age increased, repositioning frequency decreased. Many older participants described their role in PIP care as passive; believing nurses had the knowledge and skill to make healthcare decisions for them. So, when nurses did not encourage repositioning, unless participants experienced pain, it appeared many older
participants did not initiate this strategy. Female participants were repositioned more frequently than males. The female participants vocalised a strong desire to be involved in their PIP care; insisting nurses reposition them.

**Patient PIP education:** While a small number of participants had this strategy implemented (documented as implemented or observed at the bedside), those assessed at PI risk were more likely to receive PIP education. Many participants wanted more PIP education from nurses, and greater involvement in the decision-making process related to their PIP care. Many participants stated they had insufficient knowledge to make healthcare decisions, increasing their reliance on nurses for their care needs. Some participants with poor healthcare knowledge expected nurses to make decisions about their PIP care. Other participants who were proactive in their PIP care decision-making, felt ostracised and excluded by nurses when they did not follow nursing instructions. Participants wanted nurses to facilitate their PIP care participation.

Most participants want to engage in their PIP care. Regardless of their PI risk, providing all patients with education allowed them to determine their level of participation. Some participants thought that if they had received timely PIP education from nurses, they could have implemented appropriate PIP strategies, which might have reduced their PI risk.

### 6.4 Patient participation in pressure injury prevention conceptual model

A conceptual model consists of abstract concepts (Sandelowski & Barroso, 2007). The concepts within the model are used as a foundation or an advancement of nursing knowledge and critical thinking (Cahill, 1996; Walker & Avant, 1995). Conceptual models assist the researcher to describe, explain and gain a better understanding of the area under investigation (Borgida & Mylopoulos, 2009; Fawcett, 2000; Fawcett & Desanto-Madeya, 2013; Walker & Avant, 1995). Propositions within the model demonstrate a relationship between two abstract concepts (Fawcett & Desanto-Madeya, 2013). Proposition statements are developed to describe this relationship in general terms (Fawcett & Desanto-Madeya, 2013).

The concept of patient participation can increase patient involvement in their care (Cahill, 1996; Sahlsten et al., 2008; Tobiano, Marshall, et al., 2015), improve patient safety, and raise patient satisfaction with their care (Longtin et al., 2010; Sahlsten et al., 2008). While successfully implemented in a limited number of clinical areas, such as hand hygiene (Longtin et al., 2010), patient participation in PIP is not a
documented mainstay of current clinical practice. A noted difficulty instigating this concept in PIP is the absence of a conceptual model for its implementation.

Based on the results of this current study, a new preliminary conceptual model of patient participation in PIP was developed. The model was developed inductively (bottom up) and is data driven (Voils et al., 2008). This model identifies the factors that increase patient participation in PIP. The model, represented schematically in Figure 4, includes seven concepts and eight propositions. The seven concepts were inductively developed from the data (Sandelowski et al., 2012; Voils et al., 2008). The seven concepts are risk assessment, PIP strategies, patient education, resources, patient characteristics, relationships and patient participation. The central concept is patient participation in PIP with the remaining six concepts having the potential to be enablers of or barriers to patient participation. Below are the concept definitions:

1. **Risk assessment**: Is the evaluation of the patient’s PI risk. Nurses conduct the assessment soon after admission, throughout the patient’s hospitalisation, and whenever there is a change in their medical condition. Screening tools such as the Waterlow risk assessment tool or the nurse’s clinical judgement can be used to assess the patient’s PI risk.

2. **PIP strategies**: Planned and implemented interventions aimed at reducing the patient’s PI risk. These recommended strategies are outlined in the clinical practice guidelines (CPG) and include a PIP management plan, support surfaces, regular repositioning, and patient education. The implementation of PIP strategies involves the use of these interventions in the patient’s care.

3. **Resources**: The human and organisational resources, including equipment used in PIP care to reduce the patient’s PI risk. Human resources include nursing staff and other support staff. Organisational resources include the provision of ongoing staff PIP education and equipment. PIP equipment includes support surfaces, cushions and skin protectors. Nurses’ procurement of PIP resources is influenced by the hospital’s purchasing practices. The patient is also reliant on the nurse to access these PIP resources, including receiving PIP education. The nurse and organisation can either facilitate or hinder the patient’s access to PIP resources.

4. **Patient participation**: Incorporates patients’ involvement in aspects of their PIP care. Patient participation can range from no participation to full engagement, whereby patients are implementing aspects of their care. Participation can be invited by the nurse, negotiated between the nurse and patient, or initiated by the
patient. Age, illness, PIP knowledge, resources, and the nurse-patient relationship can affect the patient’s ability to participate.

5. **Patient characteristics**: The individual features that can reduce or enable a patient’s participation in their PIP care. These characteristics include increasing age, illness, the patient’s willingness to participate in their care, patient PIP knowledge, level of mobility, and the patient’s ability to communicate their care needs.

6. **Patient education**: The sharing of knowledge between the nurse and patient. This can occur formally and informally. Strategies include face-to-face delivery or the use of educational resources such as posters and brochures.

7. **Relationships**: Defined as a connection between the nurse and patient. This connection can be emotional, physical, or professional. Relationships can be developed through verbal and non-verbal communication and/or physical interactions.

The preliminary patient participation in PIP model presented in Figure 4 demonstrates the complex, inter-dependent nature between PIP resources, nurses, and patients. The relationships between the concepts are outlined in the following eight propositions:

1. **Completing a risk assessment guides and informs the nurse’s implementation of PIP strategies.**
2. **Completing a PI risk assessment creates opportunities for patients to participate in PIP.**
3. **Providing patients with PIP education enables them to make choices about their PIP participation.**
4. **Patients with planned PIP strategies are more likely to receive them.**
5. **Access to PIP resources increases the likelihood of their implementation.**
6. **Patient characteristics influence their ability to participate in PIP.**
7. **A collaborative nurse-patient relationship promotes patient participation in PIP.**
8. **The extent to which PIP strategies are implemented influences patient participation.**
Figure 4. Patient participation in pressure injury prevention conceptual model
The eight proposition statements are described below. It has long been recognised that nursing assessment is the foundation of clinical practice (Lyder, 2003). The first proposition statement, *completing a risk assessment guides and informs the nurse’s implementation of PIP strategies*, enables the nurse to identify the patient’s PI risk. Nurses can undertake this assessment using a standardised tool (e.g. Waterlow risk assessment tool, Braden scale, Norton scale) or their clinical judgement (Webster et al., 2011). Conducting a PI risk assessment soon after hospital admission (Gunningberg, Dahn, & Ehrenberg, 2008) provides opportunities for the nurse to evaluate the patient’s PI risk and make informed decisions about planning and implementing their PIP care (Bergstrom et al., 1996). Nurses who complete a PI risk assessment are more likely to identify patients at risk, and appropriately plan and implement the recommended PIP strategies. Undertaking this assessment also provides opportunities for the nurse and patient to develop a collaborative relationship (Cahill, 1996; Sahlsten et al., 2008; Tutton, 2005), and encourage patient participation in their care (Tobiano, Marshall, et al., 2015).

The second proposition statement is *completing a PI risk assessment creates opportunities for patients to participate in PIP*. This represents the first step in PIP where the nurse undertakes an assessment to identify the patient’s PI risk. There is agreement that the assessment outcome should be used to guide nurses’ planning and implementation of PIP strategies (National Pressure Ulcer Advisory Panel et al., 2014). During the assessment process, nurses gain an understanding of the patient in the context of their health history, current illness, knowing the person and their care preferences (Ekdh, Luhr, & Ehnfors, 2014; Tutton, 2005). The admission and planning phase of nursing care is also the optimal time for nurses to foster patient participation in their PIP care (Jewell, 1994; Tobiano, Bucknall, et al., 2015b). Conducting this assessment creates opportunities for the nurse and patient to begin to develop a collaborative relationship, identify patient characteristics that might facilitate or impede their ability to participate in their care, trigger a PIP education session and discuss access to PIP resources (Chou et al., 2013). Reasonable adjustments to the implementation of care can be negotiated to accommodate the patient’s needs (Sahlsten et al., 2005). Patient participation is increased when nurses and patients maximise positive care experiences (Tutton, 2005). Such as, providing the patient with grab rails, so they can reposition themselves in bed. Ongoing nursing assessment of the patient’s PI risk is needed, so that modifications to planned and implemented care can be made.
(D. Brown, Edwards, Seaton, & Buckley, 2014). These opportunities increase the likelihood of patient engagement in their PIP care.

Providing patients with PIP education enables them to make choices about their PIP participation is the third proposition statement. Education is a way to bridge the knowledge gap between nurses and patients, and increase patient participation (Cahill, 1996; Eldh et al., 2014; Sahlsten et al., 2008). Educating patients about PIP provides them with a better understanding of their own PI risk, and the strategies to reduce this risk. Formal and informal education sessions also improve patients’ health literacy (Australian Commission on Safety and Quality in Health Care, 2013). Through increased knowledge, patients are able to make informed healthcare decisions (Eldh et al., 2014; Scott et al., 2002), and decide on their level of patient participation (Institute of Medicine, 2004). Education sessions provide an opportunity to increase nurse-patient interactions, strengthening their relationship. Patients will be more receptive to new information when there is an established collaborative nurse-patient relationship (Sahlsten, Larsson, Sjöström, & Plos, 2009; Tutton, 2005). Collectively, this supportive education environment provides patients with information and access to nurses, allowing them determine their participation in PIP.

The fourth proposition statement, patients with planned PIP strategies are more likely to receive them centres on nurses’ planning of PIP strategies to reduce the patient’s PI risk. The documentation of planned PIP care provides evidence of the quality and continuity of nursing care (Moore, 2013; National Pressure Ulcer Advisory Panel et al., 2014; Sving et al., 2012; Thoroddsen et al., 2013). PIP care planning generally occurs soon after the completion of the risk assessment (Gunningberg et al., 2011; Sahlsten et al., 2008). As a component of patient participation, nurses should encourage patient involvement in the planning process (Eldh et al., 2014; Tobiano, Marshall, et al., 2015). Documenting planned PIP strategies in the nursing care plan raises the likelihood of their implementation. Nurses need a competent level of knowledge and skill to plan PIP care, with suggestions time pressure related to workloads may lead to gaps in planning (M. Leach, 2008; Tobiano, Marshall, et al., 2015). There are concerns about the completeness and accuracy of PIP care documentation (Jankowski & Nadzam, 2011; Sharp et al., 2000; Thoroddsen et al., 2013). These inaccuracies in the patient care records (Thoroddsen et al., 2013) can lead to gaps in care delivery (Larsson et al., 2011; Sahlsten et al., 2008), increased risks to patient safety (Moore, 2013) and reduced opportunities for patient participation (Tobiano, Marshall, et al., 2015).
patient’s continuity of care, and serves as a reminder for nurses involved in care delivery. Planning PIP strategies is likely to encourage nurses to seek out these resources as part of the patient’s care.

The fifth proposition statement is access to PIP resources increases the likelihood of their implementation. Nurses and patients both access PIP resources (Chou et al., 2013). For the nurse, PIP resources include PIP equipment and nurse education and training (Moore & Price, 2004; Vanderwee, Clark, et al., 2007). Nurses’ ability to deliver optimal, safe, effective, and timely PIP care is reliant on their access to PIP resources (Bours et al., 2002; Tutton, 2005; Vanderwee, Clark, et al., 2007; Worsley et al., 2016). The healthcare organisation’s supply of these resources and nurses’ ongoing PIP education and training will influence how PIP strategies, including patient education, are implemented (Chou et al., 2013). Nurses are more able to engage patients in their PIP care when they have access to the appropriate resources.

Patient access to resources is mostly determined by the nurse and healthcare organisation (Chou et al., 2013; Worsley et al., 2016). A key factor in patient participation in their care is access to PIP resources including nurses, PIP equipment, and knowledge (Bours et al., 2002; Cahill, 1996; Sahlsten et al., 2008). The nurse is a vital resource in PIP, and the strength of the nurse-patient relationship, including the effectiveness of their communication (Henderson, 2002), can affect the patient’s access to PIP strategies, and participation in their care (Cahill, 1996; Sahlsten et al., 2008; Tobiano, Marshall, et al., 2015). Patients’ ability to participate in PIP without the assistance of nurses or access to the organisation’s resources is limited. Likewise, nurses’ ability to facilitate patient participation in PIP is restricted if the patient is not willing or is unable to participate (Tobiano, Bucknall, et al., 2015b), or if difficulties arise in sourcing PIP resources (Chou et al., 2013).

The sixth proposition statement, patient characteristics influence their ability to participate in PIP suggests that demographic and personal factors influence the patient’s capacity to participate in PIP. Inhibitory and enabling patient characteristics include age, gender, illness, cognition, willingness to participate, PIP understanding and knowledge, and mobility (Boltz, Resnick, Capezuti, & Shuluk, 2014; C. Brown, Williams, Woodby, Davis, & Allman, 2007; Henderson, 2002; Jewell, 1996; Larsson et al., 2011; Tutton, 2005; Worsley et al., 2016). Some of these characteristics (age, gender, mobility) are identified on the PI risk assessment as factors that can increase the patient’s risk of PI (Braden & Maklebust, 2005; Waterlow, 2005). Some of these patient characteristics may change over time (Lindström et al., 2006; Timonen & Sihvonen, 2006).
For example, improved patient health status and mobility enables increased participation in their PIP care. The nurse-patient relationship and the patient’s prior PI experience serve as significant enablers in their willingness to participate in PIP (Tobiano, Bucknall, et al., 2015b; Weingart et al., 2011). Nurses who tailor their care in consideration of patient characteristics are more likely to engage patients in their care. Collectively, these actions result in the patient having the confidence, knowledge, resources and nursing support to engage in their PIP care.

A collaborative nurse-patient relationship promotes patient participation in PIP is the seventh proposition statement. The nurse-patient relationship is an important element that can facilitate or hinder the patient’s willingness to participate in their care (Cahill, 1996; Eldh et al., 2014; McInnes et al., 2014; Sahlsten et al., 2008; Timonen & Sihvonen, 2000; Tobiano, Marshall, et al., 2015; Tutton, 2005). Often this relationship commences early in the hospital admission process, for example during the implementation of PI risk assessment (Tobiano, Marshall, et al., 2015). Like all relationships, nurses and patients can develop poor to strong relationships. A good nurse-patient relationship is established and maintained through respectful communication and ongoing interactions (Cahill, 1996; Sahlsten et al., 2008). For example, a collaborative relationship can begin through nurse-patient education, which increases patient engagement in their care by improving their understanding of PIP (McTier et al., 2013; Timonen & Sihvonen, 2000). Spending time with one another is a significant factor needed in collaborative relationships (Eldh et al., 2014; Sahlsten et al., 2009). Overall, maintaining a strong nurse-patient relationship improves mutual respect and trust. Consequently, this increases the patient’s willingness and confidence to participate in PIP (Sahlsten et al., 2009; Tutton, 2005; Wellard et al., 2003) by shifting the nurse’s authority over care to that of a shared responsibility between the nurse and patient (Cahill, 1996; Sahlsten et al., 2008).

The final proposition statement, the extent to which PIP strategies are implemented influences patient participation centres on the notion that patients rely on nurses to implement PIP strategies. The implementation of PIP strategies is also dependent on the nurse’s ability to access the appropriate resources (Chou et al., 2013; Worsley et al., 2016). During the implementation of PIP care, patients have the opportunity to participate; this can be facilitated by the nurse, or initiated by the patient (Jewell, 1994; Tutton, 2005). Nurses who foster a collaborative nurse-patient relationship are more likely to engage patients in their care. Before PIP strategies can be implemented, nurses must first gain access to the appropriate resources (Cahill, 1996;
Chou et al., 2013; Gunningberg, 2005). These resources can be human, equipment and/or fiscal. Access to resources may be influenced by the organisation (Beitz, 2011; Bredesen et al., 2015; Moore et al., 2013b) or the individual nurse; with a lack of interest in PIP care cited as a possible factor (Demarré et al., 2012; M. Leach, 2008; O’Brien, 2009). Implementing care, either intellectual (education) or physical (repositioning), is a requirement of patient participation (Cahill, 1996; Sahlsten et al., 2008). Past research into numerous healthcare areas has found patients want some level of participation in their care (Timonen & Sihvonen, 2000; Tobiano, Bucknall, et al., 2015b; Weingart et al., 2011; Wellard et al., 2003). To increase patient participation, nurses need to implement the care as well as inviting the patient to participate (Eklh et al., 2014; Jewell, 1994; Sahlsten et al., 2008).

The proposed conceptual model presented in this thesis (Figure 4) identifies factors that can increase patient participation in PIP. This model has not been tested in clinical practice, with researchers of a recent nursing patient centred care (PCC) conceptual model asserting “research into the use of the model in several contexts allows its refinement and the development of situation-specific theories, and ultimately the development of testable hypotheses” (Moyle et al., 2015, p. 259). This approach can be used to further inform and refine the conceptual model derived through this study.

6.5 Summary of the conceptual model

To summarise, this preliminary conceptual model may guide nurses in their attempt to increase patient participation in PIP, however it requires testing. Central to this model are the patient and nurse. A collaborative nurse-patient relationship that demonstrates mutual respect, trust and information sharing engenders patient participation in their PIP care. Determining the patient’s PI risk is the first nursing action that should involve the patient. This provides the nurse with baseline patient information for the planning and implementation of PIP strategies, while also creating opportunities for the patient to participate in their care. Following the completion of a PI risk assessment, patient PIP education is the next strategy nurses should implement. Education facilitates patient care decision-making, strengthens the nurse-patient relationship, and demonstrates nurses’ willingness to share the perceived authority they have over PIP care with the patient.

With the nurse’s support, patients can determine their PIP participation. The level of patient participation ranges from no involvement to full engagement in decision-making, and the implementation of PIP strategies. It appears two things are
vital: first, nurses’ respect for patient decisions; and second, nurses’ reassessment of patient decisions during the course of care. As the patient’s health improves, or their knowledge and confidence increases, patients may change how they participate in their care. Nurses need to consider patient characteristics, such as age or illness that might enable or hinder their participation. From this, PIP care can be tailored to the patient’s need. For instance, negotiating the frequency and timing of repositioning with the patient can increase shared decision-making, improves relationships, and engages patients in their care. Access to resources such as nursing staff, ongoing education and training, and PIP equipment is necessary so that PIP strategies can be implemented. How and who accesses these resources will significantly influence their implementation, and the patient’s participation in their care. Hospitalised patients experience health status changes; meaning their health can improve, remain unchanged, or deteriorate. This proposed conceptual model is intended to be flexible, responsive and adapt to patient needs. For example, patient PIP education should be an ongoing strategy (Hoviattalab et al., 2015; Tobiano, Marshall, et al., 2015) that meets their needs at the time, rather than a once only event. Patients’ health literacy builds over time, so scaffolding patient education at multiple points is important (Wolf et al., 2009). Patient confidence in the implementation of their care also occurs over time. Nurses need to resist the inclination to implement PIP strategies for patients because it is an easier or quicker option. Finally, like most models, the desired outcome (patient participation), is reliant on the delicate interplay between other concepts, as well as the support from various stakeholders.

6.6 Summary

In this chapter, a meta-synthesis of the quantitative and qualitative study results was presented. A narrative meta-synthesis described the results in terms of PI risk assessment, support surfaces, regular repositioning, and patient PIP education. Seven concepts and eight propositions were proposed and illustrated in a preliminary conceptual model. The model has patient participation in PIP as the central concept with the remaining concepts either enabling or inhibiting patient participation. The following, and final chapter of this thesis is the discussion. In this chapter, the new knowledge arising from the quantitative and qualitative results and the conceptual model is discussed and compared to the current literature.
CHAPTER 7

Discussion

7.1 Introduction

The purpose of this mixed methods study was two-fold. First, to describe current pressure injury prevention (PIP) clinical practices in hospitalised adult medical patients with reduced mobility; and second, to describe patients’ perceptions of their current and future role in PIP care. The published and accepted manuscripts presented in Chapters Four and Five described and discussed the quantitative and qualitative study findings. A preliminary conceptual model on patient participation in PIP was outlined in Chapter Six. This current chapter will begin with a summary of the study findings. Then, the overall study findings will be discussed and situated in the context of existing theories and research, and the new knowledge and insights highlighted. The quantitative study findings are discussed as a whole under the theme of prevention interventions. Next, a discussion of the qualitative findings is presented under participating in care. Finally, situated under the theme of partnering with patients, the proposed conceptual model is discussed and compared to two previously published patient participation conceptual models. The study limitations are described, including the mitigating strategies to address them. Lastly, based on the study outcomes, recommendations for clinical practice, education, future research, and policy are identified.

7.2 Summary of the study findings

This mixed methods study, conducted at two large Australian metropolitan hospitals, recruited participants from four medical units: renal, immunology, respiratory and endocrinology. Quantitative data were collected on a consecutive sample of 241 participants with reduced mobility. Using interviews, qualitative data were collected from a purposive sample of 20 participants, who had also participated in the quantitative phase. A meta-synthesis of the quantitative and qualitative findings resulted in the development of a preliminary conceptual model of patient participation in PIP.

Notable results arose from the quantitative study phase. With the exception of regular repositioning, the overall uptake of PIP strategies was low. Despite frequent repositioning, older participants and males received this strategy less frequently than younger participants and females respectively. Many participants adopted body positions (i.e. head of bed elevation between > 30°) that increased their risk of pressure injuries (PI). Encouragingly, participants identified at PI risk were more likely to
receive a range of prevention interventions including support surfaces and education. Additionally, as participants’ mobility decreased, there was an increase in the implementation of support surfaces. This level of understanding of PIP in the Australian context was previously unknown.

Three main categories emerged from the interpretive qualitative phase of the study: *experiencing PI, participating in PIP,* and *resourcing PIP and treatment.* Generally, participants wanted to be involved in their healthcare decisions and PIP care. Participants with a previous PI associated this experience with negative memories. Several barriers and facilitators were identified. For example, participants came to hospital with varied PI and PIP knowledge, however only a few received education from nurses. Participants who experienced reduced access to prevention strategies stated their PIP care was interrupted. Furthermore, the nurse-patient relationship facilitated patients’ participation in PIP. This is new knowledge about patient participation in PIP.

Lastly, the proposed conceptual model, synthesised from the quantitative and qualitative data, was developed inductively (bottom up) and was data driven (Voils et al., 2008). The model’s concepts were derived from the data; hence they were inductively drawn (Sandelowski et al., 2012). Eight proposition statements, developed from these concepts, feature in the proposed model. While not tested, this model may provide new insights on how to increase patient participation in their PIP care. A discussion of the quantitative study findings is presented next under the theme of *prevention interventions.*

### 7.3 Prevention interventions

PI are a patient safety and quality of care issue (Australian Commission on Safety and Quality in Health Care, 2012; National Health Service, 2013; National Pressure Ulcer Advisory Panel et al., 2014). Deemed best practice, clinical practice guidelines (CPG) for PIP recommend the timely implementation of the following prevention interventions: PI risk assessment, PIP management plan, support surfaces, regular repositioning, patient education, skin assessment and protection, continence management, and nutritional assessment and supplements (National Pressure Ulcer Advisory Panel et al., 2014). This current study focussed on the PIP strategies of PI risk assessment, PIP management plan, support surfaces, regular repositioning, patient education because these interventions form the mainstay of nurses’ PIP clinical practice. These interventions need to be individualised to meet patient needs (National Pressure Ulcer Advisory Panel et al., 2014). Recently, PIP programs such as care bundles have
reported reductions in PI incidence (Barker et al., 2013; Coyer et al., 2015; Tayyib et al., 2015b), however sustaining this trend is challenging (Moore, 2013). Gaining a better understanding of current PIP clinical practices is an important first step in prevention. PIP strategies were inconsistently implemented in this current study. For example, a low uptake of PIP strategies was observed (e.g. PI risk assessment, support surfaces), yet other aspects of PIP care reflected current best practice (e.g. at risk patients receiving PIP education). These varied findings are discussed under the sub-headings of PI risk assessment, support surfaces, regular repositioning and patient education.

7.3.1 **Pressure injury risk assessment**

Nursing assessment underpins all clinical practice (Lyder, 2003). Nurses determine the patient’s risk for PI by conducting a risk assessment, generally using a standardised tool (e.g. Waterlow risk assessment tool, Braden or Norton scales) or their clinical judgement (Braden & Maklebust, 2005; Norton, 1962; Waterlow, 2005; Webster et al., 2011). There is uncertainty about the validity and reliability of these tools to predict the patient’s risk of PI development (Fulbrook & Anderson, 2016; Moore & Cowman, 2014; Webster et al., 2010). Despite this, PI risk assessment is recommended in the CPG (National Pressure Ulcer Advisory Panel et al., 2014).

Patient safety and nursing communication relies on timely, complete, and accurate documentation (Jankowski & Nadzam, 2011; National Pressure Ulcer Advisory Panel et al., 2014; Thoroddsen et al., 2013; Wang, Hailey, & Yu, 2011). Regardless of how an assessment was undertaken (tool vs. clinical judgement), this current study identified low rates of PI risk assessment by nurses, with two-thirds of participants without a completed assessment. Similar findings have been reported by researchers in other countries, such as The Netherlands (De Laat, Schoonhoven, Pickkers, Verbeek, & Van Achterberg, 2006), Sweden (Gunningberg & Ehrenberg, 2004), Germany (Hoviattalab et al., 2015), Ireland (Moore et al., 2013b), and Australia (Sharp et al., 2000). This suggests current approaches aimed at increasing nurses’ engagement with this strategy may not be effective.

Several possible explanations for the findings of this current study are discussed in relation to nursing documentation practices and workloads. Gaps in nurses’ documentation of PI risk assessment is reported (Gunningberg, Lindholm, Carlsson, & Sjoden, 2000), with many of the study participants having an incomplete assessment. It could be the assessment outcome was not recorded or undertaken; possibly explaining the findings of this current study. High patient turnover in clinical units intensifies nurses’ workloads (Park, Weaver, Mejia-Johnson, Vukas, & Zimmerman, 2015),
sometimes resulting in the omission of nursing care activities (Orique, Patty, & Woods, 2016), including PI risk assessment. The acute medical units at the research sites had high patient turnovers; increasing nurses’ workloads, which might explain the findings of this study. There are reports that PI risk assessment practices are less accurate when undertaken by inexperienced nurses compared to experienced nurses (Barker et al., 2013). Amending discrepancies in PI risk assessment documentation is reliant on addressing individual factors such as limited knowledge and inexperience, and organisational issues around leadership and culture (Bredesen et al., 2015; Soban et al., 2011).

It is recommended that nurses complete a PI risk assessment within eight hours of a patient’s admission to the healthcare facility (National Pressure Ulcer Advisory Panel et al., 2014). Notably, this current study found a three-fold difference in the completion rates between the hospital study sites (Hospital A: 18% vs. Hospital B: 55%). The risk assessment practices differed between the hospitals (clinical judgement and standard tool), with increased completion rates achieved at Hospital B where the Waterlow risk assessment tool was standard practice. It could be the standardised tool served as a visual reminder for nurses to complete the risk assessment, however this notion has been contested (Moore et al., 2013b).

A number of recent studies have reported PI risk assessment completion rates of 84% to 100%; (Barker et al., 2013; Gunningberg, Donaldson, et al., 2012; McInnes et al., 2013); figures higher than the findings in this current study. Two Australian studies reported PI risk assessment rates of between 84 to 92% (Barker et al., 2013; McInnes et al., 2013), with a USA study achieving 100% compliance (Gunningberg, Donaldson, et al., 2012). One of the Australian studies implemented a pressure ulcer program incorporating PI risk assessment into daily nursing practice, along with ongoing staff education (Barker et al., 2013); possibly explaining the results. In the USA, hospital acquired pressure injuries (HAPI) attract harsh financial and legal penalties (Gunningberg, Donaldson, et al., 2012); a likely motivator for compliance. Regardless of which PI risk assessment strategy is utilised, there is varied uptake, and therefore a need to address this evidence practice gap.

7.3.2 Support surfaces

The tailored use of support surfaces is a best practice strategy (McInnes et al., 2015; National Pressure Ulcer Advisory Panel et al., 2014). This study found varied practices involving support surfaces. First, the use of support surfaces in participants with reduced mobility was quite low (25%) (Latimer, Gillespie, & Chaboyer, 2015),
with the underutilisation of this strategy previously reported (Barker et al., 2013; Bours et al., 2002; De Laat et al., 2006; Vanderwee, Grypdonck, & Defloor, 2008). The study results may be attributed to the low completion rates of PI risk assessments, with the assessment outcome informing nurses’ subsequent planning of PIP care including support surfaces (National Pressure Ulcer Advisory Panel et al., 2014). Alternatively, nurses may be deciding participants did not require support surfaces; hence the non-implementation of this intervention. This may explain the study findings however, the participants in the sample had reduced mobility, a known PI risk factor.

Second, the study participants identified at PI risk were three times more likely to receive support surfaces compared to those not identified at risk (Latimer, Gillespie, et al., 2015). These findings are consistent with previous studies (Bergstrom et al., 1996; Perneger et al., 1998). Yet others report opposite findings: that at-risk patients are less likely to receive support surfaces (Bredesen et al., 2015; Gunningberg, Hommel, et al., 2012; Hoviatatlab et al., 2015; Lyder et al., 2001; McInnes et al., 2013; Vanderwee et al., 2008). Nurses’ ability to access support surfaces for these at-risk patients may explain the study findings.

The appropriate use of support surfaces is planned and implemented by nurses (M. Leach, 2008). Nurses’ ability to implement care is dependent upon their access to the necessary resources (Baumgarten et al., 2010). A notable finding from this current study was nurses implemented support surfaces that formed part of the patient’s planned care (Latimer, Gillespie, et al., 2015), with timely access to support surfaces (Baumgarten et al., 2010) most likely explaining the results.

Nurses consider numerous PI risk factors when planning PIP strategies such as the use of support surfaces (McInnes et al., 2015; National Pressure Ulcer Advisory Panel et al., 2014). Finally, this study found as the patient’s mobility reduced, there was a 6% increase in the implementation of support surfaces (Latimer, Gillespie, et al., 2015). This indicates patients were receiving support surfaces based on the care planned by nurses. Despite the volume of published literature on PIP, more research is needed to compare the effectiveness of the available support surfaces (McInnes et al., 2015), and to gain a better understanding of nurses’ use of this strategy.

7.3.3 Regular repositioning

Regular repositioning forms part of the CPG (National Pressure Ulcer Advisory Panel et al., 2014) and is considered the cornerstone of PIP care (Moore & Cowman, 2012). However, consensus is lacking on how to implement this strategy, in terms of the frequency and the tilt of repositioning (Gillespie, Chaboyer, McInnes, et al., 2014;
Källman, Bergstrand, et al., 2015; Miles, Nowicki, et al., 2013; Moore et al., 2011). In this study, repositioning was the most frequently implemented PIP strategy, with 89% of participants regularly repositioned (Latimer, Chaboyer, & Gillespie, 2015). Others have previously reported similar findings (Gunningberg, 2005; Sharp et al., 2000; Vanderwee, Grypdonck, et al., 2007). Despite their reduced mobility, many of the study participants could independently change their body position in bed, a possible explanation for study results. Furthermore, many nurses can easily reposition patients with either minimal assistance or the use of manual handling equipment, which might also account for the study results.

Hospitalised patients spend most of their time in bed or sitting in a chair (Kuys et al., 2012; Mudge et al., 2016; West & Bernhardt, 2012), however little is known about their repositioning patterns (Chaboyer et al., 2013; Kuys et al., 2012). Study participants changed their body position approximately once every 1.7 hours over a 24 hour period (Latimer, Chaboyer, et al., 2015), with similar patterns also reported (Chaboyer et al., 2013; McInnes et al., 2013). These changes in participant body positions were achieved independently, with nursing assistance, or through the use of equipment such as walking aids (Latimer, Chaboyer, et al., 2015); explaining the current study findings. A recent study also reported some patients spontaneously reposition themselves (Källman, Bergstrand, et al., 2015). When planning PIP care, nurses should consider the patient’s ability to assist with regular repositioning and educating them in effective implementation.

The patient’s body position needs to be considered when implementing regular repositioning (National Pressure Ulcer Advisory Panel et al., 2014). During the course of a day, patients adopt a range of body positions including sitting, walking, lateral, supine, and various degrees of head of bed elevation (HOBE) (McInnes et al., 2013). Current CPG recommend that patients avoid prolonged HOBE of 30° or greater (National Pressure Ulcer Advisory Panel et al., 2014) because this position increases the pressure and friction load on the buttocks and sacrum, raising the risk of PI (McInnes et al., 2013; M. Wilson, 2008). Regardless of the time of day, almost 10% of participant observations found they adopted a HOBE of 46-90°; increasing their PI risk. Two recent studies reported similar findings (Chaboyer et al., 2013; McInnes et al., 2013). As previously mentioned, many study participants changed their body position independently, which might also explain these findings. Nurses might also have limited awareness of the increased tissue pressure resulting from a HOBE of 30° or greater, and consequently might not encourage patients to adopt more favourable positions.
Källman, Engström, et al., 2015). Furthermore, some of the study participants had acute and chronic respiratory and cardiac conditions, so it is possible that nurses advised them to adopt a HOBEd of 30° or as part of their nursing care or comfort (Hiner, Kasuya, Cottingham, & Whitney, 2010).

A perhaps expected finding from this current study, participants were repositioned less frequently at night compared to the day and afternoon shift (Latimer, Chaboyer, et al., 2015). There are fewer staff at night because of the reduced hospital activities such as surgery, and it is a time when most patients sleep. For patients who are at PI risk, providing less frequent repositioning at night increases their vulnerability for PI (Peterson et al., 2013). Developing an individualised regular repositioning plan could be a way to ensure this care continues at night.

Increased patient age is a risk factor for PI (Lyder, 2003; Worsley et al., 2016). Globally, the trend of increasing age across populations is evident, especially those aged 85 years and older (World Health Organization, 2006). Often noted in this patient group is the requisite for complex medical and nursing care (Milton-Wildey & O’Brien, 2010). This study found that as participant age increased, the frequency of repositioning decreased; a new research finding. Age is a non-modifiable factor, and coupled with the participants’ reduced mobility, makes this finding concerning. The participants in this study were acutely ill, with nurses delivering complex nursing care that was often time-consuming (Langemo, Anderson, & Volden, 2003; Stausberg et al., 2010). These busy nursing workloads could explain why some of the participants were repositioned less frequently. One study also found patient repositioning was less likely to be implemented when there were nursing staff shortages (Sving et al., 2014); another possible explanation of the current study results. Finally, nurses’ attitude toward older patients and PIP varies, with reports that some nurses are indifferent or inattentive in the care they provide to this patient group (Demarré et al., 2012; Milton-Wildey & O’Brien, 2010).

Gender differences in healthcare areas have been previously reported (Foss, 2002; Latimer, Chaboyer, & Hall, 2011; Poisson, Johnston, Sidney, Klingman, & Nguyen-Huynh, 2010). A number of studies have found female patients receive less medical (Poisson et al., 2010) and nursing care (Foss, 2002; Latimer et al., 2011) compared to male patients. In contrast, this study found gender was a predictor of the implementation of regular repositioning, with females repositioned more frequently than males. Some researchers report female patients were more willing to express negative feelings and to identify their unmet care concerns compared to males (Sanson-
Fisher et al., 2000; Street, Gordon, Ward, Krupat, & Kravitz, 2005), prompting nurses to implement care. This may explain the study results.

7.3.4 Patient education

PIP education is a prevention strategy recommended for all patients regardless of their PI risk (National Pressure Ulcer Advisory Panel et al., 2014). Patients want PIP education and identify nurses as the appropriate healthcare professional to deliver it (Gorecki et al., 2009; Hartigan et al., 2012; Latimer et al., 2014; McInnes et al., 2013). Many patients come to hospital with some PI and PIP knowledge (Latimer et al., 2014; McInnes et al., 2014; Roberts et al., 2014); a valuable foundation for nurses to build on when delivering patient education (Latimer et al., 2014). Only a few participants in this current study had documented evidence of PIP education (11%); supporting the findings of others that patient PIP education is lacking (Clarke et al., 2005; Demarré et al., 2012; McInnes et al., 2013). Some researchers have found nurses lack the knowledge and confidence to educate patients about PIP (Demarré et al., 2012; Ilesanmi & Olabisi, 2014; Moore & Price, 2004). One study reported 67% of nurses did not have any formal PIP education (Moore & Price, 2004), which could reduce their confidence to educate patients about PIP. Encouragingly, participants in this current study who were identified at PI risk were almost four-times more likely to receive PIP education from nurses, compared to those not identified at PI risk (Latimer, Gillespie, et al., 2015). This is a new research finding not previously reported, and demonstrates nurses’ willingness to deliver PIP education (O’Brien, 2009), providing patients with the opportunity to increase their knowledge.

To summarise, the findings of the quantitative phase provide a contemporary understanding of PIP practices in hospitalised adult patients with reduced mobility at two Australian hospitals. The new knowledge generated by this study provides a foundation for nurses and researchers to use in the future development of prevention strategies to address HAPI. The qualitative study phase contains descriptions of participants’ current and future role in PIP participation, discussed under the theme of participating in care.

7.4 Participating in care

Patient participation is more than patients undertaking their care tasks. Patient participation is a dynamic process occurring in all phases of care, involves nurse-patient communication, decision making and cognitive engagement, and can change over time (Cahill, 1996; Sahlsten et al., 2008; Tutton, 2005). Three categories emerged from the
analysis of the qualitative data: experiencing PI, participating in PIP, and resourcing PIP and treatment (Latimer et al., 2014). In this current study, most participants wanted to be involved in their PIP care; however, they identified facilitators and inhibitors to their participation. The qualitative findings are discussed under the sub-headings of facilitating participation and hindering participation.

### 7.4.1 Facilitating participation

Patient participation is complex, and involves a number of stakeholders including the patient, nurse and healthcare organisation (Eldh et al., 2006; Levinson et al., 2005). This current study found a number of facilitators of participation including participant willingness, level of PIP knowledge, prior PI experience, nurse-patient relationship and organisational support. Patient willingness to participate can change over time (Tutton, 2005), for example if the patient’s poor health status reduces their ability to physically or emotionally engage in their care (McGinnis et al., 2015). While most study participants wanted to be actively involved in their care, a few mainly older patients preferred not to engage. Some older participants might believe their PIP knowledge was insufficient to make care decisions, leaving this to the healthcare professionals (Hartigan et al., 2012). Some patients may prefer to be passive in their care (Deber, Kraetschmer, Urowitz, & Sharpe, 2007) due to factors such as tiredness (Timonen & Sihvonen, 2000). One study found some patients want autonomy over their care (Deber et al., 2007), while another reported the refusal of care was considered as a form of active participation (Lindström et al., 2006).

The interview participants in this study came to hospital with some PI and PIP knowledge; a similar finding in other studies (Hartigan et al., 2012; McInnes et al., 2014; Roberts et al., 2014). They obtained their PIP knowledge in two ways: first-hand experience of a PI, or vicariously through the experiences of family members with a PI. This is a new finding not previously reported, highlighting patients gather information from a variety of sources. Participants with a good understanding of PI were often confident and active in their PIP care. Nurses can facilitate patient participation in their care by assessing the patient’s PIP knowledge and providing ongoing education (Cahill, 1996; National Pressure Ulcer Advisory Panel et al., 2014; Sahlsten et al., 2008).

Some study participants had previous PI, describing long-lasting, negative emotions and memories associated with these experiences, a new research finding not previously reported. A number of older participants in this study explained how they developed PI during their hospitalisation as children; some 50 years earlier. For these participants, touching or viewing their PI scars brought back vivid memories of this
hospitalisation and the associated physical and emotional pain. In addition, some expressed feelings of anger because having a PI as a child increased their hospital stay; stopping them from going home to their parents and family. As adults, these experiences motivated them to participate in their PIP (Cahill, 1996; Fox, 2002; Sahlsten et al., 2008), allowing them to gain some control of their care (Eldh et al., 2004).

The nurse-patient relationship (Cahill, 1996; Sahlsten et al., 2008) can facilitate the patient’s willingness to participate in their care (Eldh et al., 2004; Tobiano, Bucknall, et al., 2015b). Participants in this study, who described their relationship with nurses as positive and collaborative, were also engaged in their care. Proactive patients are reported to experience increased interactions with nurses, providing opportunities for participation (Weingart et al., 2011). Participants stated positive communication and interaction with nurses often facilitated their access to PIP resources thus increasing their participation. This notion is identified elsewhere (Cahill, 1996; Henderson, 2002; Sahlsten et al., 2008; Tobiano, Marshall, et al., 2015). Mutual respect and trust most likely underpins the positive relationship participants described; characteristics reported elsewhere (Eldh et al., 2004; Tutton, 2005). Power sharing is another attribute of a good nurse-patient relationship and a requirement of patient participation (Cahill, 1996; Sahlsten et al., 2008). A number of the interview participants who experienced respect, trust and power sharing with nurses also expressed greater satisfaction with their care and an increased willingness to participate in their care. Generally, patients rely on nurses for their care (Milton-Wildey & O’Brien, 2010), hence nurses with a positive attitude toward patient participation are more likely to engage patients in their care (Tobiano, Marshall, et al., 2015). The study participants reported varied access to PIP resources. Timely access to nurses and PIP resources were identified as facilitators to participants’ willingness and ability to participate in their care.

7.4.2 Hindering participation

Several factors were identified that hindered patient participation in PIP. Study participants with poor PIP knowledge described their care role as passive, and wanted nurses to make care decisions for them. Greater knowledge can increase patients’ confidence and willingness to participate in their care (Sahlsten et al., 2009; Tutton, 2005; Wellard et al., 2003). Many interview participants indicated they did not receive PIP education from nurses, a possible hindrance to participation. Providing patients with PIP information could increase their knowledge, and possibly influence their behaviour and attitude toward participating in their care (Eldh et al., 2004; Gillespie, Chaboyer,
Sykes, et al., 2014; Hartigan et al., 2012; McKenna & Scott, 2007). For example, one study found older patients became active participants in their care following nursing PIP education (Hartigan et al., 2012).

Poor timing in the delivery of patient education has the potential to hinder patient participation (Gunningberg, Hommel, et al., 2012; National Pressure Ulcer Advisory Panel et al., 2014). Participants in this study wanted PIP education from nurses soon after hospital admission, indicating this might have encouraged them to engage in PIP strategies. A disconnect between nurses’ perceptions of patient’s PIP knowledge and their actual knowledge (Timonen & Sihvonen, 2000) might explain this deficit in education delivery. Low levels of health literacy exist, with many patients lacking the knowledge and skills to understand healthcare information and make informed care decisions (Australian Commission on Safety and Quality in Health Care, 2013). Health literacy can be improved through patient education, which can positively affect patient behaviour changes such as increased participation in their care (Sahlsten et al., 2008; Tutton, 2005).

Some suggest patients want to develop partnerships with nurses, rather than just contributing to decision making (Ekdh et al., 2004; Ekdh et al., 2010; Moyle et al., 2015; Tobiano, Marshall, et al., 2015; Tutton, 2005). Interview participants who described having limited nurse-patient interactions, indicated they did not feel like partners in their care; an important aspect of participation (Moyle et al., 2015). Nurses need to be aware of patients’ perception of their behaviour and make conscious decisions to engage them in their care.

Reduced access to the organisations PIP resources hindered the interview participants’ engagement with their PIP care; a factor acknowledged by others (Beitz, 2011; Bredesen et al., 2015; Moore et al., 2013b; Tutton, 2005). Participants with good PIP knowledge, who were unable to access PIP resources such as support surfaces, became angry and frustrated at the nurse and organisation. Patient participation occurs in the “context of care giving” (Tutton, 2005, p. 148), so access to PIP resources provides nurses with opportunities to encourage patients to participate in their care.

There are suggestions some nurses assign a lower priority to PIP care compared to other nursing activities such as intravenous medications (Bours et al., 2002; O’Brien, 2009); a cue some patients could be sensitive to (Timonen & Sihvonen, 2000). Ensuring nurses’ have timely access to PIP resources is one way organisations can demonstrate the value of PIP care (Beitz, 2011; Moore et al., 2013b), and possibly improve patient participation.
A number of new research findings have been uncovered in the quantitative and qualitative phases of this current study. These new findings, and other results have been discussed in the context of the current literature. A meta-synthesis of the quantitative and qualitative findings resulted in the development of a preliminary conceptual model on patient participation in PIP care. The following section, *partnering with patients*, will discuss this model.

### 7.5 Partnering with patients

Following a meta-synthesis of the quantitative and qualitative data gathered in this study, a patient participation in PIP conceptual model was developed (Chapter Six); the first of its kind, to the best of my knowledge. Nursing conceptual models are relevant for current nursing practice. They can provide a framework for nursing standards, and be used to develop practice-theory or to contribute to policy development (Fawcett, 2000; Moyle et al., 2015; F. Murphy, Williams, & Pridmore, 2009). This section focuses on how the proposed model promotes the concept of patient participation in PIP care.

The model concepts highlight the elements required to engage patients in their care. The eight propositions guide clinical practice by outlining the essential nursing actions to achieve the outcome of patient participation in PIP. The delivery of PIP care is complex, with strategies implemented during the phases of assessment, planning, implementation and evaluation (National Pressure Ulcer Advisory Panel et al., 2014).

The conceptual model proposed by this current study specifically addresses an aspect of nursing practice: patient participation in PIP (Cahill, 1996; Sahlsten et al., 2008). This is important for several reasons. First, the model identifies and acknowledges the impact that patient characteristics and organisational resources have on patient participation in PIP care (Cahill, 1996; Sahlsten et al., 2008). These factors either facilitate or hinder patient participation, so acknowledging them can increase nurses’ awareness, potentially triggering PIP care adjustments. Second, for many patients, PIP care is a passive experience (Latimer et al., 2014). Finding ways to engage patients could increase the implementation of PIP strategies, and possibly reduce PI incidence. Third, the model considers the complex and interdependent aspects of PIP care, and highlights the multiple opportunities nurses have to engage patient’s in their care. Finally, this model highlights the often indelible and enduring life-long patient experience of PI, which can influence their willingness to engage in their PIP care ranging from participation to disengagement (Latimer et al., 2014).
For nurses to use this proposed conceptual model to engage patients in PIP strategies, the nurse-patient relationship and patient characteristics need to be considered collectively and not in isolation. The proposed model encourages patient participation in PIP by: 1) positioning the patient and nurse at its centre; 2) taking into account patient, nurse and organisational factors; and 3) acknowledging the continuum of PIP care occurs across assessment, planning, implementation and evaluation. These three factors will now be discussed in further detail.

First, patient-centred care is an approach to care that aims to improve the quality and safety of healthcare by placing the patient at the core of all activities (Australian Commission on Safety and Quality in Health Care, 2010). Patient participation, a key concept of patient-centred care (Kitson et al., 2013; Longtin et al., 2010), aims to achieve improved quality and safety in healthcare through increased patient involvement in their care (Australian Commission on Safety and Quality in Health Care, 2010; Vaismoradi et al., 2015). Current patient participation models are broad and tend to focus on the nurse’s role in this approach to care (Cahill, 1996; Sahlsten et al., 2008). The patient participation in PIP model contained in this study acknowledges two key stakeholders: the patient and nurse, situating them at its centre. Patient characteristics such as willingness, PIP education, and age can facilitate or hinder patients’ participation in their prevention care. Pivotal is the quality of the nurse-patient relationship, which determines how patient participation is enacted. Mutual respectful communication and trust underpins this relationship (Eldh et al., 2010; Sahlsten et al., 2008; Tutton, 2005). A breakdown in this relationship does not mean patient participation will cease, rather the level of participation may change, and the benefits may not be fully realised.

Second, the model considers the influence of some patient, nurse and organisational factors. Like most nursing activities, patient participation in PIP care is complex, and involves numerous stakeholders. The conceptual model also acknowledges the stakeholders of the patient, nurse and organisational factors affect patients’ ability to participate in their PIP care. A deficit in these areas, for example, limited access to PIP resources, will most likely see patient participation hindered or curtailed. Patient factors such as ill-health, poor health literacy and tiredness can also reduce patient participation (Timonen & Sihvonen, 2000). Nursing factors such as poor PIP knowledge or attitude can significantly influence their engagement with PIP strategies and how they invite patients to participate in PIP (Charles & DeMaio, 1993; Jewell, 1994; Tutton, 2005). Organisational factors such as culture, leadership, the
procurement of resources and ongoing nursing education signifies the value of PIP care (Cahill, 1996; Moore & Price, 2004; Sahlsten et al., 2008; Vaismoradi et al., 2015). Together, the three stakeholders ultimately decide how and to what degree patient participation in PIP care will be implemented. The influence of one or two stakeholders (e.g. organisation) can derail the entire patient participation process. However, with collaborative commitment from more than one of these parties, the patient participation process can be potentiated. Lastly, when nurses make reasonable adjustments to the implementation of PIP care, this demonstrates how they value the patient and the PIP care they are delivering.

Finally, this model takes into account that the delivery of PIP care occurs across the assessment, planning, implementation and evaluation continuum of care (National Pressure Ulcer Advisory Panel et al., 2014). Involving patients in their PIP care requires early engagement during the assessment phase. During all phases, nurses have the opportunity to partner with patients, develop a collaborative relationship (Cahill, 1996; Sahlsten et al., 2008), invite them to participate (Charles & DeMaio, 1993; Jewell, 1994; Tutton, 2005) and identify the benefits of this approach to PIP care (Cahill, 1996; Sahlsten et al., 2008). Engaging patients in their care during the assessment and planning phase is vital (Tobiano, Marshall, et al., 2015). The assessment phase is the optimal time to engage patients in their care (Tobiano, Marshall, et al., 2015) however, nurses should be mindful to invite patients to participate in their PIP care at any point.

### 7.6 Patient participation conceptual models

A few general models of patient participation exist. The current study findings resulted in the development of a conceptual model for patient participation in PIP. A comparison of the proposed model from this study with two other patient participation models (Cahill, 1996; Sahlsten et al., 2008) is presented. First, an overview of the Cahill (1996) and Sahlsten et al. (2008) conceptual models is provided. Similarities, differences, and perceived strengths and weaknesses between these models and the one presented in this thesis are highlighted.

Limited conceptual analyses of patient participation are published, with Cahill (1996) and Sahlsten et al. (2008) the exceptions. These conceptual models broadly identify and define patient participation characteristics in the general context of nursing practice, focussing on the nurses’ role (Cahill, 1996; Sahlsten et al., 2008). The conceptual model proposed by this current study is specific, it outlines and defines the propositions that increase patient participation in PIP care.
Cahill (1996) identified five defining attributes of patient participation. These are:

1. A relationship must exist;
2. Narrowing of the knowledge gap between nurses and patients;
3. Surrendering of an element of power and control by nurses;
4. Engaging in intellectual or physical activities during care; and
5. Positive benefit associated with the engagement of the intellectual or physical activities during care.

Sahlsten et al. (2008) later updated Cahill’s (1996) concept of patient participation using literature published from 1996-2005. They suggest four defining patient participation attributes. These attributes are the same as those suggested by Cahill (1996), with the exception of the existence of a positive benefit (number 5).

The attributes of patient participation outlined by Cahill (1996) and Sahlsten et al. (2008) do not collectively acknowledge the complex nature of patient participation and the difficulties faced in its application to clinical practice areas (Tobiano, Marshall, et al., 2015). Furthermore, the generalisation of these attributes means nuances reflected in specific patient care areas, such as PIP, are not represented. For example, patient PIP education is more than sharing information to narrow the knowledge gap. Effective patient education is an intellectual care activity that is reliant on the existence of a relationship between the nurse and patient, involves a shift of power and control from the nurse to the patient, and can have positive benefits for those involved. This example demonstrates the complexities associated with both patient participation and PIP care. Accessing resources is not acknowledged as an attribute by either Cahill (1996) or Sahlsten et al. (2008), yet this current study found this was a significant enabler or inhibitor in patient participation, and would be applicable to all contexts of care. Nurses’ access to PIP resources largely determines their ability to implement these strategies (Chou et al., 2013). Developing a patient participation model for a specific area of care such as PIP is beneficial because the unique aspects of the care area are incorporated. Such a model can also be used to inform the thinking around improving the implementation of strategies (Gunningberg, Hommel, et al., 2012), and to increase patient engagement in PIP participation in clinical practice.
7.7 Limitations

This study has made significant contributions to the body of knowledge of planned and implemented PIP strategies, their predictors, and patient perceptions of their role in PIP. As with any study, limitations are acknowledged.

In the quantitative phase, data were collected using chart audits and semi-structured observations. The accuracy and completeness of the information contained within the audited patient charts will affect the study results. Due diligence was enacted during the audit to carefully extract all appropriate data. Another researcher engaged in the study checked any confusing chart information. Likewise, observational data can be inaccurate due to factors such as observer bias. To minimise this, researcher observations occurred at a distance (i.e. standing outside of the room), reducing participant awareness of being observed. The study results relate to a sample of medical adult hospital patients with reduced mobility, so generalisability to other patient groups is not appropriate.

Quantitative data were collected from the PI risk assessment tools, with different risk assessments implemented at both hospitals (Waterlow risk assessment tool vs. clinical judgement). This study reported the under-utilisation of these tools. This study collected data on a number of recommended PIP strategies, and not others such as nutrition, so the study results only relate to the strategies examined. Several predictors of PIP strategy use were identified, however there may be other predictors that were not identified. These issues need to be considered when interpreting the study results. Finally, while the 24-hour observations provided only one snapshot in the participants’ hospital admission, the robust randomisation process and large sample size minimised this limitation.

The qualitative phase of the study collected data on participant perceptions of their role in PIP. While the study findings relate to the healthcare context from which they were gathered, reducing their generalisability (Taylor et al., 2006), the understandings that emerged may be applicable on a conceptual level. Purposive participant sampling ensures a range of opinions were captured, increasing the findings transferability (Andrew & Halcomb, 2009). Through semi-structured interviews the researchers invite participants to expand on their thoughts and feelings, thus gathering richer data (Taylor et al., 2006). During the interviews, participants may try to give the ‘right answer’ to questions, rather than expressing their thoughts and feelings. To minimise this, prior to each interview participants were informed there were no ‘right or wrong’ answers to the questions, and their perceptions were valued. Finally, more
female participants were interviewed than were males, which could result in an imbalanced representation of views. These issues need to be considered when interpreting the study findings.

There are some limitations related to the lack of consensus in definitions that underpin the conceptual model. The lack of agreed definitions of the concept of patient participation was a limitation when developing this conceptual model. A lack of consensus on the meaning of clinical practice concepts can result in a misuse of terms, and difficulties comparing research outputs (Hamric, Spross, & Hanson, 2005). For the proposed conceptual model in this current study, the definition of patient participation was based on the work of Cahill (1996) and Sahlsten et al. (2008). While every effort has been made to ensure the most recent literature on patient participation and pressure injury prevention was represented in this model, the speed and volume at which research is contemporaneously published, means omissions in the inclusion of some current evidence may occur (Hamric et al., 2005). This not only demonstrates the ongoing cascade of knowledge development, but the difficulties of a single conceptual model encompassing all aspects of a single phenomenon. Finally, as a novice model designer and theorist, I designed the proposed conceptual model under the guidance of my PhD supervisors who are experienced researchers.

7.8 Recommendations

Based on the study findings including the proposed conceptual model, recommendations are suggested for clinical practice, education, future research and organisational policy. Many of these recommendations are interdependent (e.g. clinical practice and nurse/patient education), reflecting the complex nature of PIP and patient participation.

7.8.1 Clinical practice

Nurses at the research sites used the Waterlow risk assessment tool or clinical judgement to assess patient PI risk however, this not always completed. Varied completion rates are reported nationally and internationally regardless of the assessment approach (Barker et al., 2013; Gunningberg, Donaldson, et al., 2012; McInnes et al., 2013). While the standardisation of PIP strategies and documentation has been recommended by others (Coyer et al., 2015; Sullivan & Schoelles, 2013; Tayyib et al., 2015b), more work is required to determine the effectiveness of these risk assessment practices (Fulbrook & Anderson, 2016; Moore & Cowman, 2014). This study recommends that clinicians and managers determine the most appropriate tool for use in
each clinical context. Through nursing leadership, this approach will improve the uptake of risk assessment practices (Yap & Kennerly, 2011). For this to succeed, ongoing nurse education and a change management process (H. Leach, 2006; Yap & Kennerly, 2011) is needed.

Many patients expressed a desire to participate in decision-making and their PIP care (Latimer et al., 2014). It is recommended that nurses identify and document patients’ PIP knowledge and care preferences during the hospital admission and assessment process. This information should be used to develop an individualised patient participation in PIP plan (Lindberg, Kreuter, Taft, & Person, 2013). This will benefit nurses and patients by prompting a targeted nurse-patient conversation that establishes the patient’s PIP knowledge, provides an opportunity for patient education, and increases continuity of patient care. This strategy requires support from clinicians and organisations, as well as ongoing nurse education.

Although a suite of strategies were available, repositioning was the cornerstone of PIP (Latimer, Chaboyer, et al., 2015). Individualised and targeted PIP strategies should be planned to meet the patient’s needs and preferences. Developing personalised PIP management plans in consultation with the patient is a way to achieve this. The selection of targeted PIP strategies might include the use of electronic repositioning sensors and reminders situated within the mattress of the bed.

This study identified a number of factors (age, gender, patient activity, identified at PI risk), some that are not modifiable, which predicted the implementation of various PIP strategies (Latimer, Gillespie, et al., 2015). It is recommended that nurses’ clinical handover reports include the patient’s PI risk, and the planned PIP strategies. Like falls and medication errors, PI are a nurse sensitive indicator, and a measure of quality care (Buerhaus & Needleman, 2000; Burston et al., 2014; Chaboyer, Johnson, Hardy, Gehrke, & Panuwatwanich, 2010). Including this information during handover raises nurses’ awareness of these predictors, demonstrates the importance of PIP care, and assists in maintaining the patient’s continuity of care. From this, nurses could commence a dialogue with the patient about making reasonable adjustments to their PIP care that encourages their participation. Recommendations for nursing and patient education will be made next.

7.8.2 Education

In this current study, nurses’ delivery of patient PIP education was low. Patients rely on nurses to educate them on a range of health issues. There are reports that formal
nurse education and training about PIP is low (Moore & Price, 2004; Porter-Armstrong et al., 2015), with some nurses lacking the confidence to deliver patient education (Demarre et al., 2012; Ilesanmi, Ofi, & Adejumo, 2012; Joseph & Davies Clifton, 2013). A recommendation from this study is that nurses complete an annual PI and PIP education package that also includes the patient PI experience and willingness to participate in their care (Latimer et al., 2014). Assigning continuing professional development (CPD) points for the completion of this package is a way of encouraging nurses’ engagement.

Increasing nurses’ awareness of patient participation in PIP, including the barriers and enablers (Sahlsten et al., 2009), is the first step in the implementation of this as a clinical practice strategy. Educating nurses about PIP in general and embedding reflective practice as an education strategy is a way for nurses to challenge their perceptions of this strategy (Wellard et al., 2003). Using reflection in health professional education helps the nurse to make meaning of complex situations (Mann, Gordon, & MacLeod, 2009). Strong nursing leadership and management support is needed to enact changes in organisational culture and nurses’ attitude toward PIP (Bours et al., 2002; Clarke et al., 2005; De Laat et al., 2006; Moore et al., 2013b).

All patients admitted to hospital, regardless of their PI risk, should receive PIP education (National Pressure Ulcer Advisory Panel et al., 2014) because it builds their content knowledge, health literacy and confidence to participate in their prevention care (Australian Commission on Safety and Quality in Health Care, 2013; Rudd, 2013). It is recommended that patients should have multiple opportunities to receive PIP education. First, nurses should deliver face-to-face patient PIP education because in addition to information sharing, opportunities for relationship building exist. Second, embracing technology through patients’ smartphones, hospital bedside iPads and/or televisions are ways nurses can educate patients. Nowadays most patients come to hospital with a smartphone, so it is recommended that organisations develop a free downloadable patient PIP application (app) as a way to increase their PI and PIP knowledge. The portability and accessibility of this app is likely to increase patient engagement (Boulos, Wheeler, Tavares, & Jones, 2011; California HealthCare Foundation, 2010). Third, nurses could use the app to support a face-to-face patient PIP education session. It is acknowledged, there may be restrictions associated with the development of an app in terms of cost, ongoing maintenance and ease of access to all patients. However, smartphone technology is increasingly being incorporated into contemporary healthcare, so we should seek opportunities to integrate this platform into patient care. Hospital beside
televisions are commonplace and are another way that patients could access a PIP education program developed by the organisation. Similar to the airline industry (Chang & Liao, 2009), organisations should develop PIP safety videos for patients to view on, or soon after, hospital admission. These videos should outline the risks of PI and appropriate prevention strategies. Preliminary findings of a recent study protocol involving a combination of technology-based patient education strategies and patient participation are promising, and could be one way in reducing HAPI (Chaboyer et al., 2015). Clinician and organisational support is required in the engagement, development and ongoing management of these technologies.

7.8.3 Future research

The proposed conceptual model of patient participation in PIP care is yet to be tested. The development of model cases (Sahlsten et al., 2008) or testing the propositions (Fawcett & Desanto-Madeya, 2013) is a way to achieve this. Testing the model in the clinical environment is recommended to assess its viability, while suggesting refinements (Fawcett & Desanto-Madeya, 2013). The data used in the development of this model was collected from adult patients in medical units, so testing the model in this population is the first logical step. Widespread consultation and feedback is required, as is nurse and patient education prior to testing.

Gaps in the implementation of PIP strategies for patients at risk of PI were identified in this study, but not the reasons why nurses did not implement this care. This is an area of recommended future research. A recent small, single site Australian study examined nurses’ perceived barriers and facilitators of implementing a bundle of PIP strategies (Chaboyer & Gillespie, 2014), however most research into nurses’ attitudes toward PIP has been conducted in Europe and the United Kingdom (Beeckman et al., 2011; Jankowski & Nadzam, 2011; Moore & Price, 2004; Pancorbo-Hidalgo et al., 2007). There are differences in nursing practices between countries in terms of nursing culture, education, hierarchy and healthcare context. Australian data is needed to understand these differences and thus inform the development of strategies that increase nurses’ uptake of PIP strategies.

Patient participation has many benefits such as reduced adverse events and increased patient satisfaction (Australian Commission on Safety and Quality in Health Care, 2010). More research into patient participation is recommended especially in terms of an agreed definition, and nurse and patient role statements (Cahill, 1996; Eldh et al., 2010; Longtin et al., 2010). Knowledge translation research is an effective way to bridge this theory-practice gap (Barker et al., 2013; Canadian Institute of Health
Research, 2015; Lang, Wyer, & Haynes, 2007), and could be a way to increase patient participation in PIP.

7.8.4 Policy and procedures

Access to PIP resources, both equipment and human, was a concern raised by many participants. For nurses to deliver quality PIP care they need timely access to PIP resources such as support surfaces, and assistance with patient repositioning. The efficient use of PIP resources is a responsibility of clinical leaders and managers. As organisations move to electronic medical and nursing record, it is recommended that PI risk assessments are conducted on-line (Chicano & Drolshagen, 2009). The outcome of the risk assessment, and the nurses’ planned PIP strategies would be entered into the electronic file, with an automated procurement and delivery of the resources to the clinical unit. Streamlining this process is a way to increase timely access to PIP resources, improve efficiencies in the use of PIP resources, and reduce gaps in practice.

7.9 Conclusions

PI are a safety and quality of care issue for patients, nurses and healthcare organisations. Despite increasing resources over the past decade, PI prevalence rates are not decreasing. The delivery of PIP care is complex and multi-faceted. CPG for PIP include the strategies of PI risk assessment, PIP management plan, support surfaces, regular repositioning, patient education, skin assessment and protection, continence management, and nutritional assessment and supplements. This study observed the PIP clinical practices implemented in adult hospitalised medical patients with reduced mobility. It also described patient perceptions of their current and future role in PIP. The new findings in this study advance the body of knowledge in the field of PIP and provide valuable insights into contemporary Australian healthcare PIP practices. They also offer a beginning understanding of patient perceptions of their role in PIP. Finally, the preliminary conceptual model presented in this study offers ways for nurses to engage patients to participate in their PIP care.

This study has highlighted nurses’ varied uptake of PIP strategies for participants with reduced mobility; with some positive findings and a number evidence practice gaps noted. If reductions in PI prevalence rates are to be achieved researchers, educators and managers need to find new ways to increase the implementation of PIP strategies. Raising nurses’ awareness of these PIP gaps is the first step in changing current clinical practices. Increasing nurses’ completion of patient PI risk assessment on admission to hospital might also trigger the implementation of PIP strategies.
Encouraging nurses to use a suite of PIP strategies, including support surfaces, regular repositioning and patient education, which target the patient needs is preferred to the current reliance on one or two strategies. Finally, this study found evidence of clinical ‘best-practice’, confirming some patients are receiving PIP care as recommended in the CPG.

A number of predictors of the implementation of PIP strategies emerged from this study. Two predictors, patients identified at PI risk, and female gender, increased the uptake of a PIP strategy, yet one predictor, patient age, resulted in the opposite. Some of these predictors are non-modifiable (age and gender), so increasing nurses’ awareness of these factors is important so they can recognise increased patient risk. The complex nature of PI means individualised PIP care is needed, and nurses are in the prime position to deliver it.

Involving patients in their PIP care is a plausible way to increase the implementation of PIP strategies and possibly reduce PI prevalence. This study found most patients want to participate in their PIP care. Opportunities exist for nurses to harness patients’ willingness to participate in their PIP care. This relies on the establishment of a collaborative nurse-patient relationship, and patients receiving adequate PIP education. However, nurses might not possess the knowledge and skills to engage patients in their PIP care.

Finally, the preliminary conceptual model of patient participation in PIP presents a way for nurses to engage patients in their PIP care. A major strength of the model is it places the patient and nurse at its core. The model acknowledges the influence of the nurse-patient relationship, patient characteristics, nurses’ planning and implementation of PIP strategies, and the healthcare organisations procurement of PIP resources. It also reflects the interplay of the three major stakeholders in the patient participation in PIP care: the patient, nurse and organisation. The varied care needs of patients mean a ‘one size fits all’ approach to PIP care delivery is inappropriate, with an individualised and targeted approach needed. Empowering nurses with a new approach that engages patients in their PIP care is one way to increase the implementation of PIP strategies and is a positive step toward reducing the incidence of PI.
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generic health-related quality of life measures. *Wound Repair and Regeneration, 17*(6), 797-805.


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Appendix A: Study Poster

Pressure Injury Prevention Research

Did you know:
- Pressure injuries are in the highest three reported incidents leading to patient harm in Queensland Health
- At least 80% of pressure injuries are preventable

What the research involves:
1. Patient observation: participants will be observed by researchers for a 24 hour period
2. Chart audits: researchers will collect information from patients’ chart from admission to observation period
3. Patient interviews: participants will be asked some informal questions around pressure injury prevention practices

About the researchers:
- Professor Wendy Chaboyer is the Director of Griffith University’s NHMRC Centre of Research Excellence in Nursing Interventions for Hospitalised Patients, and is the Principal Investigator for this study.
- Sharon Latimer (clinical nurse) is a PhD student at Griffith University, conducting this research as part of her PhD and will be collecting data at the ward level.
- Several research assistants (with clinical nursing backgrounds) will also be employed for data collection at the ward level.

Contact:
Sharon Latimer (PhD candidate, RN)
Ph: 338 21082
Mob: 0416 104 380
Email: s.latimer@griffith.edu.au
Appendix B: Participant Eligibility Screening Tool

Patient eligibility screening tool

Must answer YES to all of the below:

1. Length of stay ≥3 days
   No ☐  Yes ☐

2. Not being discharged within the next 24 hours
   No ☐  Yes ☐

3. Pt requiring assistance to ambulate or reposition:
   (Def: Pt requiring the use of any type of mobility aid, including equipment (eg. walking stick, wheelchair, hoist) and/or physical assistance [eg. staff assistance] to ambulate or reposition.)
   No ☐  Yes ☐

4. Age ≥18 years
   No ☐  Yes ☐

5. Patients who are cognitively intact
   No ☐  Yes ☐
Appendix C: Gold Coast Hospital Consent Form

GOLD COAST DISTRICT HEALTH SERVICE & GRIFFITH UNIVERSITY
CONSENT FORM FOR RESEARCH STUDIES

<table>
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<th>Project Title</th>
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</tr>
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</tr>
<tr>
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<td>Dr Ben Desbrow BSc, GradDipSc (Nut&amp;Diet), GradDipSc (HMS), MHSc (Human Nut), PhD</td>
</tr>
<tr>
<td></td>
<td>Mrs Sharon Latimer RN, BN, MN, MAP (Health Care Research), Grad Dip Learn&amp;Teach, JP(Qua)</td>
</tr>
<tr>
<td></td>
<td>Ms Shelley Roberts BHSc (Nutrition), MNutrition&amp;Dietetics</td>
</tr>
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</table>

Address
Griffith University
Centre of Research Excellence in Nursing (NCREN)
Gold Coast campus, Parklands Drive, Southport QLD 4222

Phone Number 55528518

1. You are invited to participate in the research project titled 'Understanding the patient’s role in the prevention of pressure injuries'. This research project will form part of two PhD theses being undertaken by Mrs Sharon Latimer and Ms Shelley Roberts who are students within the School of Nursing and Midwifery, and the School of Public Health, respectively, at Griffith University.

2. Background to the study

The aim of this study is to gain a better understanding of the patient’s role in pressure injury (PI) prevention, including areas such as repositioning, mobility, medications and nutrition. The data will be collected over the next 24 hours and will involve the following:

a) Observations (the researcher watching you and making note of your position)
b) Chart audit (the researcher gathering very specific information related to the study from your medical file)
c) Informal interview 10-15 minutes (about your perceptions of your role in the prevention of pressure injuries)
d) Activity monitor (a small device worn by you which documents your position every 5 minutes over the next 24 hours)

As outlined above, you may participate in a, b, & c without participating in d.

3. Data management

It is anticipated the data gathered from the four methods described above will allow us to better understand the patient factors involved in the prevention of pressure injuries. It is hoped this research will result in the implementation of clinical practices to further reduce the incidence of pressure injuries in hospitalised patients.
The information we will collect from you will remain confidential. There will be no identifying material on any of the audit tools or other data collection tools (tape recorder, activity monitor). During the data collection and data entry periods all data will be stored in a locked filing cabinet, in a locked office, within a locked building in the School of Nursing and Midwifery, Griffith University. Data entered into computer files will be stored in secure computers and password protected. At the completion of the required information storage period, all information will be destroyed.

The research team has determined there are minimal risks associated with this project. Your privacy and wishes are paramount and you are able to withdraw your consent at any time.

4. I acknowledge that I have read the above statement that explains the purpose, the method of data collection and the possible risks of the investigation, and the statement has been explained to me to my satisfaction. Before signing this document I have been given the opportunity to ask questions relating to any possible physical and psychological harm I might suffer as a result of my participation, and I have received satisfactory answers. I have also been informed that I may not receive any benefits from participating in this study.

5. I acknowledge I have been provided with a written Patient Information Sheet outlining the purpose, risks, benefits and anticipated outcomes of this study.

6. My decision whether or not to participate will not prejudice my future relations with the Gold Coast District Health Service. If I decide to participate, I am free to withdraw my consent and to discontinue participation at any time without prejudice.

7. I acknowledge I am able to choose to participate in phase one of the study (observation, chart audit and interview), without agreeing to participate in phase two of the study (wearing the Actigraph activity monitor).

8. I agree that research data gathered from the results of this study may be published provided my name is not used.

.................................................................
Date
Signature of Participant

9. I have fully explained to the participant .............................................................. the nature and purpose of the study and the procedures to be employed as described above and such risks as are involved in their performance, and I have provided the participant with a copy of a written Participant Information Sheet.

.................................................................
Date
Signature of Principal Investigator/Research Assistant

10. In the event that you have any further queries in relation to any aspect of this study or any other matter related to the study or should you wish to speak to someone during the conduct of the study, the person to contact is Dr. Brian Bell, Chair, GCDHS, District Ethics Committee, C/O Gold Coast Hospital. Phone (07) 5519 8010. Email: GCHEthics@health.qld.gov.au

11. This study has also been approved by the Griffith University Human Research Ethics Committee. In the event that you have any complaint about the way you have been treated during the study, or a query that the investigators have not been able to satisfy, you may contact the Manager, Research Ethics, Gold Coast campus, Room 3.60 Science, Engineering and Architecture (G39), Griffith Parklands Drive, Gold Coast campus, QLD 4222, Phone (07) 5552 7226, Email: research-ethics@griffith.edu.au
Appendix D: Royal Brisbane and Women’s Hospital Consent Form

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<td></td>
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2. Background to the study

   The aim of this study is to gain a better understanding of the patient's role in pressure injury (PI) prevention, including areas such as repositioning, mobility, medications and nutrition. The data will be collected over the next 24 hours and will involve the following:

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   It is anticipated the data gathered from the four methods described above will allow us to better understand the patient factors involved in the prevention of pressure injuries. It is hoped this research will result in the implementation of clinical practices to further reduce the incidence of pressure injuries in hospitalised patients.


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5. I acknowledge I have been provided with a written Patient Information Sheet outlining the purpose, risks, benefits and anticipated outcomes of this study.

6. My decision whether or not to participate will not prejudice my future relations with the Metro North District Health Service. If I decide to participate, I am free to withdraw my consent and to discontinue participation at any time without prejudice.

7. I acknowledge I am able to choose to participate in phase one of the study (observation, chart audit and interview), without agreeing to participate in phase two of the study (wearing the Actigraph activity monitor).

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10. In the event that you have any further queries in relation to any aspect of this study or any other matter related to the study or should you wish to speak to someone during the conduct of the study, the person to contact is Dr Conor J Ehrlich, Chair, Metro North HSD RBWH, District Ethics Committee, C/O Royal Brisbane and Women’s Hospital. Phone (07) 3636 5490, Email: RBWH-Ethics@health.qld.gov.au

11. This study has also been approved by the Griffith University Human Research Ethics Committee. In the event that you have any complaint about the way you have been treated during the study, or a query that the investigators have not been able to satisfy, you may contact the Manager, Dr Gary Allen, Research Ethics, Gold Coast campus, Room 3.55 Science, Engineering and Architecture (G39), Griffith Parklands Drive, Gold Coast campus, QLD 4222, Phone (07) 5552 7226, Email: research-ethics@griffith.edu.au
Appendix E: Gold Coast Hospital Plain Language Statement

GCH: Understanding the patient’s role in the prevention of pressure injury

Plain Language Statement: Patient Information Sheet

November 2011 to April 2012

Dear Participant

We are conducting a study looking at the patient’s role in the prevention of pressure injuries. The term ‘pressure injury’ is used to describe any area of local skin damage or prolonged redness that is usually caused by pressure, a shearing force or both. You may be more familiar with the term ‘pressure ulcer’. The impact of pressure injuries for patients include pain, a risk of infection, and longer hospital stay.

This study has four components. The chart below outlines each component and your involvement:

<table>
<thead>
<tr>
<th>Component</th>
<th>What data is gathered?</th>
<th>What do I need to do?</th>
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</thead>
<tbody>
<tr>
<td>Observation</td>
<td>24 hour intermittent observation of your activities related to pressure injury prevention practices (mobility, bed movement, use of equipment)</td>
<td>Continue your usual activities</td>
</tr>
<tr>
<td>Chart audit</td>
<td>A standardised chart audit form will collect information from your medical file about your demographics (age, gender), diagnosis, baseline observations, co-morbidities, mobility status, medications, history of pressure injury, evidence skin assessment and nutritional assessment</td>
<td>You do not need to do anything</td>
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<td>Informal interview</td>
<td>A the completion of the 24 hour observation/monitoring study you will be asked a series of standardised questions by our researcher. Questions will include ‘How do you feel when you are woken at night to be turned in bed?’; ‘Do you comply with the nursing staff pressure injury prevention measures?’</td>
<td>Informal 10-15 minute interview with one of our researchers</td>
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<tr>
<td>Activity monitor</td>
<td>A 24 hour monitoring device. The monitor will record your position every 5 minutes</td>
<td>Wear a small monitor on your chest</td>
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When the research project is completed, a copy of the final report will be available on request. Participants will not be able to gain their individual results because the information will be de-identified. Results of the project will be published in Australian and international academic journals, and presented at conferences and seminars. The project findings will also be reported back to the Queensland Health and Griffith University ethics committees, as well as the executive committee of this organisation.

We can be contacted if you have any queries about the study, and you have the right to withdraw your participation from this study at any time. We would like to take this opportunity to thank you for your time and support for this study.

In the event that you have any further queries in relation to any aspect of this study or any other matter related to the study or should you wish to speak to someone during the conduct of the study, the person to contact is Dr. Brian Bell, Chair, GCDHS, District Ethics Committee, C/O Gold Coast Hospital. Phone (07) 5519 8010, Email: GCHEthics@health.qld.gov.au
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Any complaint made will be treated in confidence, investigated fully and the participant informed of the outcome.

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Dr Brigid Gillespie – Senior Research Fellow Centre of Research Excellence in Nursing (NCREN), Griffith University, Gold Coast campus, Parkland Drive, Southport Qld, 4222. Ph: 55528518 Email: b.gillespie@griffith.edu.au

Dr Ben Desbrow – Senior Lecturer School of Public Health, Griffith University, Gold Coast campus, Parkland Drive, Southport Qld, 4222. Ph: 55528518 Email: b.desbrow@griffith.edu.au

Sharon Latimer – PhD student School of Nursing and Midwifery, Logan Campus, Meadowbrook, Qld 4131 Ph: 55528518 Email: s.latimer@griffith.edu.au

Shelley Roberts – PhD student School of Public Health, Gold Coast Campus, Parkland Drive, Southport, Qld 4222 Ph: 55528518 Email: shelley.roberts@griffithuni.edu.au
Appendix F: Royal Brisbane and Women’s Hospital Plain Language Statement

RBWH: Understanding the patient’s role in the prevention of pressure injury

Plain Language Statement: Patient Information Sheet

November 2011 to April 2012

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Appendix G: Data Collection Schedule

Gold Coast Hospital and Royal Brisbane and Women's Hospital Randomised data collection schedule

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Monday 28/11</th>
<th>Tuesday 29/11</th>
<th>Wednesday 30/11</th>
<th>1/12</th>
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</table>

<table>
<thead>
<tr>
<th>Week 2</th>
<th>Monday 5/12</th>
<th>Tuesday 6/12</th>
<th>Wednesday 7/12</th>
<th>Thursday 8/12</th>
<th>Friday 9/12</th>
<th>Saturday 10/12</th>
<th>Sunday 11/12</th>
</tr>
</thead>
<tbody>
<tr>
<td>0700 – 1500</td>
<td>Ward 1 (38) (GCH)</td>
<td></td>
<td>Ward 2 (BA) (GCH)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500 – 2300</td>
<td>Ward 1 (38) (GCH)</td>
<td></td>
<td>Ward 2 (BA) (GCH)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2300 - 0700</td>
<td>Ward 1 (38) (GCH)</td>
<td></td>
<td>Ward 2 (BA) (GCH)</td>
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<table>
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<tr>
<th>Week 3</th>
<th>Monday 12/12</th>
<th>Tuesday 13/12</th>
<th>Wednesday 14/12</th>
<th>Thursday 15/12</th>
<th>Friday 16/12</th>
<th>Saturday 17/12</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Week 4</th>
<th>Monday 19/12</th>
<th>Tuesday 20/12</th>
<th>Wednesday 21/12</th>
<th>Thursday 22/12</th>
<th>Friday 23/12</th>
<th>Saturday 24/12</th>
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</thead>
<tbody>
<tr>
<td>0700 – 1500</td>
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<td>Ward 1 (38) (GCH)</td>
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<tr>
<td>1500 – 2300</td>
<td>Ward 2 (BA) (GCH)</td>
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<td>Ward 1 (38) (GCH)</td>
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<td></td>
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<tr>
<td>2300 - 0700</td>
<td>Ward 2 (BA) (GCH)</td>
<td></td>
<td>Ward 1 (38) (GCH)</td>
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<tr>
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<th>Saturday 14/1</th>
<th>Sunday 15/1</th>
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<tr>
<td>0700 – 1500</td>
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<td>RBWH Data Collection</td>
<td>RBWH Data Collection</td>
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<td>Ward 1 (38) (GCH)</td>
<td>Ward 2 (BA) (GCH)</td>
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<td>2300 - 0700</td>
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<td>Ward 1 (38) (GCH)</td>
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<tr>
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<tr>
<td>0700 - 1500</td>
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<td>Ward 2 BB North (RBWH)</td>
<td>Ward 1 BB South (RBWH)</td>
<td>Ward 2 BB North (RBWH)</td>
<td>GCH data collection</td>
<td>GCH data collection</td>
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<td>Ward 2 BB North (RBWH)</td>
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<td>Week 2</td>
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<tr>
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<td>2300 - 0700</td>
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<td>Thursday 26/1</td>
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<td>2300 - 0700</td>
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<td>Ward 2 BB North (RBWH)</td>
<td>Ward 1 BB South (RBWH)</td>
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<td>Week 4</td>
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<td>Wednesday 1/2</td>
<td>Thursday 2/2</td>
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<td>Ward 1 BB South (RBWH)</td>
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<tr>
<td>Week 5</td>
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<td>Wednesday 8/2</td>
<td>Thursday 9/2</td>
<td>Friday 10/2</td>
<td>Saturday 11/2</td>
<td>Sunday 12/2</td>
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<td>2300 - 0700</td>
<td>Ward 2 BB North (RBWH)</td>
<td>Ward 1 BB South (RBWH)</td>
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### Appendix H: Data Dictionary

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Source</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>The age of the patient at the point of admission</td>
<td>Patient medical chart: admission sheet</td>
<td>(European Pressure Ulcer Advisory Panel, 1998; Joanna Briggs Institute, 2008; National Pressure Ulcer Advisory Panel (NPUAP), 2007) (Queensland Health, 2009)</td>
</tr>
<tr>
<td>Admission diagnosis</td>
<td>The provisional diagnosis determined by the admitting medical officer</td>
<td>Patient medical chart: medical entry</td>
<td>(European Pressure Ulcer Advisory Panel, 1998; Joanna Briggs Institute, 2008; National Pressure Ulcer Advisory Panel (NPUAP), 2007) (Queensland Health, 2009)</td>
</tr>
<tr>
<td>Co-morbidities</td>
<td>Pre-existing medical conditions which may or may not contribute to the admission diagnosis</td>
<td>Patient medical chart: medical entry</td>
<td>(Queensland Health, 2009)</td>
</tr>
<tr>
<td>Source of admission</td>
<td>The location from which the patient was ‘housed’ immediately prior to their admission to the research ward</td>
<td>Patient medical chart: admission sheet</td>
<td>(Webster et al., 2011)</td>
</tr>
<tr>
<td>HLOS min 3 days</td>
<td>Patient must have had a minimum hospital stay of 3 days</td>
<td>Patient medical chart: admission sheet</td>
<td>(Australian Institute of Health and Welfare, 2009; Webster et al., 2011)</td>
</tr>
<tr>
<td>Admission type</td>
<td>Surgical: patient whose admission is for medical reasons</td>
<td>Patient medical chart: admission sheet, and BMI (or observation)</td>
<td>(European Pressure Ulcer Advisory Panel, 1998; Joanna Briggs Institute, 2008; National Pressure Ulcer Advisory Panel (NPUAP), 2007) (Queensland Health, 2009)</td>
</tr>
<tr>
<td></td>
<td>Surgical: patient whose admission is for surgical reasons</td>
<td>Patient medical chart: admission sheet, and BMI (or observation)</td>
<td>(European Pressure Ulcer Advisory Panel, 1998; Joanna Briggs Institute, 2008; National Pressure Ulcer Advisory Panel (NPUAP), 2007) (Queensland Health, 2009)</td>
</tr>
<tr>
<td></td>
<td>Rehabilitation: patient whose admission has been for rehabilitative purposes</td>
<td>Patient medical chart: admission sheet, and BMI (or observation)</td>
<td>(European Pressure Ulcer Advisory Panel, 1998; Joanna Briggs Institute, 2008; National Pressure Ulcer Advisory Panel (NPUAP), 2007) (Queensland Health, 2009)</td>
</tr>
<tr>
<td></td>
<td>Palliative: patient whose admission has been for palliation</td>
<td>Patient medical chart: admission sheet, and BMI (or observation)</td>
<td>(European Pressure Ulcer Advisory Panel, 1998; Joanna Briggs Institute, 2008; National Pressure Ulcer Advisory Panel (NPUAP), 2007) (Queensland Health, 2009)</td>
</tr>
<tr>
<td>Surgery during current admission</td>
<td>Minor or major surgery included</td>
<td>Patient medical chart: medical entry</td>
<td>(Webster et al., 2011)</td>
</tr>
<tr>
<td>Variable</td>
<td>Definition</td>
<td>Source</td>
<td>Reference</td>
</tr>
<tr>
<td>----------</td>
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</tr>
<tr>
<td>Number of days post surgery</td>
<td>If patient had an operative procedure during their current hospitalisation</td>
<td>Patient medical chart: medical entry</td>
<td>(Waterlow, 2003)</td>
</tr>
<tr>
<td>Reduced mobility</td>
<td>Any variation from ‘normal gait’ or activity</td>
<td>Patient medical chart: nursing care plan</td>
<td>(Moore &amp; Cowman, 2009; Moore, Cowman, &amp; Conroy, 2011; Warms, 2006)</td>
</tr>
<tr>
<td>Mobility status</td>
<td>Independent: no assistance from another person or aid, Staff assistance with all mobility, Transfer aid: use of a slide sheet/Hoist, Aid required: patient uses stick, wheeled walker, Supervision: pt requires a person to closely observe their mobility</td>
<td>Patient medical chart: nursing care plan</td>
<td>(Moore &amp; Cowman, 2009; Moore et al., 2011; Warms, 2006)</td>
</tr>
<tr>
<td>Co-morbidities documented</td>
<td>Pre-existing illness/es</td>
<td>Patient medical chart: medical entry</td>
<td></td>
</tr>
<tr>
<td>Previous history of pressure injury</td>
<td>Documented evidence of the presence of a stage 1, 2, 3, or 4 pressure injury previously</td>
<td>Patient medical chart</td>
<td>(Webster et al., 2011)</td>
</tr>
<tr>
<td>PI assessment tool completed</td>
<td>Waterlow, Braden or Ramstadius tool completed to assess pt’s ‘risk’ of developing PI and the implementation of prevention strategies</td>
<td>Patient medical chart</td>
<td>(Queensland Health, 2009; Webster et al., 2011)</td>
</tr>
<tr>
<td>National Inpatient Medication Chart (NIMC) audit</td>
<td>&gt;5 medications prescribed?</td>
<td>NIMC chart</td>
<td>(Webster et al., 2011)</td>
</tr>
<tr>
<td>Skin assessment</td>
<td>Documentation of daily skin assessment</td>
<td>Patient medical chart or care plan</td>
<td>(Queensland Health, 2009)</td>
</tr>
<tr>
<td>Support surfaces</td>
<td>PI preventative strategies</td>
<td>Patient medical chart or care plan</td>
<td>(Queensland Health, 2009)</td>
</tr>
<tr>
<td>Variable</td>
<td>Definition</td>
<td>Source</td>
<td>Reference</td>
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<tr>
<td>------------------------------</td>
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<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Repositioning regime</td>
<td>PI preventative strategies</td>
<td>Patient medical chart or care plan</td>
<td>(European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010; Queensland Health, 2009)</td>
</tr>
<tr>
<td>Documentation of PI prevention and management strategies</td>
<td>PI preventative strategies documented</td>
<td>Patient medical chart or care plan</td>
<td>(European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010; Queensland Health, 2009)</td>
</tr>
<tr>
<td>Evidence of PI</td>
<td>PI documented including stage, site, and impediments to healing</td>
<td>Patient medical chart or care plan</td>
<td>(European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010; Queensland Health, 2009)</td>
</tr>
<tr>
<td>PI pain assessment</td>
<td>Evidence of documented PI pain assessment</td>
<td>Patient medical chart or care plan</td>
<td>(European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010; Queensland Health, 2009)</td>
</tr>
<tr>
<td>PI Wound management</td>
<td>Evidence of documented PI wound management</td>
<td>Patient medical chart or care plan</td>
<td>(Queensland Health, 2009)</td>
</tr>
<tr>
<td>PI Infection</td>
<td>PI infection management strategies</td>
<td>Patient medical chart or care plan</td>
<td>(Queensland Health, 2009)</td>
</tr>
<tr>
<td>Variable</td>
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</tr>
<tr>
<td>Gender</td>
<td>The gender of the patient (male/female)</td>
<td>Patient observation</td>
<td>(European Pressure Ulcer Advisory Panel, 1998; Joanna Briggs Institute, 2008; National Pressure Ulcer Advisory Panel (NFUAP), 2007) (Queensland Health, 2009)</td>
</tr>
<tr>
<td>Reduced mobility</td>
<td>Any variation from ‘normal gait’ or activity</td>
<td>Patient observation</td>
<td>(Moore &amp; Cowman, 2009; Moore et al., 2011)</td>
</tr>
<tr>
<td>Mobility status</td>
<td>Independent: no assistance from another person or aid Staff assistance with all mobility Transfer aid: use of a slide sheet/Hoist Aid required: patient uses stick, wheelie walker Supervision: pr requires a person to closely observe their mobility</td>
<td>Patient observation</td>
<td>(Moore &amp; Cowman, 2009; Moore et al., 2011)</td>
</tr>
<tr>
<td>PI risk factors</td>
<td>Presence of bluish, bed rails, IDC, IV, Oxygen delivery device, NGT or PEG Urine/Faecal incontinence all increase the patient’s risk of developing a PI or worsening a PI</td>
<td>Patient observation</td>
<td>(European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010; Queensland Health, 2009)</td>
</tr>
<tr>
<td>Observed skin assessment</td>
<td>PI prevention strategies</td>
<td>Patient observation</td>
<td>(European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010; Queensland Health, 2009)</td>
</tr>
<tr>
<td>Continence management strategies</td>
<td>Patients identified with continence issues, and the strategies which may reduce the patient’s risk of experiencing a fall</td>
<td>Patient observation</td>
<td>(European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2010; Queensland Health, 2009)</td>
</tr>
<tr>
<td>Observed patient position</td>
<td>The position of the patient when observed (e.g. prone, lateral, sitting, walking), and also the degree of incline observed</td>
<td>Patient observation</td>
<td>(Moore &amp; Cowman, 2005; Moore et al., 2011)</td>
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</tbody>
</table>
# Appendix I: Chart Audit Tool

**PATIENT CODE**

<table>
<thead>
<tr>
<th><strong>APPENDIX II</strong></th>
<th><strong>CHART AUDIT form: Pressure Injuries (PI)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Date: ________</td>
<td></td>
</tr>
</tbody>
</table>
| 2. Site:  
  - 1. GCH  
  - 2. RBWH |
| 3. Ward:  
  - 1. GCH 8A  
  - 2. GCH 3B  
  - 3. RBWH 8B Sth  
  - 4. RBWH 8B Nth |
| 4. Gender:  
  - 1. Female  
  - 2. Male |
| 5. Age (yrs): ________ |
| 6. Admitted from:  
  - 1. Home  
  - 2. Interhosp tser  
  - 3. Intrahosp tser  
  - Other: __________ |
| 7. Admission diagnosis |
| 8. Length of stay (must be ≥3 days): ___________ days |

9-14. **Admission type** (Tick all that apply):

- 1. Medical Patient  
- 2. Palliative Patient  
- 3. Surgical Patient  
- 4. Spinal Patient  
- 5. Rehabilitation Patient  
- 6. Bariatric (obese) patient

15. During this current admission, has the **patient had surgery**?  
  - 3. No  
  - 4. Yes

16. If **YES**, how many days post-operative?  
  - 1. 1 day post operative  
  - 2. 2 day post operative  
  - 3. 3 days post operative  
  - 4. 4 days post operative  
  - 5. 5 days post operative  
  - 6. 6 days post operative  
  - 7. ≥6 days post operative

17. **Co-morbidities documented:**  
  - 3. No  
  - 4. Yes  
  - 59. N/A

18-33. **Current Co-morbidities** (Tick all that apply):

- 1. Chronic Heart Failure  
- 2. Ischaemic Heart Disease  
- 3. Chronic Respiratory Disease/ COPD  
- 4. Circulatory Disease  
- 5. Hypertension  
- 6. Smoking  
- 7. Chronic Renal Disease  
- 8. Skin disease (e.g. eczema, dermatitis)  
- 9. Hypo/hyperglycaemia  
- 10. Hypercholesterol  
- 11. Stroke  
- 12. Diabetes Mellitus  
- 13. Immuno-compromised  
- 14. Metastatic Carcinoma/Malignancy  
- 15. Peripheral Vascular Disease  
- 16. Impaired tissue oxygenation e.g. anaemia, smoking

34. Documented history of PI in past 12 months:  
  - 3. No  
  - 4. Yes

34.1 If **YES**, year of previous PI ________, How many PI’s documented__________.

35. **PI assessment tool completed on admission:**  
  - 1. Waterlow, Braden Q or Ramstadius  
  - 2. No tool  
  - 3. Tool partially completed  
  - 4. Tool FULLY completed
PATIENT CODE

36. **ONLY for FULLY COMPLETED TOOL: RESULTS of PI assessment tool on admission:**
    (Enter ONE score ONLY)
    - Waterlow score
    - Braden Q. score
    - Ramstadius - 'not at risk' - 'at very high risk'

37. **Follow-up PI assessment tool** completed at:
    - Change in patient's condition
    - 7 days post previous assessment
    - Other
    - Daily
    - N/A

38. **RESULTS of Follow up PI assessment** (Enter ONE score ONLY)
    - Waterlow score
    - Braden Q. score
    - Ramstadius - 'not at risk' - 'at very high risk'
    - N/A

39. Vascular assessment documented
    - No
    - Yes

40. Identified as 'at risk' of developing PIs:
    - No
    - Yes → Complete section A

41. Presence of documented PI on admission:
    - No
    - Yes → Complete section A + B

42. Has the pt been reviewed by a dietician in the past 12 month?
    - No
    - Yes

**National Inpatient Medication Chart (NIMC) audit:**

43. Is the patient prescribed more than five (5) regular medications?
    - No
    - Yes

Is the patient regularly prescribed: (tick all that apply) (regular prn medication can be included)

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>44.</td>
<td>Steroids (PO or IV)</td>
</tr>
<tr>
<td>45.</td>
<td>Narcotics</td>
</tr>
<tr>
<td>46.</td>
<td>Cytotoxics</td>
</tr>
<tr>
<td>47.</td>
<td>Sedatives</td>
</tr>
</tbody>
</table>

**Section A: Prevention**

**Documentation** (Regular documentation of the following):

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>48.</td>
<td>Risk assessment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49.</td>
<td>Identified risk factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50.</td>
<td>Management plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>51.</td>
<td>Daily skin evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>52.</td>
<td>Turning schedule documented</td>
<td></td>
<td></td>
</tr>
<tr>
<td>53.</td>
<td>Support surface upgrade ordered (e.g. Nimbus)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Referrals** (Tick all that apply)

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>54.</td>
<td>Physiotherapist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55.</td>
<td>Occupational Therapist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>56.</td>
<td>Dietitian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>57.</td>
<td>Skin Integrity Nursing service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>58.</td>
<td>Wound team</td>
<td></td>
<td></td>
</tr>
<tr>
<td>59.</td>
<td>Pain team</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60.</td>
<td>Other , please specify</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61.</td>
<td>Patient / carer education documented in chart directly related to PI (e.g. mobility, continence, nutrition)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Documented plan insitu**
**Section B: Treatment**

**PI Category** (Tick stage that applies on the table below):

**Stage I** Observable pressure-related alteration(s) of intact skin whose indicators as compared to the adjacent or opposite area on the body may include changes in one or more of the following: skin temperature (warmth or coolness), tissue consistency (firm or boggy feel) and/or sensation (pain, itching). Defined area of persistent redness in lightly pigmented skin or persistent red/blue or purple hues in darker skin.

**Stage II** Partial thickness skin loss involving epidermis and/or dermis. The ulcer is superficial and presents clinically as an abrasion, blister, or shallow crater.

**Stage III** Full thickness skin loss involving damage or necrosis of subcutaneous tissue that may extend down to, but not through, underlying fascia. The ulcer presents clinically as a deep crater with or without undermining of adjacent tissue.

**Stage IV** Full thickness skin loss with extensive destruction, tissue necrosis or damage to muscle, bone, or supporting structures (for example, tendon or joint capsule). Undermining and sinus tracts may also be associated with Stage 4 pressure ulcers. (NPUAP, 2009)

| 61. Evidence of PI: stage, location: (Tick stage and sites that apply): |
|-------------------|-----------------|-----------------|-----------------|
| PI               | Stage          | Site            | R/L             | Present on adm |
| 1                | 1, 2           | Occiput, Ear    | R, L            | No              |
|                  | 3, 4           | Shoulder, Elbow | L               | Yes             |
|                  | 4, 5           | Coccyx, Buttock | R               | Yes             |
|                  | 2, 3           | Knee, Ankle     | L, R            | Yes             |
|                  | 1, 2           | Heel, Trochanter| L, L            | Yes             |
| 2                | 1, 2           | Occiput, Ear    | R, L            | No              |
|                  | 3, 4           | Shoulder, Elbow | L               | Yes             |
|                  | 4, 5           | Coccyx, Buttock | R               | Yes             |
|                  | 2, 3           | Knee, Ankle     | L, R            | Yes             |
|                  | 1, 2           | Heel, Trochanter| L, L            | Yes             |
| 3                | 1, 2           | Occiput, Ear    | R, L            | No              |
|                  | 3, 4           | Shoulder, Elbow | L               | Yes             |
|                  | 4, 5           | Coccyx, Buttock | R               | Yes             |
|                  | 2, 3           | Knee, Ankle     | L, R            | Yes             |
|                  | 1, 2           | Heel, Trochanter| L, L            | Yes             |
| 4                | 1, 2           | Occiput, Ear    | R, L            | No              |
|                  | 3, 4           | Shoulder, Elbow | L               | Yes             |
|                  | 4, 5           | Coccyx, Buttock | R               | Yes             |
|                  | 2, 3           | Knee, Ankle     | L, R            | Yes             |
|                  | 1, 2           | Heel, Trochanter| L, L            | Yes             |
| 5                | 1, 2           | Occiput, Ear    | R, L            | No              |
|                  | 3, 4           | Shoulder, Elbow | L               | Yes             |
|                  | 4, 5           | Coccyx, Buttock | R               | Yes             |
|                  | 2, 3           | Knee, Ankle     | L, R            | Yes             |
|                  | 1, 2           | Heel, Trochanter| L, L            | Yes             |

**62. PI Size: (from table above)**

<table>
<thead>
<tr>
<th>PI</th>
<th>Width (cm)</th>
<th>Length (cm)</th>
<th>Depth (cm)</th>
<th>Condition of wound bed</th>
<th>Exudate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1, Not documented</td>
<td>1, Not documented</td>
<td>1, Not documented</td>
<td>Well Perfused, Moderately perfused, Poorly perfused, Not documented</td>
<td>Nil, Serous, Haemoserous, Haemapurulent</td>
</tr>
<tr>
<td>2</td>
<td>1, Not documented</td>
<td>1, Not documented</td>
<td>1, Not documented</td>
<td>Well Perfused, Moderately perfused, Poorly perfused, Not documented</td>
<td>Nil, Serous, Haemoserous, Haemapurulent</td>
</tr>
<tr>
<td>Patient Code</td>
<td>Documented cm</td>
<td>Documented cm</td>
<td>Documented cm</td>
<td>Not Documented cm</td>
<td>Eschar cm</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>-------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Impediments to Healing:** (Tick all that apply)

- 63. Impaired perfusion
- 64. Impaired sensation
- 65. Systemic Infection
- 66. Local infection

**Pressure Injury Pain: Documented Evidence of:**

**Assessment [Documented Evidence]**

<table>
<thead>
<tr>
<th>67. Assessment undertaken</th>
<th>No</th>
<th>Yes</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>68. Use of validated scale</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
<tr>
<td>69. Specify pain scale used:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70. Documentation of body language/non-verbal</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Prevention: Documented Evidence**

<table>
<thead>
<tr>
<th>71. Use of transfer aids when repositioning</th>
<th>No</th>
<th>Yes</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>72. Positioning of patient off PI when possible</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
<tr>
<td>73. Avoidance of postures that increase pressure</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Management: Documented Evidence**

**Chronic Pain: Documented Evidence**

<table>
<thead>
<tr>
<th>78. Referral to Pain/Wound Clinic Resources</th>
<th>No</th>
<th>Yes</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>79. Effective analgesia prescribed</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Education re Pain Management: Documented Evidence**

<table>
<thead>
<tr>
<th>80. Patient/Relative education re-causes, assessment and management</th>
<th>No</th>
<th>Yes</th>
<th>NA</th>
</tr>
</thead>
</table>

**PI Wound Management**

<table>
<thead>
<tr>
<th>81. Wound management regime documented</th>
<th>No</th>
<th>Yes</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>82. Frequency of dressing change: Daily</td>
<td>BD</td>
<td>TDS</td>
<td>QID</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

217
PATIENT CODE

Dressing type (Tick all that apply):

<table>
<thead>
<tr>
<th>No.</th>
<th>Dressing Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>Melolin</td>
</tr>
<tr>
<td>84</td>
<td>Transparent</td>
</tr>
<tr>
<td>85</td>
<td>Hydrogel</td>
</tr>
<tr>
<td>86</td>
<td>Alginate</td>
</tr>
<tr>
<td>87</td>
<td>Foam</td>
</tr>
<tr>
<td>88</td>
<td>Vacuum</td>
</tr>
<tr>
<td>89</td>
<td>Gauze</td>
</tr>
<tr>
<td>90</td>
<td>Silicon</td>
</tr>
<tr>
<td>91</td>
<td>Collagen Matrix</td>
</tr>
<tr>
<td>92</td>
<td>Composite</td>
</tr>
<tr>
<td>93</td>
<td>Other (specify)</td>
</tr>
</tbody>
</table>

Cleansing solution used (Tick all that apply):

<table>
<thead>
<tr>
<th>No.</th>
<th>Cleansing Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>94</td>
<td>Normal Saline</td>
</tr>
<tr>
<td>95</td>
<td>Antimicrobial</td>
</tr>
<tr>
<td>96</td>
<td>H2O</td>
</tr>
<tr>
<td>97</td>
<td>Other (specify)</td>
</tr>
</tbody>
</table>

98. Use of wound irrigation (PI) documented:

- [ ] No
- [ ] Yes

99. Medical debridement (dressing):

- [ ] No
- [ ] Yes

100. Surgical debridement:

- [ ] No
- [ ] Yes

**Pressure injury Infection:** (Tick all that apply):

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Wound exudate</td>
</tr>
<tr>
<td>102</td>
<td>Presence of wound infection</td>
</tr>
<tr>
<td>103</td>
<td>Wound odour</td>
</tr>
<tr>
<td>104</td>
<td>Positive Culture</td>
</tr>
<tr>
<td>105</td>
<td>Management plan in place</td>
</tr>
<tr>
<td>106</td>
<td>Notification of medical team.</td>
</tr>
<tr>
<td>107</td>
<td>Universal precautions.</td>
</tr>
<tr>
<td>108</td>
<td>Antibiotic therapy: IV</td>
</tr>
<tr>
<td>109</td>
<td>Antibiotic therapy: Oral</td>
</tr>
<tr>
<td>110</td>
<td>Additional Topical treatments</td>
</tr>
<tr>
<td>111</td>
<td>Topical antimicrobial silver</td>
</tr>
<tr>
<td>112</td>
<td>Honey</td>
</tr>
<tr>
<td>113</td>
<td>Topical antiseptics</td>
</tr>
<tr>
<td>114</td>
<td>Other (specify)</td>
</tr>
</tbody>
</table>

**Additional therapy to stimulate healing documented:**

- [ ] No
- [ ] Yes

Additional Therapies (Tick all that apply)

<table>
<thead>
<tr>
<th>No.</th>
<th>Therapy Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>115</td>
<td>Oxygen</td>
</tr>
<tr>
<td>116</td>
<td>Infra-red</td>
</tr>
<tr>
<td>117</td>
<td>UV</td>
</tr>
<tr>
<td>118</td>
<td>Acoustic</td>
</tr>
<tr>
<td>119</td>
<td>Electrical</td>
</tr>
<tr>
<td>120</td>
<td>Laser</td>
</tr>
<tr>
<td>121</td>
<td>NPWT/TNP</td>
</tr>
<tr>
<td>122</td>
<td>Hydrotherapy</td>
</tr>
</tbody>
</table>
## Appendix J: Semi-structured Observation Tool

**APPENDIX J** Semi-structured OBSERVATIONAL Data Collection form: Pressure Injury (PI)

1. Date: __________________________

2. Site:  
   - ☐, GCH
   - ☐, RBWH

3. Ward:  
   - ☐, GCH 8A
   - ☐, GCH 3B
   - ☐, RBWH 8B 3th
   - ☐, RBWH 8B Nth

4. Start time: __________ (24 hr clock)  
   Finish time: __________ (24hr clock)

5. Gender:  
   - ☐, Female
   - ☐, Male

### Mobility Status (in bed) (Tick all that apply)

6. ☐, staff assistance  
   - ☐, number

7. ☐, Independent 'in bed' mobility

8. ☐, Use of bed mechanics: e.g. bar

9. ☐, Transfer aid (Hoist/slide sheet)

10. ☐, other  
    - ☐, specify

### Mobility Status (out of bed) (Tick all that apply)

11. ☐, Assist x 1 staff

12. ☐, Aid required (stick, hopper)

13. ☐, Assist x 2 staff

14. ☐, Supervision

15. ☐, Walk belt

16. ☐, Wheelchair

17. ☐, Assist Hoist

18. ☐, Other  
    - ☐, specify

### PI risk factors (Tick all that apply)

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. Protective bluey present at bed</td>
<td>☐, No</td>
</tr>
<tr>
<td>20. Bed rails insitu</td>
<td>☐, No</td>
</tr>
<tr>
<td>21. IDC insitu</td>
<td>☐, No</td>
</tr>
<tr>
<td>22. IV line or cannula</td>
<td>☐, No</td>
</tr>
<tr>
<td>23. Central venous or PICC Line</td>
<td>☐, No</td>
</tr>
<tr>
<td>24. Oxygen therapy (nasal prongs/mask)</td>
<td>☐, No</td>
</tr>
<tr>
<td>25. NGT or PEG insitu</td>
<td>☐, No</td>
</tr>
<tr>
<td>26. Incontinent urine</td>
<td>☐, No</td>
</tr>
<tr>
<td>26.1 If incontinent of urine</td>
<td>☐, Day</td>
</tr>
<tr>
<td>26.2 If incontinent of urine</td>
<td>☐, Night</td>
</tr>
<tr>
<td>26.3 Both</td>
<td>☐, Both</td>
</tr>
<tr>
<td>27. Incontinent faeces</td>
<td>☐, No</td>
</tr>
<tr>
<td>27.1 If incontinent of faeces</td>
<td>☐, Day</td>
</tr>
<tr>
<td>27.2 If incontinent of faeces</td>
<td>☐, Night</td>
</tr>
<tr>
<td>27.3 Both</td>
<td>☐, Both</td>
</tr>
</tbody>
</table>

### Observed skin assessment: (Tick all that apply)

<table>
<thead>
<tr>
<th>Observed skin assessment:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>28. ☐, Healthy</td>
<td></td>
</tr>
<tr>
<td>29. ☐, Clammy</td>
<td></td>
</tr>
<tr>
<td>30. ☐, Thin and fragile</td>
<td></td>
</tr>
<tr>
<td>31. ☐, Discoloured</td>
<td></td>
</tr>
<tr>
<td>32. ☐, Dry</td>
<td></td>
</tr>
<tr>
<td>33. ☐, Oedematous</td>
<td></td>
</tr>
</tbody>
</table>

### Skin care

<table>
<thead>
<tr>
<th>Skin care</th>
<th>☐, No</th>
<th>☐, Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>34. Evidence of appropriate skin hygiene, e.g. removal of irritating</td>
<td>☐, No</td>
<td>☐, Yes</td>
</tr>
<tr>
<td>substances, suitable soaps (non alkaline), no excessive washing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35. Skin moisture maintenance (creams applied)</td>
<td>☐, No</td>
<td>☐, Yes</td>
</tr>
<tr>
<td>36. Maintenance of stable skin temp (no warming blankets or surfaces</td>
<td>☐, No</td>
<td>☐, Yes</td>
</tr>
<tr>
<td>that interfere with conduction and convection of heat)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Support surfaces

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>37. Use of sophisticated alternating pressure device (e.g. Invacare, Autologic, Nimbus)</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
<tr>
<td>38. Sophisticated alternating pressure device functioning</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
<tr>
<td>39. Use of seating support surface (e.g. gel cushion)</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
<tr>
<td>40. Use of pillows as a PI prevention strategy</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
<tr>
<td>41. Use of foam wedges</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
<tr>
<td>42. Protection of skin exposed to friction (padding/sheepskins/dressings)</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
</tbody>
</table>

### Repositioning regime

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>43. Provided opportunities for increased mobility (e.g. Physio, Nurse)</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
<tr>
<td>44. Avoiding prolonged chair sitting (e.g. reposition/mobility provided after 2 hrs of sitting)</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
</tbody>
</table>

### Continence management strategies observed

(Tick all that apply):

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>45. toileting regime (1hrly or 2hrly)</td>
<td>No</td>
<td>Yes</td>
<td>N/A</td>
</tr>
<tr>
<td>46. Pt wearing continence pad</td>
<td>No</td>
<td>Yes</td>
<td>N/A</td>
</tr>
<tr>
<td>47. Regular continence pad changes</td>
<td>No</td>
<td>Yes</td>
<td>N/A</td>
</tr>
<tr>
<td>48. Protective barrier cream applied</td>
<td>No</td>
<td>Yes</td>
<td>N/A</td>
</tr>
<tr>
<td>49. Presence of cotton protective bed sheet</td>
<td>No</td>
<td>Yes</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Weight range

Does the patient appear to be:

- [ ] Underweight
- [ ] Healthy weight
- [ ] Overweight
- [ ] Obese
<table>
<thead>
<tr>
<th>Time</th>
<th>51. Supine (Degree of incline)</th>
<th>52. R) Lateral</th>
<th>53. L) Lateral</th>
<th>54. Sitting</th>
<th>55. Walking</th>
<th>56. Pt absent from ward</th>
<th>Change in position observed to occur:</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1400</td>
<td>□ 1, □ 1</td>
<td>□ 1</td>
<td>□ 1</td>
<td>□ 1</td>
<td>□ 1</td>
<td>□ 1</td>
<td>57, Independently 58, with assistance 59, with equipment 60, not observed</td>
<td></td>
</tr>
<tr>
<td>1430</td>
<td>□ 1, □ 1</td>
<td>□ 1</td>
<td>□ 1</td>
<td>□ 1</td>
<td>□ 1</td>
<td>□ 1</td>
<td>57, Independently 58, with assistance 59, with equipment 60, not observed</td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>□ 1, □ 1</td>
<td>□ 1</td>
<td>□ 1</td>
<td>□ 1</td>
<td>□ 1</td>
<td>□ 1</td>
<td>57, Independently 58, with assistance 59, with equipment 60, not observed</td>
<td></td>
</tr>
<tr>
<td>1530</td>
<td>□ 1, □ 1</td>
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Appendix K: Semi-structured Interview Guide

Pressure Injury Prevention Interview Guide

1. Are you familiar with the term pressure sore? Where did you hear this term? Can you tell me what it means?

2. Have you ever had a pressure sore? Can you describe to me what your experience was (pain, emotions, physical, social, financial)? Have you ever experienced areas on your skin that have become sore or painful? Can you describe how it felt? What do you think was the cause?

3. What do you consider to be your role in the prevention of pressure sores? Can you tell me the type of activities that might increase or decrease your risk of developing pressure sores?

4. Have you received any education from the staff or any other health professional about how to reduce the risk of developing pressure sores?

5. What types of things prompt you to change your position when you are lying in bed or sitting in a chair?

6. How involved do you feel in the decisions made about your care?

7. Do the nursing staff wake you at night to change your positions? If so, how do you feel about this?

8. Do you think patients have a role in the prevention of pressure sores? Can you expand on your response to this question?

Probing statements:

- Can you expand on this point a bit more?

- Can you tell me what you mean when you say......?
Appendix L: Queensland Health NEAF HREC Ethics Approval Letter

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20 October 2011

Wendy Chaboyer  
School of Nursing and Midwifery  
Gold Coast Campus  
Griffith University  
Southport QLD 4222  

Dear Wendy

HREC Reference number: HREC/11/QTHS/111  
Project Title: Understanding the patient’s role in the prevention of pressure injuries  
Protocol number:

Thank you for your letter dated 3 October 2011 providing a response regarding requested amendments for the above-mentioned study.

On behalf of the Townsville Human Research Ethics Committee, I grant ethical approval for the commencement of this study.

Should you require any additional information, please contact the HREC Coordinator, on (07) 4796 1140.

Yours sincerely

Ms Mary Leech  
Deputy Chairperson  
Townsville Health Service District  
Human Research Ethics Committee
Appendix M: Griffith University HREC Approval Letter

GRIFFITH UNIVERSITY HUMAN RESEARCH ETHICS COMMITTEE

10-Nov-2011

Dear Professor Chaboyer

I write further to the additional information provided in relation to the conditional approval granted to your application for ethical clearance for your project "Prior Review: Understanding the patient's role in the prevention of pressure injuries" (GU Ref No: NRS/40/11/HREC).

This is to confirm receipt of the remaining required information, assurances or amendments to this protocol.

Consequently, I reconfirm my earlier advice that you are authorised to immediately commence this research on this basis.

The standard conditions of approval attached to our previous correspondence about this protocol continue to apply.

Regards

Dr Gary Allen
Manager, Research Ethics
Office for Research
G9 room 3.55 Gold Coast Campus
Griffith University
ph: 3735 5585
fax: 07 5552 9058
email: g.allen@griffith.edu.au
web:

Cc:

At this time all researchers are reminded that the Griffith University Code for the Responsible Conduct of Research provides guidance to researchers in areas such as conflict of interest, authorship, storage of data, & the training of research students. You can find further information, resources and a link to the University's Code by visiting http://www62.gu.edu.au/policylibrary.nsf/xupdatemonth/e7852d226231d2b44a25750c0062f457?openDocument PRIVILEGED, PRIVATE AND CONFIDENTIAL

This email and any files transmitted with it are intended solely for the use of the addressee(s) and may contain information which is confidential or privileged. If you receive this email and you are not the addressee(s) [or responsible for delivery of the email to the addressee(s)], please disregard the contents of the email, delete the email and notify the author immediately.
Appendix N: Gold Coast Hospital Site Specific Governance Approval Letter

District Research Governance

11 April 2012

Professor Wendy Chaboyer
Clinical Sciences Building 2 G16
Gold Coast Campus
Griffith University,
4222

Dear Professor Chaboyer

HREC reference number: HREC/11/QTHS/111
SSA reference number: SSA/12/QGC/61
Project title: Understanding the patient's role in the prevention of pressure injuries

Thank you for submitting an application for authorisation of this project. I am pleased to inform you that authorisation has been granted for this study to take place at the following site(s):

- Gold Coast Health Service District

The following conditions apply to this research proposal. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval.

1. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project are to be submitted to the HREC for review. A copy of the HREC approval/rejection letter must be submitted to the RGO;
2. Proposed amendments to the research protocol or conduct of the research which only affects the ongoing site acceptability of the project, are to be submitted to the research governance officer;
3. Any proposed amendments to the research protocol or conduct of the research which may affect both the ongoing ethical acceptability of the project and the site acceptability of the project are to be submitted firstly to the HREC for review and then to the research governance officer after a HREC decision is made.

Yours sincerely

for Naomi Dwyer
District CEO or Delegate
Gold Coast Health Services District

cc. Shelley Roberts

Ian Pieper
Research Governance Officer
Gold Coast Health Service District
Appendix O: Royal Brisbane and Women's Hospital Site Specific Governance Approval Letter

Professor Wendy Chaboyer
NHMRC Centre for Research Excellence in Nursing Intervention for Hospitalized Patients
Griffith University
Gold Coast Campus
South Port QLD 4222

Dear Professor Chaboyer

Re: HREC/11/QTHS/111 Understanding the patient's role in the prevention of pressure injuries

Thank you for submitting an application for authorisation of the above research project. I am pleased to inform you that authorisation has been granted for this study to take place at the Royal Brisbane and Women's Hospital.

Specific approval is also provided for the following:

- **Patient Information Sheet Metro North Health Service District version 2 dated 10 November 2011**
- **Patient Consent form GU & Metro North Health Service District version 1 dated 25 November 2011**

In addition to the conditions of approval imposed by the Human Research Ethics Committee, when submitting an amendment to the HREC, please also submit (electronically) to the RGO a copy of the covering letter for the amendment as well as a description and the rationale for it. This is to allow the RGO to determine whether or not there are research governance implications connected with the amendment. Amendments may include changes to the protocol, budget, information sheets, consent forms, clinical trial agreements and any other research-related documentation. The RGO will then advise you whether or not further documentation is required.

When the study commences, please complete the Commencement Form and send it to the HREC office with a copy to the Research Governance Office.

I wish you every success with your research.

Thank you for conducting this important research.

Yours sincerely,

Dr David Alcorn
Executive Director
81/06.1.2

C.C. Joan Webster, Centre for Clinical Nursing, Building 34, RBWH