

**UNIVERSITY OF KWAZULU-NATAL**  
**NURSES' KNOWLEDGE, ATTITUDES, AND PRACTICES OF PRESSURE ULCER**  
**PREVENTION IN THE PIETERMARITZBURG METROPOLITAN HOSPITAL**  
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## **DECLARATION**

I, **Sanelisiwe Malinga** declare that the dissertation titled: “Nurses’ Knowledge, Attitudes, and Practices of Pressure Ulcer Prevention in the Pietermaritzburg Metropolitan Hospital Complex in 2016” is my original work. It has never been submitted before for any degree or examination at this or any other university. Sources utilised in this thesis have been acknowledged through citation and a reference list.

Signature:

Date:

## **SUPERVISOR DECLARATION**

I, **Thembelihle Dlungwane** hereby confirm that I have read the contents of this dissertation and approve of its submission.

Supervisor:

Signature:

Date:

## **DEDICATION**

To God for the strength during this journey.

To my supervisor for all the guidance and support.

To my partner for all the support and encouragement.

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# **ABSTRACT**

## **Introduction**

Pressure ulcers are a growing problem for health institutions worldwide. Increased length of stay, litigation, increased workload, and diminished quality of life of individuals are implications of pressure ulcers. Nurses require good knowledge, attitudes, and practices to implement effective pressure ulcer prevention strategies. The purpose of the study was to determine nurses' knowledge, attitudes and practices of pressure ulcer prevention in the Pietermaritzburg Metropolitan Hospital Complex in 2016.

## **Methods**

The study was quantitative in nature and an observational, cross-sectional, descriptive design with an analytical component was implemented. A self-administered questionnaire was used to collect information on nurses' knowledge, attitudes, and practices. The two-sample t-test and analysis of variance were used to determine the relationships between demographic characteristics and knowledge, attitudes, and practices of pressure ulcer prevention.

## **Results**

Nurses' knowledge and practices of pressure ulcer prevention were unsatisfactory at 69.2% and 58.2% respectively whilst attitudes were satisfactory at 88.8%. The analysis of variance revealed a significant difference in knowledge in terms of rank, years of experience, previous PU knowledge and ward while the two-sample t-test revealed no significant difference in knowledge, attitudes and practices with gender.

## **Conclusion**

Nurses' knowledge and attitudes regarding pressure ulcer prevention are limited while their attitudes are positive. An intervention is required to educate and empower nurses to improve care.

**Keywords:** attitude; knowledge; nurse; practice; pressure ulcer prevention

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## **ACRONYMS AND ABBREVIATIONS**

PU's	Pressure Ulcers
NPUAP	National Pressure Ulcer Advisory Panel
EPUAP	European Pressure Ulcer Advisory Panel
WHASA	Wound Healing Association of Southern Africa
NCS	National Core Standards

## DEFINITIONS

- ‘Pressure ulcers’ refers to “localised injury occurring to skin or underlying tissue usually over bony prominences caused by pressure or a combination of pressure in combination with shear,” and apply to all grades of pressure ulcers.
- ‘Professional nurse’ refers to a nurse who is registered with the South African Nursing Council and has undergone a four-year training at an accredited institution.
- ‘Staff nurse’ refers to a nurse who is registered with the South African Nursing Council and has undergone a two-year training at an accredited institution.
- ‘Nursing assistant’ refers to a nurse who is registered with the South African Nursing Council and has undergone a one-year training at an accredited institution.
- ‘Operational manager’ refers to a nurse who is registered with the South African Nursing Council, who has undergone a four-year training at an accredited institution, and is in charge of the day-to-day running of the ward.
- ‘Pressure ulcer prevention’ refers to risk assessment of patients, skin assessments, nutritional assessments, repositioning of patients, and the use of pressure-redistributing surfaces.

# CHAPTER 1: BACKGROUND TO STUDY

## 1.1 Introduction

Pressure ulcers (PU's) have been recognised as a major health problem within the healthcare system (1). It is estimated that three million people are affected by PU's, representing a major challenge to health care providers (2, 3). Pressure ulcers threaten the well-being of patients and have been identified as one of the five most common causes of harm to patients (4). Pressure ulcers affect all age groups but are more common among immobile and geriatric patients, as well as patients with severe acute neurological conditions (5).

In the United States of America (USA) and Europe, the prevalence of PU's ranges between 10.5% and 22% in acute care settings (6). In an attempt to reduce PU prevalence, the USA and Europe have readily available guidelines from panels dealing specifically with PU's, namely: The National Pressure Ulcer Advisory Panel (NPUAP) in the USA and the European Pressure Ulcer Advisory Panel (EPUAP) in Europe (7). The NPUAP serves as an authoritative voice for PU prevention and treatment through public policy, education, and research (8). Through the panel's collaboration with many organisations, it has designed a model for addressing PU prevention and treatment and has become an internationally recognised panel (9). The EPUAP serves a similar function to the NPUAP, and the two panels have collaborated to develop new, evidence-based guidelines on PU prevention and management (7).

In the USA, the total cost of treating a grade four PU for 19 patients, is estimated at \$129,248 annually (10). The cost of treating a single patient can range from \$20.90 to \$151.00 per pressure ulcer (11). In Europe, the cost of treating PU's is estimated to be between £1.4 and £2.1 billion annually (12). The financial burden incurred as a result of PU's further increases costs due to litigation, with an average malpractice lawsuit settlement amounting to roughly \$250,000 in the USA (13). Pressure ulcers have been reported to increase hospital stay by about seven days (14). This increase in hospital stay can add \$43,180 in costs to a hospital stay (11).

Pressure ulcers are common in high- and middle-income countries but the subject is rarely researched in low-income countries (15). Although there is little published data about PU's in low-income countries, the problem of PU's is more extensive in developing countries due to lack of medical resources (15). There is paucity of data on PU prevalence or incidence in South Africa (16); however, studies conducted in two countries in sub-Saharan Africa (Nigeria and Ethiopia) revealed a PU prevalence of 4.2% and 16.8% respectively (17, 18). Therefore research on PU prevalence in South Africa is imperative to bridge the gap in the literature.

The treatment of PU's affects nursing staff workload and the time spent by nurses in managing PU's is equivalent to 90% of the total cost in grade 1 and grade 2 PU's (12). Apart from financial burden, PU's are also associated with human suffering (19). Patients experience pain, limited movement, and some struggle to cope with their PU's, while others report on how PU's have affected their family and social lives due to the added care that they needed (20).

Pressure ulcers have been recognised universally as a preventable patient safety problem and are used as a measure of quality nursing care in health institutions worldwide (2). Pressure ulcer development is a phenomenon that is complex and the factors contributing to PU development relate to external factors and/or a patient's condition (21). Some of the risk factors associated with PU development include: immobility, poor nutritional status, reduced sensation, age, moisture (often caused by incontinence), as well as circulation issues (22). The prevention of PU's includes the use of a combination of strategies such as foam-based mattresses, sheepskins, and other high technology pressure support surfaces which have been found to be more effective than standard hospital beds (23). Furthermore, a combination of repositioning and the use of pressure-alleviating surfaces has been found to be more effective than using a single strategy (24).

The National Department of Health in South Africa adopted the National Core Standards (NCS) in 2009. The purpose was to improve service delivery and quality of care in all health institutions in the South African setting. The NCS consist of seven domains. The domain of particular importance to PU's is Domain 2 (Patient Safety, Clinical Governance, and Care (25). This domain sets out the standards pertaining to quality nursing care, ethical practice, reduction of

unintended harm to patients, prevention and management of adverse events, clinical management, and infection prevention and control standards (25).

Most PU's are preventable and a core indicator of quality of care (19). Poor implementation of evidence-based methods and insufficient equipment in clinical practice are common problems (26). Nurses should possess good knowledge, positive attitudes, as well as evidence-based practices in preventing PU's. While a multi-disciplinary approach is required in the prevention of PU's, nurses are the appropriate practitioners to lead prevention teams since they are primarily concerned with coordinating the nursing aspect of care (27).

## **1.2 Problem statement**

In the Pietermaritzburg Metropolitan Hospital Complex, quarterly reports submitted showed an increase in the number of PU's over the years 2013-2014. In 2013 21.2% cases of PU's were reported by facilities, and the cases reported increase up to 78.8% in 2014. The units mostly reporting PU's are the medical, surgical, and orthopaedic wards. Patients are assessed on admission for PU risk or existence of PU on admission, and available policies pertain to the reporting of PU's as adverse events and to the management of PU's that have developed. Nurses are traditionally considered as the backbone in any health facility. Identifying their knowledge, attitudes, and practices in PU prevention assists in identifying gaps and initiating appropriate interventions.

## **1.3 Significance of study**

The study will assess the knowledge, attitudes, and practices of nurses working in two hospitals in the Pietermaritzburg Metropolitan Hospital Complex with regard to pressure ulcer prevention. The findings of the study can form a baseline for nurses and healthcare professionals, and may also contribute to developing an educational platform on PU prevention and treatment in the uMgungundlovu district.

## **1.4 Aim**

The aim of the study is to determine nurses' knowledge, attitudes, and practices of pressure ulcer prevention in the Pietermaritzburg Metropolitan Hospital Complex in 2016.

## **1.5 Objectives**

The study has the three objectives:

1. To describe the socio-demographic profile of nurses working in the Pietermaritzburg Metropolitan Hospital Complex.
2. To determine the knowledge, attitudes, and practices of nurses regarding pressure ulcer prevention.
3. To analyse the relationship between knowledge, attitudes, and practices and socio-demographic details (years of experience, professional rank, and previous source of pressure ulcer information).

## **1.6 Definition of Key concepts**

- Pressure ulcer prevention: refers to risk all the methods of assessing, preventing and managing PU's.
- Knowledge: refers to information and skills on PU prevention that are possessed by participants.
- Attitudes: refers to a way of thinking or feeling about PU prevention.
- Practices: refers to the application or the use of PU prevention methods.
- Pietermaritzburg Metropolitan Hospital Complex: refers to the hospitals providing primary, secondary and tertiary healthcare services for the population of Midlands and Northern KwaZulu-Natal Province.
- Nurses refers to all the nursing staff that provide care to patients.

## **1.7 Overview of dissertation**

The dissertation is organised in the following order:

- Chapter One includes an introduction, problem statement, as well as the aims and objectives of the study.
- Chapter Two presents the literature review.
- Chapter Three details the study methods employed in carrying out the study.
- Chapter Four outlines the results and analysis in the form of a journal article.

- Chapter Five consists of the discussion, with the purpose of making sense of the data presented, by making remarks and recommendations throughout the discussion. The chapter will also highlight limitations, recommendations, conclusions, and suggestions for the future based on the gaps identified from the findings of the study.
- The appendices consist of the study instruments used for data collection, the information sheet, consent form and letters of permission for the conduct of the study.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

The aim of this chapter is to review the literature pertaining to pressure ulcers. It will discuss previous research on burden of PU's, risk assessment, risk factors, prevention, treatment, nurses' current knowledge, attitudes, and practices regarding PU prevention, and a conceptual framework that will underpin the study.

The literature review presented in this chapter was sourced from electronic sources using the following databases: Ebscohost, Science Direct, PubMed, and Cochrane libraries. The key words used in the search included: pressure ulcers, prevalence, prevention, nurses, knowledge, attitudes, and practices. The search was limited to 'English' and publications between January 2000 and September 2016.

### **2.2 Definition and Grades of PU's**

A pressure ulcer is defined as a "localised injury occurring to skin or underlying tissue usually over bony prominences caused by pressure or a combination of pressure in combination with shear" (7). The National Pressure Ulcer Advisory Panel (NPUAP) has graded the severity of PU's in the following way:-

- Grade 1: Redness or bruising usually occurring over a bony prominence, without breakdown of the skin.
- Grade 2: Breakdown of the skin, sometimes extending into the deeper layers.
- Grade 3: Deeper breakdown of the skin and possible fat exposure.
- Grade 4: Extensive deep damage with the exposure of tendons, muscles or bone.
- Unstageable: Extremely extensive, and actual depth of the PU cannot be ascertained.

### **2.3 The burden of pressure ulcers**

#### ***2.3.1 Developed countries***

Pressure ulcers are recognised universally as a preventable patient safety problem (28). The prevalence of PU's in developed countries is well documented (17). In the USA, a national study

on PU prevalence and incidence revealed an incidence of 7% of PU and a prevalence of 22% in acute care hospitals in the year 2000 (29). Another study also done in the USA in 2008-2009, found an overall PU prevalence of 12.3% in acute care settings and 29.3% in long-term acute care (30). However, a study conducted in the USA in 2013 revealed a prevalence of hospital-acquired PU's of 3.6% among those at risk (31). In Europe, prevalence ranges between 8.3% and 23% (32), which is comparable with prevalence rates in the USA. The financial implications related to treating PU's are huge and have been estimated at \$151.00 per patient in the USA for grade four PU's (11) and up to £579 million in Europe yearly (12).

### ***2.3.2 Africa and South Africa***

Little research is published on the nursing care for PU prevention in low- and middle-income countries (15). A study done in south-west Nigeria revealed an overall prevalence of 3.2% in hospitalised adults in university hospitals (33). A study conducted in Ethiopia among patients admitted to a referral hospital in 2014 revealed an overall prevalence of 16.8%. In South Africa, incidence and prevalence of PU's is very difficult to source; however, despite the lack of published data, it appears that the liability from patients developing PU's is on the increase, though the real associated costs are still unknown (34). This is evident from the attention PU's are receiving in the media, with the result that patients are now more aware and some are educated and realise that PU's should not occur while in a health facility (35). A headline in the online version of The Sunday Times, Times Live, reads: "Man rendered paraplegic sues Medi-Clinic for negligence". In this report, the patient sued the hospital for R3.5 million after developing PU's on his heels and lower back after he was admitted in October 2012 (36). Litigation matters of this sort are bound to have a negative effect on financial aspects of an institution.

### **2.4 Risk assessment**

The diagnosis of a PU is made on clinical judgement or the use of PU risk-assessment tools or scales. The most commonly used scales include the Braden scale, the Waterlow scale, and The Norton scale. The Braden scale assesses six risk factors which include mobility, sensory perception, nutrition, moisture, friction, and shear. Scores below 9 are considered extremely high risk (37).

The Waterlow scale assesses BMI, skin status, nutrition, age and sex, continence, and mobility. A special risk portion accounts for disorders due to malnutrition, neurological problems, and trauma or surgery (38). Scores of above 10 are considered high risk. The Norton scale assesses physical condition, mental state, activity, mobility, as well as incontinence. Scores of more than 14 are considered high risk (39).

Research on the reliability of the scales revealed that the Braden scale has the highest sensitivity and specificity, while the Waterlow scale has increased sensitivity rather than specificity and the Norton Scale showed moderate sensitivity and specificity (40). Risk-assessment scales are often used to identify people at a higher risk of developing PU's, although more research is required to determine whether the scales impact on PU incidence (41). No reliable evidence has indicated that the use of risk-assessment tools reduces PU incidence (42).

## **2.5 Risk factors**

The external factors associated with the development of PU's are pressure, shear, and friction (43). Pressure that is exerted by the body, mainly over bony prominences, compresses capillaries leading to ischaemia and necrosis (cell death) (43). Shear occurs when the deeper layers of the skin move in an opposite direction to an external force (44). Friction occurs when two structures rub against each another leading to skin breakdown (45). The internal risk factors associated with PU development are immobility, nutrition status, skin status (perfusion, moisture, temperature), age and race, and general status of health (22). These will be elaborated on in the following sections.

### **2.5.1 Immobility**

Immobility is identified as the most important risk factor in the development of PU's (21). During immobilisation, the decreased blood flow to distal parts of the body causes a decrease in oxygen to cells resulting in cell death (46). A systematic review identified immobility as a strong risk factor in the development of PU's (22). This has an important implication when developing PU-prevention strategies.

### ***2.5.2 Nutritional status***

Nutrition has been identified as another important risk factor in PU development, and optimising nutrition improves PU prevention (47). The NPUAP and EPUAP outline the importance of nutrition in their guidelines (48):

- Screening and assessing nutritional status of individuals upon admission
- Identifying individuals at risk
- A tailored nutritional intervention plan
- Supplementation as required
- Balanced diet
- Adequate fluid intake
- Follow up with dietician post discharge to maintain optimal nutritional status.

A study done in Switzerland pertaining to nutrition and food intake in patients with PU's revealed that most patients in the population had insufficient food intake and that hospital food was not sufficient in meeting the nutritional need of patients (49). Moreover, it was reported that supplementation was effective in addressing protein and energy requirements, while the micronutrients mostly affected in the majority of the patients were zinc and iron (49).

### ***2.5.3 Perfusion and skin status***

Perfusion is important for maintaining healthy skin. Poor perfusion leads to necrosis. Evidence reveals that individuals with perfusion problems have an increased probability of developing a PU (22). Skin status refers to factors related to the skin including sensation, moisture from incontinence or excessive sweating, and temperature. Skin moisture caused by incontinence, sweating, and oozing wounds has been found to be closely related to PU's (50). This was confirmed by a study done in the Europe that revealed that moist skin is significantly associated with PU development (51). In Contrast a study conducted in the USA revealed that dry skin, as well as incontinence, are significantly associated with PU incidence (52). There is some evidence that moisture is a factor for PU development but more research is required to determine if temperature is a factor in PU development (22).

#### **2.5.4 Age**

An increase in the elderly population and coexisting co-morbidities and disabilities increases PU prevalence among the elderly (53). Age alone is not a risk factor but the factors associated with age such as immobility and malnutrition increase PU development (54). However, evidence shows that age does not emerge as a statistically significant factor. (22).

### **2.6 Pressure ulcer prevention**

Pressure ulcers (PU's) have been recognised universally as a patient safety problem that can be prevented and they are used as a measure of quality of nursing care in many health institutions worldwide (28).

A PU can occur within two to six hours (55). Prevention of PU is not dependant on a single practice but a combination of strategies. The NPUAP and the EPUAP developed PU-prevention guidelines which include: Baseline assessments to determine risk, reduction of mechanical load through the use of pressure-redistributing surfaces, correction of nutritional deficiencies, maintenance of optimal skin status, and patient education (8).

Traditionally, changing of position on a two-hourly basis has been widely applied, although evidence to support this practice has not been clearly identified (56). A study done in an intensive care unit in a university hospital in the USA found that the implementation of a turn team in the repositioning of patients in the ICU setting reduced the incidence of PU's (57). The limitation of the study was that the authors did not take into consideration other factors (like nutrition, BMI, and skin status) that could have contributed to the decrease in PU incidence. The implications of the study are important as the implementation of a turn team could be part of an effective PU-prevention strategy. On the other hand, the turn team approach may be difficult to implement in a large orthopaedic or medical ward, due to the workload on nursing staff.

A study conducted in Belgium among residents in nursing homes revealed that the implementation of a four-hourly turning schedule of patients who are at high risk for developing PU's in combination with the use of pressure-redistributing surfaces decreases PU incidence significantly (58). This may be a more practical strategy to implement, especially in large wards.

A systematic review in 2006 further cemented the idea that the implementation of a combination of repositioning and pressure-redistributing surfaces is an effective PU strategy, more so than two-hourly repositioning. (24).

Risk assessment includes identifying all patients at a high risk of developing PU's at baseline, reassessing those patients periodically, inspection of the skin on a daily basis, cleansing of the skin after soiling, the use of moisturisers to prevent damage to the skin, and avoiding any kind of massage over bony prominences (24).

The nutritional aspect includes identification of nutritional status at baseline, use of supplements, and maintaining adequate hydration (59). Mechanical loading and support surfaces includes the repositioning of patients, the use of pressure support surfaces, for example, foam cushions or mattresses, and rehabilitation programmes to improve mobility (24).

A multi-disciplinary approach is required in the prevention of PU's as quality of care is a responsibility of all health practitioners. Multi-disciplinary teams and good leadership in PU-prevention programmes are essential (60).

## **2.7 Pressure ulcer assessment and treatment**

The comprehensive evaluation of PU's is the initial step in effective management of the wound (55). The NPUAP has developed guidelines to be used in assessing the patient who has developed a PU which includes the following aspects (7):

- Overall health assessment
- Physical examination of the skin and staging of the PU
- Nutritional assessment
- Pain assessment
- Psychological assessment
- Functional assessment
- Adherence to pressure-relieving methods.

Common treatments include dressings with or without the use of ointments, as well as pressure-relieving techniques which include repositioning and the use of pressure support surfaces (61).

Surgical management is usually reserved for more severe cases and is aimed at reducing osteomyelitis, reducing protein loss through the wound, preventing future malignancy, as well as promoting speedy closure of the wound (34).

A systematic review on PU treatment revealed that addressing the underlying causes of PU development is possibly more effective than adjunctive therapies (62). The study did not find sufficient evidence that any one treatment was superior to another. Although repositioning is a commonly used method in PU prevention and management, there is a lack of evidence to prove that repositioning has a positive effect on PU healing (63). This suggests that a combination of strategies will need to be employed for the effective management of PU's.

## **2.8 Nurses' knowledge, attitudes, and practices**

A number of studies have been conducted aimed at determining the knowledge, attitudes, and practices of nursing staff with regard to PU prevention (64-67). Studies conducted in Jordan in 2001 and 2014, and in Sweden in 2014, have revealed that nurses' knowledge on PU prevention is generally insufficient and not in line with current guidelines (1, 26, 68).

A study conducted in Jordan in 2014 concluded that there was a correlation between knowledge and practices, and age (1); in contrast, another Jordanian study revealed that nurses' knowledge had no correlation with education, age or years of experience (69). Another study among Jordanian nurses attributed the unsatisfactory knowledge among the nurses to the fact that Jordanian nurses were usually young and inexperienced (1).

A study conducted in the Republic of Iraq in 2005 found that nurses had positive attitudes towards PU prevention although this was not evident in their practices (65). This suggests that attitude alone is insufficient to change practices and this has implications for intervention development. This was consistent with the findings of a study done in Belgium among nurses working in nursing homes which showed that nurses' positive attitudes did not necessarily impact on their practices of PU prevention (70). A study conducted in Sweden revealed that nurses were inattentive when it came to PU prevention even though they identified PU

prevention as a basic in patient care (64). In addition, nurses tend to rely on their own judgement when providing care to patients, rather than using evidence-based methods (71).

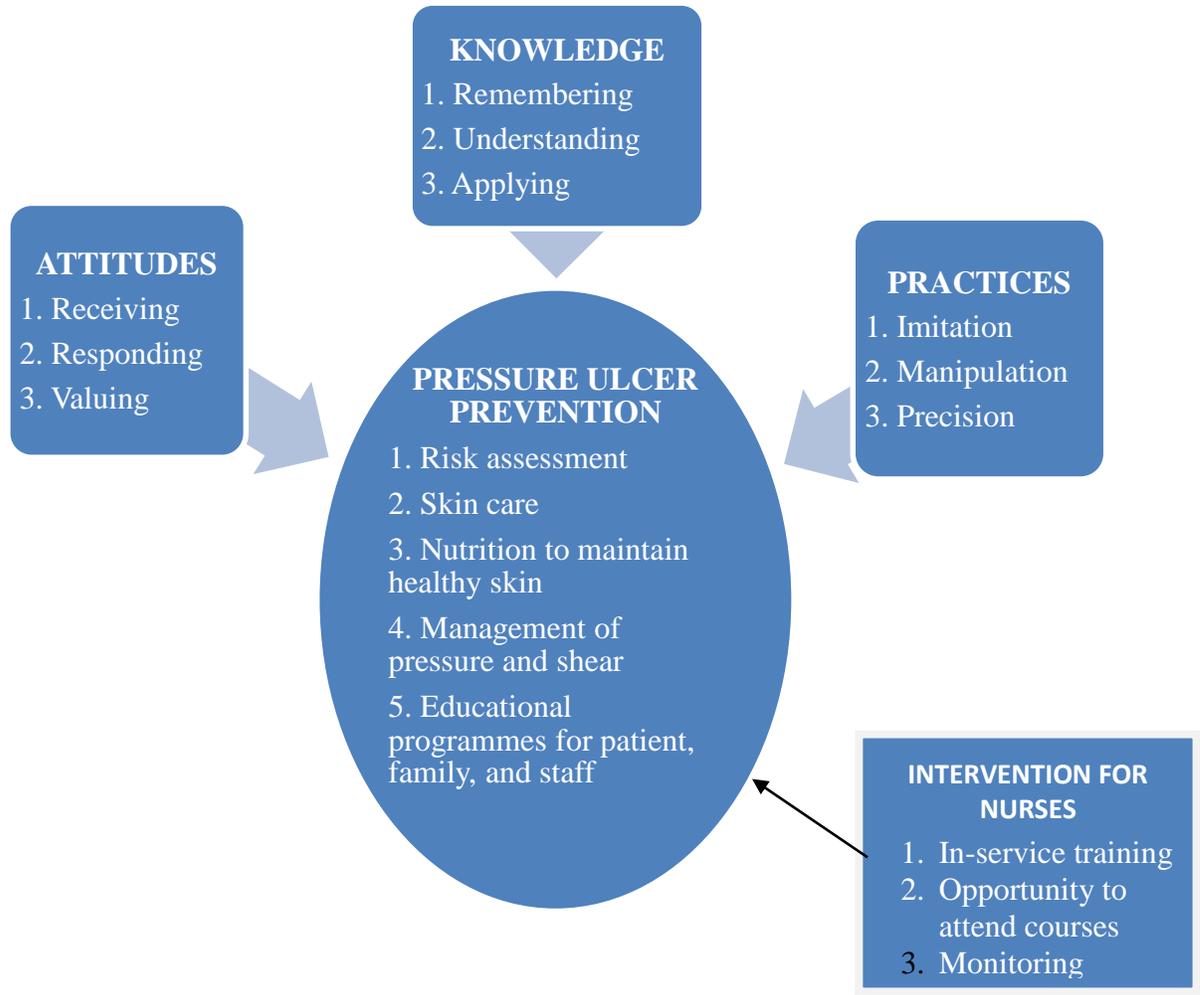
## **2.9 Conceptual framework**

The conceptual framework that was utilised to underpin this study was taken from a study by Islam (72) and was adapted for this study. The conceptual framework outlines the prevention of PU's and provides a link to knowledge, attitudes, and practices. The "Pressure Ulcer Prevention Points" included risk assessment, skin care, nutrition, mechanical loading and support surfaces, and lastly, education (8).

The Islam study highlighted the following (72):

- Knowledge is described as having three components which include the ability to remember, understand, and apply particular concepts.
- Attitude is defined in three components which are the way in which one receives a particular concept or subject matter, the way one responds to a particular concept or subject matter, and the value one attaches to that particular concept or subject matter.
- Practices pertain to the way one imitates, manipulates a particular activity, and the precision with which one carries out that particular practice.

The conceptual framework was adapted to include the concept of intervention. Based on the findings of the study, appropriate intervention should be aimed at addressing the five areas of PU prevention that have been mentioned earlier, according to the NPUAP.



**Figure1: Conceptual framework of nurses' knowledge, attitudes, and practices regarding pressure ulcer prevention. (Adapted from Islam 2010)**

## **2.10 Conclusion**

Pressure ulcers are a growing concern for the health system globally. The literature demonstrates that information on PU's in terms of prevalence, guidelines, and knowledge of PU prevention is available in developed countries like the USA and Europe but scarce in low- and middle-income countries. The literature further suggests that a good PU-prevention strategy is possible through a well-coordinated multi-disciplinary team. Nursing care plays a major role in the treatment and prevention of PU's and hence nurses require good knowledge, positive attitudes, and evidence-based practices in order to carry out their role in leading prevention programmes. It is important

to determine nurses' knowledge, attitudes, and practices of PU prevention in order to put in place appropriate educational resources to assist with prevention.

## **CHAPTER 3: RESEARCH METHODS**

### **3.1 Introduction**

This chapter discusses the research methodology for the study. It consists of the study setting, study period, study design, target population, study population, sampling, data sources, method of data collection, data handling, data analysis, and ethical considerations.

### **3.2 Study setting**

The study was conducted in the uMgungundlovu District, particularly the Pietermaritzburg Metropolitan Hospital Complex. The Pietermaritzburg Metropolitan Hospital Complex serves a population of about 3.5 million people.

Hospital 1 is a district /regional hospital. The facility has 900 beds and offers medical, surgical, orthopaedic, obstetrics and gynaecology, intensive care, paediatric, and rehabilitation services, among others. It is a recognised post-graduate teaching facility including all major disciplines.

Hospital 2 is a regional tertiary hospital providing 100% tertiary services. The hospital has 530 beds. The hospital offers a variety of services including anaesthetics and pain management, radiotherapy and oncology, orthopaedic and other sub-specialities, to name a few.

The study was carried out on nursing staff working day and night shifts in the medical, surgical, orthopaedic, and intensive care units of the respective hospitals.

### **3.3 Study period**

The study period was from May 2016 to September 2016.

### **3.4 Study design**

The study was quantitative in nature. An observational, cross-sectional, descriptive design with an analytical component was implemented. The design chosen would allow the researcher to determine relationship between variables.

### **3.5 Target population**

The target population was all categories of nurses (professional nurses, staff nurses, and nursing assistants) working day and night shifts, who are permanently employed at the 2 hospitals.

### **3.6 Study population**

The study population consisted of all categories of permanently employed nurses working in the medical, orthopaedic, surgical, and ICU wards on either day or night shift in the two hospitals.

Inclusion criteria:

- All permanently employed professional nurses, staff nurses, and nursing assistants currently working either day or night shifts in the respective hospitals, in the medical, surgical, orthopaedic, and ICU wards.

Exclusion criteria:

- All student nurses and those nurses not permanently employed at the respective hospitals.
- All categories of nurses currently working in units other than the ones specified.

### **3.7 Method of selecting sample and sample size**

The sample size was calculated using the formulae:  $\text{Sample size} = \frac{Z_{1-\alpha/2} P(1-P)}{d^2}$ . The Islam study found satisfactory proportions of knowledge, attitudes and practices to be 57.7%, 78.3% and 77.5% respectively. The sample size for each proportion of knowledge, attitudes and practices were 372, 264, and 272 respectively. The highest sample size of 372 was selected for this study which upon discussion with the statistician was deemed appropriate. Nurses working in the medical, surgical, orthopaedic, and intensive care units were invited to participate in the study. Non-probability, purposive sampling was utilised and all nurses in the units of interest who were willing to participate were surveyed on the days of data collection. There were a total of approximately 450 nurses placed in the units of interest at the time of data collection.

In all, 317 questionnaires were distributed to nurses who agreed to participate. A total of 250 questionnaires were returned. Of the 250 questionnaires, 12 were incomplete, and 15 were returned blank, leaving 223 usable questionnaires. This translated to a response rate of 70%.

### **3.8 Data sources**

#### ***3.8.1 Data collection tool***

A self-administered questionnaire was used to collect data (see Appendix A). The questionnaire was adapted from the Islam (2010) study which investigated nurses' knowledge, attitudes, and practices of PU prevention in a university hospital in Bangladesh. The questionnaire was not translated into any of the other official languages as the language used in both institutions is English. The questionnaire was made up of four sections:

- Section 1: Demographic data
- Section 2: Nurses' knowledge of pressure ulcer prevention
- Section 3: Nurses' attitudes towards pressure ulcer prevention
- Section 4: Nurses' practices of pressure ulcer prevention.

#### *Section 1: Demographic details*

This section dealt with the demographic details of the participant. Data collected included age, gender, marital status, professional rank, previous source of PU-prevention information, years of experience, shift (day or night), and unit of work. The original questionnaire did not include information on professional rank or shift.

#### *Section 2: Nurses' knowledge of PU prevention*

This section was made up of 22 questions in a multiple choice type format. The participant was instructed to read each statement carefully and select either a, b or c as an option. There is only one correct answer to each question. The knowledge section tested knowledge of risk factors, knowledge of appropriate preventative strategies, assessment of risk and the appropriate tools and knowledge on grading, and correct identification of PU's. Previous studies looking at knowledge of PU prevention identified any score less than 60% as unsatisfactory. The scores were categorised as follows:

<b>CATEGORY</b>	<b>SCORING</b>
Very low	<60%
Low	60%-69.99%
Moderate	70%-79.99%
High	80%-89.99%
Very high	90%-100%

*Section 3: Nurses' attitudes towards PU prevention*

This section was made up of 25 questions. A Likert scale was used to determine the attitudes of nurses. Participants were instructed to read each statement carefully and tick in the available spaces the option that best described their attitude where 5= Strongly agree, 4= Agree, 3= Neither agree nor disagree, 2= Disagree and 1= Strongly disagree.

There were both positive and negative statements included in the section. These included attitudes towards risk factors, attitudes towards risk assessment, attitudes towards skin care, attitudes towards nutritional status, management of pressure and shear, and educational advice to patients. The scoring for this section was exactly as from the Islam (2010) study.

The scores were categorised as follows:

<b>CATEGORY</b>	<b>SCORE</b>
Negative	<71.70%
Neutral	71.70%-84.92%
Positive	>84.92%

*Section 4: Nurses' practices of PU prevention.*

This section was made up of 22 questions. Participants were instructed to read each statement carefully and select the option that best described their practice of PU prevention. Their options were: Always, Sometimes, and Never. Practices related to risk factors, management of pressure and shear, skin care, nutrition, risk assessment, and educational advice to patients and family members. The scoring method used for practices was the same as that of knowledge scores.

The scores were categorised as follows:

<b>CATEGORY</b>	<b>SCORING</b>
Very low	<60%
Low	60%-69.99%
Moderate	70%-79.99%
High	80%-89.99%
Very high	90%-100%

After obtaining ethical approval from the UKZN Biomedical Research Ethics Committee (reference number BE375/15), and the Kwa-Zulu Natal department of health (reference number HRKM104/16), (Appendix E), a meeting was held with the nursing managers of each institution. A schedule was arranged with operational managers to establish the most appropriate times for data collection, to avoid interruption of services.

### ***3.8.2 Measures to ensure internal validity***

Internal validity can be understood as the degree to which the results of the study are true (73). An academic lecturer from a nursing college and physiotherapists were called upon to provide input on the structure and content of the questionnaire. A physiotherapist was utilised as a research assistant and was trained in the use of the questionnaire and to handle any questions arising from participants.

A pre-test of the data collection instrument was conducted at Hospital 1. Fifteen questionnaires were distributed to staff in the outpatient eye clinic and collected at the end of their shift. Seven questionnaires were returned for analysis. The pre-test did not result in any changes to the questionnaire but it was found that the time given to participants to complete the questionnaire was not sufficient. This resulted in the decision to give participants an additional time to complete the questionnaire should they fail to do so in one day.

### ***3.8.3 External validity/generalisability***

External validity or generalisability can be understood as the degree to which the findings can be generalised (73). The results of the study are generalisable to nurses working within the UMgungundlovu district.

### ***3.8.4 Measures to reduce bias***

In order to reduce information bias, a standardised questionnaire was utilised and the research assistant was trained on the questionnaire. Selection bias was ensured by including all nurses that met the inclusion criteria.

### ***3.8.5 List of variables***

#### ***3.8.5.1 Personal details***

This section collected information on socio-demographic variables. These included: age, sex, professional rank, and qualification.

#### ***3.5.5.1 Employment***

This section collected information on years of experience as a nurse, the unit in which they work currently, previous source of pressure ulcer information, and shift (day or night).

#### ***3.8.5.3 Knowledge, attitudes, and practices***

This section collected information pertaining to nurses' knowledge, attitudes, and practices regarding pressure ulcer prevention.

## **3.9 Data collection method**

A meeting was arranged with the nursing managers of the two hospitals to discuss the study. Assistant nursing managers and operational managers were made aware of the study. Operational managers conveyed information about the research to their staff. On the days of data collection, all nurses meeting the inclusion criteria and willing to participate were surveyed. The study was explained to the participants and they were requested to fill in the consent form. Due to staff shortages and high workloads, questionnaires were given to participants to complete during their shift and collected at the end of their shift. Participants who could not complete the

questionnaires were given an additional time to complete the questionnaire. Some participants failed to return questionnaires on time; those which were returned much later were also accepted.

A physiotherapist was utilised as a research assistant in the distribution and collection of questionnaires. The physiotherapist was trained with regard to the questionnaire prior to data collection.

### **3.10 Data handling**

Questionnaires were collected and checked for completeness. All questionnaires were kept under lock and key, and could be accessed by the researcher only.

### **3.11 Data analysis**

Descriptive statistics were reported using frequencies and were displayed on a frequency distribution table. The analytical statistics were analysed using two-sample t-test and analysis of variance test (ANOVA) to determine the relationships between participant characteristics and knowledge, attitudes, and practices.

### **3.12 Ethical considerations**

Permission was obtained from gatekeepers in both hospitals (see Appendix E). Full ethical approval was obtained from the UKZN Biomedical Research Ethics Committee (BREC) on the 05 May 2016 (reference number BE375/15) (Appendix E). Approval was also obtained from the KwaZulu-Natal Department of Health (HRKM104/16) to conduct the study in the province.

A participant information sheet accompanied each questionnaire to introduce and explain the study to the participants (see Appendix B). The details of the researcher as well as the UKZN Biomedical Research Ethics Committee were included in the information sheet.

Informed consent was obtained from each participant willing to take part in the study. Consent was obtained through a consent form which was included in the questionnaire (see Appendix C). Confidentiality and privacy of participants was maintained as questionnaires did not collect personal information on participants. Questionnaires were assigned numbers for identification

purposes. Non-maleficence of participants was maintained as the participant information sheet stated that partaking in the study posed minimal risk to the participants. The ethical guidelines utilised were informed by the University of KwaZulu Natal ethics policy.

## **CHAPTER 4: RESULTS**

The results of the study are presented in this chapter in manuscript format. The manuscript will be submitted to the *Health SA Gesondheid* journal.

# **NURSES' KNOWLEDGE, ATTITUDES, AND PRACTICES OF PRESSURE ULCER PREVENTION IN THE PIETERMARITZBURG METROPOLITAN HOSPITAL COMPLEX IN 2016.**

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## **Abstract**

### **Background**

Pressure ulcers have been recognised globally as a serious problem for the healthcare system. Pressure ulcers have been identified as being among the top five causes of harm to patients and they affect all age groups but are mostly common among immobile or geriatric patients, as well as people with severe acute or neurological conditions. The effects of pressure ulcers include high treatment costs, litigation matters, and increased workload on nursing staff. The development of pressure ulcers is often used as a mark of poor quality of nursing care. Nurses require good knowledge, attitudes, and practices of pressure ulcer prevention as they are primarily involved in the care of patients.

### **Objectives**

The study aimed to investigate the knowledge, attitudes, and practices of nurses employed in the Pietermaritzburg Metropolitan Hospital Complex, with regard to pressure ulcer prevention.

### **Method**

An observational, cross-sectional study with an analytical component was utilised. Data were collected using a self-administered questionnaire. Descriptive statistics were summarised using

frequencies while analytical statistics (t-test and ANOVA) were used to determine the relationships between participant demographics and knowledge, attitudes, and practices.

## **Results**

The mean knowledge of nurses (N=223) was 69.9% which was regarded as low. A small majority of nurses (58%) had a positive attitude towards pressure ulcer prevention and the average practice score was 56.2%. There was a statistically significant difference in knowledge by rank ( $p=0.000$ ), years of experience ( $p=0.019$ ), previous pressure ulcer knowledge ( $p=0.000$ ), and ward ( $p=0.000$ ).

## **Conclusion**

The knowledge and practices of nurses are unsatisfactory, although their attitudes are positive. Knowledge needs to be improved in order to influence attitudes and practices. A multi-faceted approach is required to empower nurses and hence improve PU prevention.

**Key words:** attitude; knowledge; nurse; practice; pressure ulcer prevention

## **Introduction**

Pressure ulcers (PU's) are a growing problem in the healthcare system (Tubaishat, Anthoy, & Saleh, 2011). Pressure ulcers have been identified among the top five causes of harm to patients (Abou El Enein & Zaghloul, 2011) and they affect all age groups but are mostly common among immobile or geriatric patients, as well as people with severe acute or neurological conditions (Kruger, Pires, & Rubayi, 2013). The prevalence of PU's ranges between 10.5% and 22% in acute care settings in the United States of America (USA) and Europe (Leijon, Bergh, & Karin, 2013).

The consequences of PU's include increased costs for health institutions as well as having a negative impact on patients (Spear, 2013). It is reported that the cost of treating grade four PU's in the USA is estimated at \$150 000 (Lyder & Ayello 2008) and up to £579 million in Europe (Pather, 2012). In addition, litigation matters further increase costs, with an average malpractice lawsuit settlement amounting to \$250 000 in the USA (Qaddumi & Khawaldeh, 2014).

Furthermore, PU's increase hospital stay by seven days, adding to the financial costs (Gedamu, Hailu, & Amano, 2014). The time spent on the treatment of PU's impacts on the nursing staff workload, especially in settings which are short staffed (Gedamu et al., 2014). Apart from the financial implications, PU's affect the quality of life of patients as they experience pain, limited mobility, and increased dependency on family for assistance with activities of daily living (Hopkins, Dealey, Bale, Defloor, & Worboys, 2006).

The risk factors associated with PU development include immobility, nutritional status, age, skin status (perfusion, moisture, and temperature), and general health status (Coleman, Gorecki, Nelson, & Closs, 2013). The development of PU's is complex and hence prevention is not based on a single practice but rather a combination of strategies. Prevention methods include positioning, the use of pressure-relieving surfaces like mattresses or pillows, addressing nutritional deficiencies, and maintaining good skin quality (Reddy, Gill, & Rochon, 2006).

Pressure ulcers have been recognised universally as a preventable patient safety problem (Leijon et al., 2013). Nurses are the backbone of any health institution and although PU prevention requires a multi-disciplinary approach, nurses are the most appropriate practitioners to lead prevention teams since they are primarily concerned with coordinating the nursing aspect of care

(Gunningberg, 2004). In order to execute this role effectively, nurses require good knowledge, positive attitudes, and evidence-based practices.

A number of studies have been conducted to determine the knowledge, attitudes, and practices of nurses in PU prevention and these have revealed that, generally, nurses' knowledge on PU prevention is insufficient and not in line with current guidelines (Al Kharabsheh, Alrimawi, Al Asaaf, & Saleh, 2014; Gunningberg, Lindholm, Carlsson, & Sjoden, 2001; Tubaishat & Aljezawi, 2014). In the Pietermaritzburg Metropolitan Hospital Complex, quarterly reports submitted have shown an increase in the number of PU's over the years 2013-2014. The year 2013 contributed 21.2% of cases while 2014 contributed 78.8% of the total cases reported over these two years. The wards mostly reporting PU's were the orthopedic, medical, and surgical wards. The study aimed to determine the knowledge, attitudes, and practices of nurses regarding PU prevention in the Pietermaritzburg Metropolitan Hospital Complex in 2016.

## **Methods**

### **Measurement instrument**

A self-administered questionnaire was used to collect data. The questionnaire was previously used in a study conducted by Islam (2010) which investigated nurses' knowledge, attitudes, and practices of PU prevention in a university hospital in Bangladesh. The variables measured in the questionnaire included demographic data, and nurses' knowledge, attitudes, and practices of PU prevention. The questionnaire was adapted for the purpose of the study. Two variables were added in the demographics section of the questionnaire (rank and shift).

The questionnaire was tested through a pilot study of 15 nurses working in an out-patient eye clinic. The pilot study did not result in any change in the questionnaire but it was decided that nurses would require more time to complete the questionnaire due to their work commitments.

### **Setting**

The study was conducted in two hospitals within the Pietermaritzburg Metropolitan Hospital Complex in uMgungundlovu District. The hospitals are tertiary and district/regional hospitals. The services provided include medical, surgical, orthopedic, and intensive care (ICU), neurosurgery, and obstetrics and gynecology, among others.

### **Research design**

An observational, cross-sectional, descriptive study with an analytical component was implemented.

### **Procedure**

#### **Population**

The study population consisted of all categories of permanently employed nurses working in the medical, orthopedic, surgical, and ICU wards on either day or night shift in the two hospitals.

#### **Sample**

All permanently employed registered nurses, staff nurses, and nursing assistants working in the medical, surgical, orthopedic, and ICU wards either on day or night shifts in the respective hospitals were invited to participate in the study. Non-probability, purposive sampling was utilised and all nurses in the units of interest who were willing to participate were surveyed on the days of data collection. All student nurses and those nurses not permanently employed at the respective hospitals, as well as all categories of nurses currently working in other units were excluded.

#### **Data collection**

Data were collected between May 2016 and August 2016 through a self-administered questionnaire. Nurses who met the inclusion criteria in both hospitals completed the questionnaires.

### **Data analysis**

The responses from the questionnaires were captured on a Microsoft Excel spreadsheet and exported to Stata 14. Descriptive data were summarised using frequencies and displayed using frequency distribution tables. The two-sample t-test and the ANOVA test were used to test the association of the demographic characteristics with knowledge, attitudes, and practices. The level of significance used was 95% ( $p < 0.05$ ).

## Results

### Demographic characteristics

The total number of participants who completed the questionnaire was 223 (see Table 1). The majority of the participants 114 (51.1%) were aged between 30 and 44 years, 190 (85.2%) were females, and 111(49.8%) were registered nurses. Most of the participants (131; 60.1%) had clinical nursing experience of one to ten years, 97 (43.5%) were working in the medical wards, and 128 (60.4%) had obtained previous PU knowledge through in-service training.

TABLE 1

Demographic characteristics of participants (n=223)

<b>DEMOGRAPHIC CHARACTERISTIC</b>	<i>N</i>	<b>%</b>
<b>AGE</b>		
<i>18-29</i>	37	16.6
<i>30-44</i>	114	51.1
<i>45-49</i>	66	29.6
<i>60-69</i>	6	2.7
<b>GENDER</b>		
<i>Male</i>	31	13.9
<i>Female</i>	190	85.2
<b>RANK</b>		
<i>Nursing Assistant</i>	40	17.9
<i>Enrolled Nurse</i>	72	32.3

<i>Registered Nurse</i>	111	49.8
<b>YEARS OF EXPERIENCE</b>		
<i>0-10</i>	131	60.1
<i>10-20</i>	59	27.1
<i>20-30</i>	21	9.6
<i>30-40</i>	7	3.2
<b>WARD</b>		
<i>Orthopedic</i>	31	13.9
<i>Surgical</i>	70	31.4
<i>ICU</i>	25	11.2
<i>Medical</i>	97	43.5
<b>PREVIOUS PU KNOWLEDGE</b>		
<i>Peer review</i>	30	14.2
<i>Internet</i>	3	1.4
<i>External course</i>	23	10.8
<i>In-service training</i>	128	60.4
<i>Tertiary</i>	28	13.2

### **Nurses' knowledge of pressure ulcer prevention**

Nurses mean knowledge score was low at (69.2%). Table 3 represents the differences PU prevention knowledge and participant characteristics. In nurses knowledge in order to determine the relationship between PU prevention knowledge and participant characteristics. Results revealed that the nurse's rank ( $F=8.671$ ,  $df=2$ ,  $p=0.000$ ) and years of experience ( $F=3.386$ ,  $df=3$ ,

$p=0.019$ ) significantly influences their knowledge on PU care. Furthermore there was a statistically significant association in knowledge with ward ( $F=10.765$ ,  $df=3$ ,  $p=0.000$ ) and previous PU knowledge ( $F=5.900$ ,  $df=4$ ,  $p=0.000$ ). Regarding nurses' knowledge, participants were asked to identify the correct answer to each question. The questions that were considered most important in PU prevention are presented in Table 2. A large majority of participants ( $n=198$ , 89%) knew that pressure was a contributing factor to the development of PU's and ( $n=186$ , 83%) were able to identify immobility as the most important factor contributing to PU development in the aged. A majority of the participants ( $n=176$ , 79%) could adequately identify the first sign of a PU. Fewer than half (92, 41%) did not know the scale used to determine the risk of developing a PU (Table 2).

TABLE 3

Differences in PU prevention knowledge and participant characteristics, (N=223)

<b>PARTICIPANT CHARACTERISTICS</b>	<b>n</b>	<b>M</b>	<b>SD</b>	<b>t-test</b>	<b>ANOVA</b>	<b>P-value</b>
<b>AGE</b>						
<i>18-29</i>	37	16.0	0.6		0.946	0.419
<i>30-44</i>	114	15.0	0.3			
<i>45-49</i>	66	15.2	0.4			
<i>60-69</i>	6	14.2	1.9			
<b>GENDER</b>						
<i>Male</i>	31	15.2	2.9	1.686		0.981
<i>Female</i>	190	15.2	3.5			
<b>RANK</b>						
<i>Nursing Assistant</i>	40	14.0	2.7		8.671	0.000
<i>Enrolled Nurse</i>	72	14.5	3.8			
<i>Registered Nurse</i>	111	16.1	3.1			
<b>YEARS OF EXPERIENCE</b>						

<i>0-10</i>	131	15.1	3.6		3.386	0.019
<i>10-20</i>	59	14.8	3.2			
<i>20-30</i>	21	17.3	2.5			
<i>30-40</i>	7	16.0	2.4			
<b>WARD</b>						
<i>Orthopedic</i>	31	16.8			10.765	0.000
<i>Surgical</i>	70	15.7				
<i>ICU</i>	25	17.0				
<i>Medical</i>	97	13.9				
<b>PREVIOUS PU KNOWLEDGE</b>						
<i>Peer review</i>	30	15.5			5.900	0.000
<i>Internet</i>	3	13.7				
<i>External course</i>	23	12.3				
<i>In-service training</i>	128	15.4				
<i>Tertiary</i>	28	16.6				

TABLE 2

Nurse's knowledge of PU prevention (N=223)

Question	Correct		Incorrect	
	N	%	N	%
What factor contributes to the development of a pressure ulcer?	198	89	25	11
Which is the most important factor contributing to pressure ulcer development in an 80-year-old man who has a fractured hip and is bedridden?	186	83	37	17
Which is the first sign of a pressure ulcer?	176	79	47	21
Which scale is used to determine an individual who is at risk of developing pressure ulcers?	92	41	131	59
Which environment will best favour the growth of bacteria on the skin of a patient with a head injury?	156	70	67	30
Which nutritional factor contributes to the development of pressure ulcers?	152	68	71	32
Which is the method for maintaining integrity of the skin?	93	42	130	58
What would be an appropriate strategy to manage mechanical load?	98	44	125	56
What nutritional support would be required for an 80-year-old bedridden patient with a BMI<18.5?	186	83	37	17
Which is an appropriate method for skin care?	62	28	161	72
Which is the correct description of a grade 2 PU?	144	65	79	35

### Nurses' attitudes towards pressure ulcer prevention

More than half of participants (n=111, 58.1%) had positive attitudes towards PU prevention. In Table 5 presented the differences in PU prevention attitudes and participant characteristics in order to establish the relationship between PU prevention attitudes and participant characteristics. The results presented revealed that there was no statistical significance in attitude with participants' characteristics. Participants were asked to indicate the extent to which they

agreed or disagreed with the statements on attitudes towards PU prevention. The statements considered to be most important to PU development and participants' responses to these statements are presented in Table 4. A small majority of participants (n=111, 50.7%) agreed that most risk factors contributing to PU development could be managed. About a third of the participants (n=71, 32.4%) disagreed with the statement that nurses were less interested in PU prevention than other aspects of nursing care. In addition, (n=102, 46.8%) participants disagreed with the statement that nutritional status is not an important risk factor in the development of PU's.

TABLE 5

Differences in PU prevention attitudes and participant' characteristics.

<b>PARTICIPANT CHARACTERISTICSs</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>t-test</b>	<b>ANOVA</b>	<b>P-value</b>
<b>AGE</b>						
<i>18-29</i>	37	89.7	8.0		0.231	0.874
<i>30-44</i>	114	88.3	16.5			
<i>45-49</i>	66	88.7	11.9			
<i>60-69</i>	6	92.5	7.1			
<b>GENDER</b>						
<i>Male</i>	31	93.2	10.9	0.239		0.061
<i>Female</i>	190	88.1	14.3			
<b>RANK</b>						
<i>Nursing Assistant</i>	40	89.2	12.5			
<i>Enrolled Nurse</i>	72	90.7	12.9		1.198	0.304
<i>Registered Nurse</i>	111	87.4	14.9			
<b>YEARS OF EXPERIENCE</b>						
<i>0-10</i>	131	88.6	1.3		0.383	0.765
<i>10-20</i>	59	89.6	1.6			
<i>20-30</i>	21	86.0	2.2			
<i>30-40</i>	7	90.4	3.0			
<b>WARD</b>						
<i>Orthopedic</i>	31	90.2	8.5		0.310	0.818
<i>Surgical</i>	70	88.2	10.2			
<i>ICU</i>	25	87.0	9.8			
<i>Medical</i>	97	89.3	18.0			
<b>PREVIOUS PU KNOWLEDGE</b>						
<i>Peer review</i>	30					

<i>Internet</i>	3					
<i>External course</i>	23					
<i>In-service training</i>	128					
<i>Tertiary</i>	28					

TABLE 4

Nurses' attitudes towards PU prevention (N=223)

QUESTION	STRONGLY DISAGREE		DISAGREE		NEUTRAL		AGREE		STRONGLY AGREE	
	N	%	N	%	N	%	N	%	N	%
Most risk factors contributing to pressure ulcers can be managed.	0	0	10	4.6	4	1.88	111	50.7	94	42.9
I am less interested in pressure ulcer prevention than other aspects of nursing care.	71	32.4	101	46.1	18	8.2	20	9.1	9	4.1
I do not think nutritional status is an important risk factor in the development of pressure ulcers.	47	21.6	102	46.8	17	7.8	30	13.8	22	10.1
Prevention of pressure ulcers is time consuming to carry out.	32	14.5	69	31.4	24	10.9	49	22.3	46	21
My clinical judgement is better than using a pressure ulcer	13	6	58	26.7	23	10.6	74	34.1	49	22.6

risk-assessment tool.										
All patients are at risk of developing pressure ulcers.	29	13.6	83	39	17	8	33	15.5	51	24
The development of pressure ulcers is an important indicator of quality nursing care.	20	9.2	40	18.3	15	6.9	63	28.9	80	36.7

### **Nurses' practices of PU prevention**

The average practices of participants scored at 56.2% which was low. Table 5 presents the differences in PU prevention practices with participant characteristics in order to ascertain the relationship between PU prevention practices and participant characteristics. The results revealed no statistically significant difference in practices with participants' characteristics (Table 7). The responses to practices considered to be most important in PU development are presented in Table 6. Nearly two-thirds of the participants (n=134, 61.75%) indicated that they always observe how other nurses assess a patient's risk of developing a pressure ulcer.

A large majority of participants (n=181, 83.4%) indicated that they always identify common factors contributing to PU development, while (n=32, 14.7%) indicated that they sometimes did, and only (n=4, 1.8%) indicated that they never did. Nearly two-thirds of participants (n=144, 66.1%) indicated that they monitor patients who require high protein and high carbohydrate diets, while only (n=8, 3.6%) said they never did.

TABLE 7

Differences in PU prevention practices and participants' characteristics.

<b>PARTICIPANT CHARACTERISTICS</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>t-test</b>	<b>ANOVA</b>	<b>P-value</b>
<b>AGE</b>						
<i>18-29</i>	37	57.8	4.4		0.946	0.419
<i>30-44</i>	114	55.2	10.5			
<i>45-49</i>	66	57.0	5.2			
<i>60-69</i>	6	59.5	6.3			
<b>GENDER</b>						
<i>Male</i>	31	57.9	4.7	1.900		0.228
<i>Female</i>	190	55.9	8.8			
<b>RANK</b>						
<i>Nursing Assistant</i>	40	55.9	5.3		0.151	0.860
<i>Enrolled Nurse</i>	72	56.0	8.5			
<i>Registered Nurse</i>	111	56.6	9.1			
<b>YEARS OF EXPERIENCE</b>						
<i>0-10</i>	131	55.6	9.9		0.899	0.442
<i>10-20</i>	59	57.8	5.5			
<i>20-30</i>	21	56.4	4.9			
<i>30-40</i>	7	56.3	5.6			
<b>WARD</b>						
<i>Orthopedic</i>	31	56.2	3.5		2.033	0.110
<i>Surgical</i>	70	57.6	5.8			
<i>ICU</i>	25	58.1	6.0			
<i>Medical</i>	97	54.8	10.9			
<b>PREVIOUS PU KNOWLEDGE</b>						

<i>Peer review</i>	30	55.4	6.9		0.783	0.537
<i>Internet</i>	3	59.3	5.7			
<i>External course</i>	23	54.3	5.3			
<i>In-service training</i>	128	56.4	9.9			
<i>Tertiary</i>	28	58.0	4.2			

TABLE 6

Nurses' practices of PU prevention (N=223)

QUESTION	ALWAYS		SOMETIMES		NEVER	
	N	%	N	%	N	%
I observe how other nurses assess a patient's risk of developing pressure ulcers.	134	61.7	80	36.9	3	1.4
I identify common factors that contribute to the development of pressure ulcers in my patients.	181	83.4	32	14.7	4.	1.8
I monitor patients who need high protein and carbohydrate diets.	144	66.1	61	28	13	6.0
I avoid massaging patients over bony prominences.	66	30.4	39	18	112	51.6
I attend seminars or courses on pressure ulcer prevention.	59	26.9	89	40.6	71	32.4
I use risk assessment scales to determine my patients' risk of developing pressure ulcers.	177	80.8	31	14.2	11	5.0

### **Ethical considerations**

Gatekeeper approval was obtained from hospital management in both hospitals. Permission to conduct research in the KwaZulu-Natal Department of Health (HRKM104/16) was also obtained. Full ethical approval was obtained from the UKZN Biomedical Research Ethics Committee (BE375/15). Nurses who participated in the study were requested to sign a consent form which was included in the front of the questionnaire along with a participation information sheet. The identity of the participants was protected since the questionnaires did not require the names of participants. Numbers were assigned to questionnaires for identification purposes.

### **Discussion**

The purpose of this study was to determine nurses' knowledge, attitudes and practices of PU prevention. This study showed that nurses' knowledge of PU prevention was low, their attitudes were positive, and their level of practice was also low. Although PU prevention is a multi-disciplinary team responsibility, nurses play a major role (Lyder & Ayello, 2008) and therefore nurses need to possess good knowledge, positive attitudes, as well as good practices. Lack of knowledge and skills in PU prevention contributes significantly to the development or progression of PU's (Gunningberg, 2004). Insufficient knowledge can result in inadequate PU prevention (Demarre et al., 2011).

### **Knowledge of PU prevention**

The low level of knowledge of PU prevention in this study was in line with previous studies (Islam, 2010; Qaddumi & Khawaldeh, 2014) which also reported unsatisfactory knowledge levels among nurses. Reasons that could explain the lack of knowledge include lack of training, lack of evidence supported by research, and staff shortages (Dilie & Mengistu, 2015; Qaddumi & Khawaldeh, 2014). In the current study the majority of participants received previous PU prevention knowledge through in-service training whilst (Qaddumi & Khawaldeh, 2014) found that the majority of participants received previous PU in university. However in both studies the level of knowledge of PU prevention was inadequate. This may suggest that nurses require more frequent up-to-date PU prevention training and improved dissemination of PU prevention guidelines.

The results showed that there were statistically significant associations between knowledge and rank ( $p=0.000$ ), years of experience ( $p=0.019$ ), previous PU knowledge ( $p=0.000$ ), and the ward in which nurses were employed ( $p=0.000$ ). This is comparable to the findings of Taha among nurses in an ICU setting (Taha, 2014). In contrast a study conducted among Jordanian nurses found no significant association in knowledge with years of experience and previous PU training (Qaddumi & Khawaldeh, 2014), although the study found a significant association in knowledge with gender. The current study did not find a significant difference in knowledge with gender.

In this study, the lowest scores were found in questions relating to risk assessment and skin integrity, and the higher scores were found in questions relating to factors contributing to PU prevention, nutrition, and PU classification. In contrast, a study conducted in Belgium (Demarre et al., 2011) found that the lowest scores were among nutrition, etiology, and classification, and the higher scores were found in questions relating to risk assessment. The difference in findings in this respect may be attributed to the difference in setting of the two studies.

### **Attitudes towards PU prevention**

Nurses' attitudes towards PU prevention were positive and this concurs with findings from other studies (Dilie & Mengistu, 2015; Islam, 2010; Uba, Alih, Keever, & Lola, 2015). The majority of nurses agreed that most risk factors contributing to PU's could be avoided and that the development of PU's is an important indicator of quality nursing care; in this regard, the results correspond with findings of previous studies (Dilie & Mengistu, 2015; Islam, 2010; Uba et al., 2015).

The current study revealed no statistical differences in attitudes with demographic characteristics which supported the findings of a study conducted in Turkey which investigated nurse' attitudes of PU prevention (Aslan & Yavuz van Giersbergen, 2016). Participants mostly disagreed with the statement that all patients were at risk of developing PU's and that PU prevention is time consuming although a study conducted in Addis Ababa found that nurses strongly agreed with the statement that all patients were at risk of developing PU's and that PU prevention is time consuming (Etafa, 2015).

### **Practices of PU prevention**

The practices of PU prevention amongst participants in this study were unsatisfactory, even though they had positive attitudes. This suggests that positive attitudes alone may not improve practices and this has implications for interventions. The poor level of practices could be attributed to poor knowledge and suggests that positive attitudes might not be sufficient to improve practices of PU prevention (Moore & Price, 2004). A study by (Nuru, Zewdu, Amsalu, & Mehretie, 2015) also found poor practices among nurses in the prevention of PU's and the barriers identified were formal training on PU prevention, dissatisfaction with nursing leadership, and staff shortages.

Nurses' practice scores were highest in practices relating to skin assessments, risk assessment, and positioning while the lowest scores were relating to nutritional assessments and attending seminars on PU prevention. This finding was consistent with (Islam, 2010) who also found the highest scores in positioning and skin assessments but the lowest scores in risk assessment, in

addition to nutritional assessment and attending seminars on PU prevention. The reason for low scores on nutritional aspects could be due to overall low levels of knowledge on PU prevention and low scores pertaining to attending seminars on PU prevention may be due to lack of training opportunities as well as poor access to updated PU prevention programs as confirmed by (Uba et al., 2015).

### **Limitations**

The data were self-reported and therefore subject to information bias. The study used a self-administered questionnaire and did not include observations. The study was conducted in one health district and the results may therefore not be generalisable to nurses working in other districts.

### **Recommendations**

The nurses' knowledge and practices in this study were unsatisfactory but their attitudes were positive. An intervention that will provide ongoing education and support for nurses especially those in the lower ranks is necessary. Regular in-service training which includes theory as well as practical sessions should be implemented. Nurse-led PU-prevention programs are essential to improve patient outcomes. Furthermore, adequate dissemination of PU-prevention guidelines is a prerequisite to improving the quality of PU prevention.

### **Conclusion**

Knowledge and practices of PU prevention among nurses was low although attitudes were positive. Pressure ulcer prevention is a patient safety concern; nurses are at the forefront of care and need to be equipped with good knowledge and practices. Further research should seek to identify barriers to PU prevention and strategies to manage those barriers to improve clinical care.

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## **CHAPTER 5: DISCUSSION**

### **5.1 Introduction**

This chapter begins by reviewing the findings of the study followed by the key findings. The study also documents the study limitations, recommendations for nursing managers and nurses, future research, and the conclusion.

### **5.2 Review of findings**

PU prevention is an important aspect in nursing care and there are many negative implications associated with PU's (35). A number of studies have been conducted in various settings to determine knowledge, attitudes, and practices of nurses pertaining to PU prevention (72, 74-76). Furthermore, the literature is suggestive of the importance of effective PU prevention through multi-disciplinary team involvement, with nurses as the leaders (77, 78).

The current study revealed that nurses' knowledge was limited and this concurred with previous studies (70, 72, 75). There was a statistically significant association between knowledge and rank, years of experience, previous PU prevention, and the ward in which nurses were working. Nurses' attitudes towards PU prevention were positive and this finding concurred with other studies (65, 76, 79). Moreover, practices of PU prevention among nurses were inadequate, which was a finding common in other studies (79, 80). The findings suggest that a sustainable intervention to improve nurses' knowledge and practices is required.

### **5.3 Key findings**

The key findings of the study were that the knowledge and practices of nurses regarding PU prevention were inadequate and their attitudes towards PU prevention were positive. Furthermore, there was a statistically significant association found between knowledge and rank, years of experience, previous PU prevention, and ward, while no significant association was found between in knowledge, attitudes and practices with gender.

#### **5.4 Study limitations**

The study was conducted using a self-administered questionnaire and observations were not included. The study was self-reported and therefore subject to information bias. Moreover, the study was conducted in one health district and can therefore not be generalised to other districts.

#### **5.5 Recommendations**

Drawing from the findings of this study, the following recommendations are given for consideration:

##### ***5.5.1 Service***

Nursing managers should be involved in interventions that provide ongoing education as well as support that will primarily target the lower ranks. There needs to be adequate dissemination of PU guidelines as well as tools that will periodically assess the extent to which guidelines are adhered to. Nurse managers should identify the challenges experienced by nurses regarding PU prevention and aim to address them accordingly. A review of nursing curriculum with regards to PU care must be conducted.

##### ***5.5.2 Nursing Education***

Nurses should engage in in-service training in their respective wards to improve their knowledge and practices. There should be regular demonstration and assessment of the competency of nurses in PU prevention. Nurse-led PU-prevention programmes are vital to improve patient outcomes. Nurses should also take responsibility in reporting the challenges they experience in their respective practice of PU prevention.

#### **5.6 Future studies**

- Future research should be carried out with a larger sample size to allow for greater generalisability
- A multi-facility study should be conducted to establish if there are any differences in knowledge, attitudes, and practices in nurses practising in different hospitals.
- Future research needs to be conducted to determine the barriers to effective PU prevention.

- Further research should also focus on determining the effectiveness of interventions in improving knowledge and practices of PU prevention.

## **5.7 Conclusion**

The aim of the study was to determine the knowledge, attitudes, and practices of nurses regarding PU prevention in the Pietermaritzburg Metropolitan Hospital Complex. The study concluded that nurses have unsatisfactory knowledge and practices, and positive attitudes. It is essential to provide the appropriate interventions to improve the knowledge and practices of nurses in PU prevention.

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## **APPENDICES**

### **APPENDIX A** **QUESTIONNAIRE**

Dear Participant

This questionnaire has been designed for the fulfilment for a Master in Public Health Degree. The study will investigate Nurses' knowledge, attitudes and practices of pressure ulcer prevention in the Pietermaritzburg Metropolitan Hospital Complex.

Please take some time to fill in the questionnaire provided. Please answer all questions as best you can. Please do not leave any blanks. Please feel free to ask the physiotherapist if you have any questions.

Thank you.

**Instructions:** This questionnaire is divided into four questions. Section 1 relates to personal information. Section 2 is related to your knowledge about pressure ulcer prevention. Section 3 is related to your attitudes towards pressure ulcer prevention and Section 4 is related to your actual practice of pressure ulcer prevention.

---

**SECTION 1: SOCIO-DEMOGRAPHIC DETAILS**

**Instruction:** Please fill in the blank spaces and tick (✓) the relevant option in the brackets.

1. Age

18-29     30-44     45-59     60-69

2. Gender

Male     Female

3. Marital Status

Single     Married     Divorced     Widowed

4. Nursing Rank

Professional nurse     Staff (enrolled) Nurse     Nursing Assistant

5. Years of clinical Experience.....

6. Where have you learnt about pressure ulcer prevention previously?

University     In-Service Training     External Course  
 Internet     Peer education

7. Which ward are you working in currently?

Orthopaedic    (...) Surgical  
 ICU     Medical

8. Which shift are you currently on?

(...) Day    (...) Night

**SECTION 2: NURSES' KNOWLEDGE ON PRESSURE ULCER PREVENTION**

**Instruction:** Please read each question carefully and tick (√) next to a, b or c to show the correct answer.

1. What factor contributes to the development of pressure ulcers?
  - (a) Intracranial pressure
  - (b) Chronic wound
  - (c) Pressure
  
2. Which of the following factors is the most important factor contributing to pressure ulcer development in an 80-year-old man who has a fractured hip and is bedridden?
  - (a) Malnutrition
  - (b) Urinary incontinence
  - (c) Immobility
  
3. Which environment will best favour the growth of bacteria on the skin of a patient with a head injury?
  - (a) Malnutrition
  - (b) Anaemia
  - (c) Faecal incontinence
  
4. Which nutritional factor contributes to the development of pressure ulcers?
  - (a) Low albumin
  - (b) High haematocrit
  - (c) High sodium
  
5. Which is an appropriate examination for a patient with a high risk of developing pressure ulcers?
  - (a) Abdominal assessment
  - (b) Respiratory assessment
  - (c) Head-to-toe assessment

6. Which scale is used to determine an individual who is at risk of developing pressure ulcers?
  - (a) Richter Scale
  - (b) Glasgow Coma Scale
  - (c) Braden scale
  
7. What is the appropriate method of assessing an individual who is at high risk of developing pressure ulcers?
  - (a) Clinical judgement
  - (b) Risk assessment scale
  - (c) Physician's judgement
  
8. Which is the correct description of a grade 2 pressure ulcer?
  - (a) Intact skin with redness
  - (b) Partial skin loss with blister
  - (c) Full thickness skin loss with exposed muscle
  
9. Which is the first sign of a pressure ulcer?
  - (a) Open sore
  - (b) Redness or blue-grey discolouration
  - (c) Blister or bruise of the skin
  
10. Which is an appropriate method for skin care?
  - (a) Massage bony prominences
  - (b) Apply cream
  - (c) Apply powders
  
11. How would you best protect the skin from maceration?
  - (a) Nappies
  - (b) Cleaning the skin well after soiling?
  - (c) Wound dressing

12. How can you best protect skin damage?
- (a) Sitting for two hours
  - (b) Turning every two hours
  - (c) Elevate the head at 30 degrees
13. What is the best method for maintaining the integrity of the skin?
- (a) Lifting the patient up without dragging
  - (b) Using a cushion
  - (c) Using sheepskin
14. How can you prevent an ulcer on the heel?
- (a) Raise the bed
  - (b) Use cotton pad
  - (c) Use a pillow under the patient's legs
15. Which vitamin(s) is important to maintain healthy skin?
- (a) Vitamin B & D
  - (b) Vitamin C & E
  - (c) Vitamin K
16. What nutritional support would be required for an 80-year-old bedridden patient with a BMI < 18.5?
- (a) High fat diet
  - (b) High protein and high calorie diet
  - (c) Fruit and vegetable diet
17. What would be an appropriate lab test that would be included in nutritional assessment?
- (a) Platelet count
  - (b) Serum electrolyte
  - (c) Serum albumin

18. What would be an appropriate strategy to manage mechanical load?
- (a) Repositioning
  - (b) Cleanse after soiling
  - (c) Place air cushion under bony prominences
19. How would you best reduce friction of a patient with a fractured hip and who is on skeletal traction?
- (a) Elevate the head at more than 30 degrees
  - (b) Lift the patient without dragging
  - (c) Massage over bony prominences
20. Which would be an appropriate strategy to reduce shearing force on the skin?
- (a) Elevate the head above 30 degrees
  - (b) Elevate the head at 60 degrees
  - (c) Elevate the head at 90 degrees
21. What educational information is important in the prevention of pressure ulcers?
- (a) Sitting up information
  - (b) Lifting the end of the bed
  - (c) A repositioning schedule
22. Which educational strategy is most likely to enhance nurses' competency in pressure ulcer prevention?
- (a) In-service training on pressure ulcer prevention
  - (b) Drafting of pressure ulcer prevention protocol
  - (c) Conducting seminars

**SECTION 3: NURSES' ATTITUDES TOWARDS PRESSURE ULCER PREVENTION**

**Instruction:** Please read each statement carefully and tick (✓) the statement that best reflects your opinion of the question. There are five possible options for each statement. You may not tick in two boxes.

5= Strongly agree

4= Agree

3= Neither agree nor disagree

2= Disagree

1= Strongly disagree

	STATEMENT	NURSE'S ATTITUDE				
1	All patients are at risk of developing pressure ulcers.	5	4	3	2	1
2	Most risk factors contributing to pressure ulcers can be managed.					
3	Prevention of pressure ulcers is time consuming to carry out.					
4	There should be 0% pressure ulcers in my ward.					
5	In my opinion, nurses can independently implement pressure ulcer prevention.					
6	I am less interested in pressure ulcer prevention than other aspects of nursing care.					
7	I am aware of appropriate pressure ulcer assessments.					
8	My clinical judgement is better than using a pressure ulcer risk assessment tool.					
9	Patients who are at risk of developing pressure ulcers should be assessed on the first day of admission.					
10	Pressure ulcer risk assessment should not be carried out routinely during the patient's hospital stay.					
11	All information about pressure ulcers should be documented at the time of assessment and reassessment.					
12	The development of pressure ulcers should be an important indicator of quality of nursing care.					
13	A patient's relatives should not be advised about assessing the skin during bathing the patient.					

14	A patient who is at risk of developing a pressure ulcer must be cared for using standard nursing care.					
15	I realize the importance of applying skin care as part of my nursing care in order to protect the skin.					
16	Patients should be cleaned immediately after soiling.					
17	I feel that applying skin lotion to my patient's skin is important to reduce the development of a pressure ulcer.					
18	A patient should be massaged over bony prominences.					
19	I think it is important to assess the quantity of food my patient consumes.					
20	I do not think that nutritional status is an important risk factor in the development of pressure ulcers.					
21	I should monitor the nutritional status of my patient.					
22	I feel patients at risk of developing pressure ulcers should be given less fluids.					
23	I am aware of turning my patient every two hours to prevent a pressure ulcer.					
24	I am less interested in lifting my patient out of bed.					
25	I value education about pressure ulcer prevention and feel it is important in my practice as a nurse.					

**SECTION 4: NURSES' PRACTICES OF PRESSURE ULCER PREVENTION**

**Instructions:** Please read each statement carefully and tick (√) in the answer that best reflects your views. Your options are **ALWAYS**, **SOMETIMES** and **NEVER**. You may only tick one option.

	<b>NURSES' PRACTICES OF PRESSURE ULCER PREVENTION</b>	<b>ALWAYS</b>	<b>SOME TIMES</b>	<b>NEVER</b>
--	---	---------------	-------------------	--------------

<b>1</b>	I observe how other nurses assess a patient's risk of developing pressure ulcers.			
<b>2</b>	I identify common factors that contribute to the development of pressure ulcers in my patients.			
<b>3</b>	I do skin assessments routinely in my unit.			
<b>4</b>	I do skin assessments guided by appropriate nursing standards that are available in my hospital or ward.			
<b>5</b>	I use risk assessment scales to determine my patient's risk of developing pressure ulcers.			
<b>6</b>	I document all information pertaining to pressure ulcers in my unit.			
<b>7</b>	I assess and provide pain management for patients with pressure ulcers.			
<b>8</b>	I place a pillow under my patient's leg to prevent pressure ulcers on the heels.			
<b>9</b>	I advise caregivers and relatives to use moisturisers on the patient's skin to prevent pressure ulcers.			
<b>10</b>	I pay more attention to pressure points when cleaning my patient after they have soiled.			
<b>11</b>	I take time to review lab results of a nutritional assessment followed by the doctor's instructions or orders.			
<b>12.</b>	I ensure my patients with nutritional deficits receive the necessary supplementation and foods.			
<b>13</b>	I monitor patients who need high protein and carbohydrate diets.			
<b>14</b>	I avoid dragging my patient when repositioning them.			

<b>15</b>	I use special mattresses to prevent pressure in patients at risk of developing pressure ulcers.			
<b>16</b>	I avoid massaging patients over bony prominences.			
<b>17</b>	I avoid using ring-shaped cushions at bony prominences.			
<b>18.</b>	I reposition patients two-hourly to prevent pressure ulcers.			
<b>19</b>	I put pillows under a patient's leg from the mid-calf to the ankle to prevent pressure ulcers.			
<b>20</b>	I use an air bed for patients at high risk of developing pressure ulcers.			
<b>21</b>	I attend seminars or courses on pressure ulcer prevention.			
<b>22</b>	I give advice on how to prevent pressure ulcers to patients and their families or caregivers upon discharge of the patient.			

## **APPENDIX B**

### **PARTICIPANT INFORMATION SHEET**

**Study title:** Nurses' Knowledge, Attitudes and Practices of Pressure Ulcer Prevention in the Pietermaritzburg Metropolitan in 2015.

My name is Sanelisiwe Malinga. I am employed by The Department of Health and currently working at Edendale Hospital as a Physiotherapist. I am a student of the University of Kwa-Zulu Natal and currently doing a Master's Degree in Public Health. This research is being done in partial fulfilment for the completion of the Master's Degree in Public Health. I would like to welcome you to this study on nurses' knowledge, attitudes, and practices of pressure ulcer prevention.

**Introduction:** I am Sanelisiwe Malinga currently doing my research on nurses' knowledge, attitudes, and practices of pressure ulcer prevention in the Pietermaritzburg Metropolitan Hospital Complex. Research is a learning process whereby we seek to answer a specific question. In this study, I would like to find out what nurses working in the Pietermaritzburg Metropolitan Hospital Complex that is (Edendale Hospital and Grey's Hospital), know about pressure ulcer prevention, what are the attitudes of nurses regarding pressure ulcer prevention, and what are the nurses practising regarding pressure ulcer prevention.

**Invitation:** I am inviting you to participate in this research. Your participation will benefit the hospital and all other nurses working in the two hospitals mentioned.

**What is involved in the study?** The study will be carried out using a questionnaire. All that is required is that you kindly fill in the questionnaire as accurately as you can. This should take you about 20 minutes. The responses will be collected and put together in order to provide an answer to the question of interest.

**Risks:** There are no foreseen risks and the study does not include invasive procedures.

**Benefits:** the study will benefit you and all nurses working in the Pietermaritzburg Metropolitan Hospital Complex. It will reveal how much nurses know about pressure ulcer prevention, what their attitudes towards pressure ulcer prevention are, and what they practice pertaining to pressure ulcer prevention. Based on the results, recommendations will be made.

**Participation:** Your participation is completely voluntary. You will not be penalised if you decide to refuse to take part in the study and are free to withdraw from the study at any time.

**Confidentiality:** The results of the study are completely confidential. Your name will not appear on the questionnaire and every measure will be made to keep your personal information confidential. Absolute confidentiality cannot be guaranteed in the event that disclosure of your personal information is required by the law. Once the study has been completed, you will receive a summary of the results so that you may know the outcome of the results of the study in which you participated.

**Contact Details:** If you have any questions relating to this study or study-related adverse events, please contact myself, Sanelisiwe Malinga on (033) 3954100 or 0769626195 or 0764323001.

**Contact details of BREC or Chair** - for the reporting of complaints/ problems:

**Biomedical Research Ethics Research Office, UKZN, Private Bag X54001, Durban 4000.**

Telephone: +27 (0) 31 260 4769/ 2601074

Fax: +27 (0) 31 260 4609

Email: [BREC@ukzn.ac.za](mailto:BREC@ukzn.ac.za)

**APPENDIX C**

**CONSENT FORM**

You have been asked to participate in a research study

You have been informed about the study by

You may contact Sanelisiwe Malinga on (033) 3954100/4101 or 0769626195 or 0764323001 at any time if you have any queries about the research or have suffered any adverse effects of the study as a result of the research.

You may contact the **Biomedical Research Ethics Office** on **031-260 4769** or **031-260 1074** or email **BREC@ukzn.ac.za**. If you have questions about your rights as a research participant.

Your participation in this research is entirely voluntary and you will not be penalized or lose any benefits if you refuse to participate or decide to withdraw from the study.

If you agree to participate, you will be given a signed copy of this document and the participant information sheet which is a written summary of the research.

**The research study including the above information has been described to me orally. I understand what my involvement in the study means and I voluntarily agree to participate in this study.**

**Signature of Participant:..... Date:.....**

**Signature of Witness:.....Date:.....**

**Signature of Translator:.....Date:.....**

## APPENDIX D

### LETTER TO GATEKEEPER

23 Maning Avenue  
MountainRise  
Pietermaritzburg  
3200

Dear Sir/ Madam

My name is Sanelisiwe Malinga. I am currently studying towards a Masters Degree in Public Health at the University of Kwa-Zulu Natal, Howard Campus. As part of the requirements of my degree I am required to undertake research. The topic of my study is Nurses' Knowledge, Attitudes and Practices of Pressure Ulcer Prevention in the Pietermaritzburg Metropolitan Hospital Complex in 2015.

This letter serves to seek permission from the institution to conduct the study. Ethical approval has been granted by the UKZN Biomedical Research Ethics Committee. The study will require the participation of all categories of nurses permanently employed in the Pietermaritzburg Metropolitan Hospital Complex. They will be required to complete a self-administered questionnaire as part of the data collection process. The risks of participating in the study are minimal and informed consent will be obtained from all willing participants.

Kind regards

Sanelisiwe Malinga

Contact details: **0769626195 or 0764323001**

Email: sanemalinga@gmail.com

Biomedical Research Ethics Committee:

Contact details: **031-260 4769 or 031-260 1074**

Email: BREC@ukzn.ac.za

**APPENDIX E**

**PERMISSION LETTERS**

Enquiries: Ms. H.G Grace  
Ext: 4040  
Date: 12 November 2015

Ms S. Malinga

Dear Madam

**RE: REQUEST FOR APPROVAL TO CONDUCT RESEARCH ON "NURSES' KNOWLEDGE, ATTITUDES AND PRACTISES OF PRESSURE ULCER PREVENTION IN PIETERMARITZBURG METROPOLITAN HOSPITAL COMPLEX IN 2015."**

Your request regarding "to conduct a research on the above is acknowledged and refers.

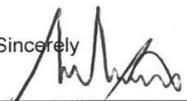
I have pleasure in informing you that permission has been granted to you by Edendale Hospital to conduct research.

Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
2. Please ensure this office is informed before you commence your research.
3. The Hospital will not provide any resources for this research.
4. You will be expected to provide feedback on your findings to Edendale Hospital.

Thank you

Yours Sincerely

  
MRS Z.S.I NDWANDWE  
CHIEF EXECUTIVE OFFICER  
EDENDALE HOSPITAL





<b>To:</b> Ms. S. Malinga Discipline of Public Health - UKZN
<b>From:</b> Dr. K. B. Bilenge CEO - Greys Hospital
<b>Date:</b> 19 November 2015
<b>Re:</b> Request for permission to conduct research at Grey's Hospital: <i>Nurses' Knowledge, Attitudes and Practices of Pressure Ulcer Prevention in Pietermaritzburg Metropolitan Hospital Complex in 2015</i>

Dear Ms. Malinga

Your request to conduct research at Grey's Hospital refers.

Permission to conduct the above study is hereby granted under the following conditions:

- Your provisional ethics approval and research protocol is assumed to be valid and final ethics approval is a prerequisite for conducting your study at our hospital. Once obtained from BREC, please submit a copy of the full ethics approval;
- You are also required to obtain approval for your study from the Provincial Department of Health KZN Health Research Unit prior to commencing your study at Grey's Hospital. You will find more information on their website: <http://www.kznhealth.gov.za/hrkm.htm>
- Confidentiality of hospital information, including staff and patient medical and/or contact information, must be kept at all times; Patient records are **not** to be removed from the hospital premises nor are you allowed to photocopy/ photograph them.
- You are to ensure that your data collection process will not interfere with the routine services at the hospital;
- You are to ensure that hospital resources are **not** used to manage your data collection, e.g. hospital staff collating data; photocopying; telephone; facsimile, etc.;
- Informed consent is to be obtained from all participants in your study, if applicable;
- Policies, guidelines and protocols of the Department of Health and Grey's Hospital must be adhered to at all times;
- Professional attitude and behaviour whilst dealing with research participants must be exhibited;
- The Department of Health, hospital and its staff will not be held responsible for any negative incidents and/or consequences, including injuries and illnesses that may be contracted on site, litigation matters, etc. that may arise as a result of your study or your presence on site;
- **You are required to submit to this office and to the Nursing Manager a summary of study findings upon completion of your research.**
- You are requested to make contact with the **Nursing Manager, Mrs. K.T. McKenzie**, at Grey's Hospital once you are ready to commence data collection.

Recommended by:

Dr L. Naidoo  
Senior Manager: Medical Services

Approved by:

Dr. K. B. Bilenge  
Hospital CEO



05 May 2016

Ms S Malinga  
Discipline of Public Health  
School Of Nursing and Public Health Medicine  
[sinemalinga@gmail.com](mailto:sinemalinga@gmail.com)

Dear Ms Malinga

**Protocol:** Nurses' knowledge, attitudes and practice of pressure ulcer prevention in UMgungundlovu district in 2015.

**Degree:** M-PH

**BREC reference number:** BE375/15

The Biomedical Research Ethics Committee has considered and noted your application received on 18 August 2015.

The study was provisionally approved pending appropriate responses to queries raised. Your response received 29 April 2016 to queries raised on 16 October 2015 have been noted and approved by a sub-committee of the Biomedical Research Ethics Committee. The conditions have now been met and the study is given **full ethics approval**.

This approval is valid for one year from **05 May 2016**. To ensure uninterrupted approval of this study beyond the approval expiry date, an application for recertification must be submitted to BREC on the appropriate BREC form 2-3 months before the expiry date.

Any amendments to this study, unless urgently required to ensure safety of participants, must be approved by BREC prior to implementation.

Your acceptance of this approval denotes your compliance with South African National Research Ethics Guidelines (2015), South African National Good Clinical Practice Guidelines (2006) (if applicable) and with UKZN BREC ethics requirements as contained in the UKZN BREC Terms of Reference and Standard Operating Procedures, all available at <http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx>.

BREC is registered with the South African National Health Research Ethics Council (REC-290408-009). BREC has US Office for Human Research Protections (OHRP) Federal-wide Assurance (FWA 678).

The sub-committee's decision will be **RATIFIED** by a full Committee at its meeting taking place on **10 June 2016**.

We wish you well with this study. We would appreciate receiving copies of all publications arising out of this study.

Yours sincerely

Professor J Tsoka-Gwegweni  
Chair: Biomedical Research Ethics Committee

cc supervisor: [dlungwane@ukzn.ac.za](mailto:dlungwane@ukzn.ac.za)

cc postgrad: [Arumugamd@ukzn.ac.za](mailto:Arumugamd@ukzn.ac.za)

---

Biomedical Research Ethics Committee

Professor J Tsoka-Gwegweni (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban 4000

Telephone: +27 (0) 31 260 2486 Facsimile: +27 (0) 31 260 4609 Email: [brec@ukzn.ac.za](mailto:brec@ukzn.ac.za)



**health**

Department:  
Health  
PROVINCE OF KWAZULU-NATAL

330 Langalibalele street,  
Private Bag X9051 PMB, 3200  
Tel: 033 395 2805/3189/3123 Fax: 033 394 3782  
Email: [hrkm@kznhealth.gov.za](mailto:hrkm@kznhealth.gov.za)  
[www.kznhealth.gov.za](http://www.kznhealth.gov.za)

**DIRECTORATE:**

Health Research & Knowledge  
Management (HKRM)

Reference: HRKM104/16  
KZ\_2016RP14\_700

14 April 2016

**Dear Ms S Malinga**

(University of KwaZulu-Natal)

**Subject: Approval of a Research Proposal**

1. The research proposal titled '**Nurses' Knowledge, Attitudes and Practises of Pressure Ulcer Prevention in Pietermaritzburg Metropolitan Hospital Complex in 2015**' was reviewed by the KwaZulu-Natal Department of Health (KZN-DoH).

The proposal is hereby **approved** for research to be undertaken at Greys and Edendale Hospitals.

2. You are requested to take note of the following:
  - a. Obtain support letters from the relevant district managers and make the necessary arrangement with the identified facility before commencing with your research project.
  - b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.
3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to [hrkm@kznhealth.gov.za](mailto:hrkm@kznhealth.gov.za)

For any additional information please contact Ms G Khumalo on 033-395 3189.

Yours Sincerely

**Dr E Lutge**

Chairperson, Health Research Committee

Date: 14/04/16

**APPENDIX F**

**ETHICS CERTIFICATES**



# Zertifikat Certificat Certificado

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale  
Promoting the highest ethical standards in the protection of biomedical research participants



Clinical Trials Centre  
The University of Hong Kong

## Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

a complété avec succès - has successfully completed  
**Research Ethics Evaluation**

du programme de formation TRREE en évaluation éthique de la recherche  
of the TRREE training programme in research ethics evaluation

March 26, 2015

CID : J5SW8wZam

Professeur Dominique Sprumont  
Coordonnateur TRREE Coordinator



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Promoting the highest ethical standards in the protection of biomedical research participants

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**sanelisiwe malinga**  
a complété avec succès - has successfully completed  
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du programme de formation TRREE en évaluation éthique de la recherche  
of the TRREE training programme in research ethics evaluation

March 26, 2015  
CD : QWAAy8t9E

Professeur Dominique Sprumont  
Coordinateur TRREE



REV : 201403381

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Swiss Academy of Medical Sciences (SAM/SMS/MS) ([www.sam.ch](http://www.sam.ch)) - Commission for Research Partnerships with Developing Countries ([www.crdp.ch](http://www.crdp.ch))



# Zertifikat

# Certificat

# Certificado

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale  
Promoting the highest ethical standards in the protection of biomedical research participants



## Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

**sanelisive malinga**  
a complété avec succès - has successfully completed  
**Good Clinical Practice (GCP)**

du programme de formation TRREE en évaluation éthique de la recherche  
of the TRREE training programme in research ethics evaluation

March 26th, 2015  
CID : ZZSMAHAKM

Professeur Dominique Spinnont  
Coordinateur TRREE Coordinator



Continuing Education Programmes  
Programmes de formation continue

GCP training program for investigator recognized by Swissmedic  
Programme de formation GCP pour investigateur reconnu par Swissmedic

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**APPENDIX G**

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**PR. No. 8634041**

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21<sup>st</sup> February 2017

To Whom It May Concern

This confirms that I have language edited the following thesis (including the article for journal submission) by Sanelisiwe Malinga (Stud no: 206510124):

**NURSES' KNOWLEDGE, ATTITUDES, AND PRACTICES OF PRESSURE  
ULCER PREVENTION IN THE PIETERMARITZBURG METROPOLITAN  
HOSPITAL COMPLEX IN 2016**

I completed a three-day Basic Editing and Proofreading course with John Linnegar (from McGillivray Linnegar Associates) in March, 2008. Since then, I have undertaken extensive copy editing work for Oxford University Press (South Africa), including editing both the first and second editions of their *Abnormal Psychology* text.

I have also edited several articles for submission to journals in South Africa and abroad, as well as about 20 theses.



Ms V.C. O'Neill

## APPENDIX H



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### 1.1 Introduction

Pressure ulcers (PU's) have been recognised as a major health problem within the healthcare system (1). It is estimated that three million people are affected by PU's, representing a major challenge to health care providers (2, 3). Pressure ulcers threaten the well-being of patients and have been identified as one of the five most common causes of harm to patients (4). Pressure ulcers affect all age groups but are more common among immobile and geriatric patients, as well as patients with severe acute neurological conditions (5).

In the United States of America (USA) and Europe, the prevalence of PU's ranges between 10.5% and 22% in acute care settings (6). In an attempt to reduce PU prevalence, the USA and Europe have readily available guidelines from panels dealing specifically with PU's, namely: The National Pressure Ulcer Advisory Panel (NPUAP) in the USA and the European Pressure Ulcer Advisory Panel (EPUAP) in Europe (7). The NPUAP serves as an authoritative voice for PU prevention and treatment through public policy, education, and research (8). Through the panel's collaboration with many organisations, it has designed a model for addressing PU prevention and treatment and has become an internationally recognised panel (9). The EPUAP serves a similar function to the NPUAP, and the two panels have collaborated to develop new, evidence-based guidelines on PU prevention and management (7).

In the USA, the total cost of treating a grade four PU for 19 patients, is estimated at \$129,248 annually (10). The cost of treating a single patient can range from \$20.90 to \$151.00 per pressure ulcer (11). In Europe, the cost of treating PU's is estimated to be between £1.4 and £2.1 billion annually (12). The financial burden incurred as a result of PU's further increases costs due to litigation, with an average malpractice lawsuit settlement amounting to roughly \$250,000 in the USA (13). Pressure ulcers have been reported to increase hospital stay by about seven days (14). This increase in hospital stay can add \$43,180 in costs to a hospital stay (11).

Pressure ulcers are common in high- and middle-income countries but the subject is rarely researched in low-income countries (15). Although there is little published data about PU's in low-income countries, the problem of PU's is more extensive in developing countries due to lack of medical resources (15). There is paucity of data on PU prevalence or incidence in South

**Nurses KAP on PU prevention**

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