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Needs of nursing students caring for carbapenem-resistant enterobacteriaceae patients

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NEEDS OF NURSING STUDENTS CARING FOR CARBAPENEM-RESISTANT ENTEROBACTERIACEAE PATIENTS

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A research report submitted to the Faculty of Science, University of the Witwatersrand, in fulfilment of the requirements for the degree of Masters of Science in Nursing Education

Johannesburg, July 2017

Declaration

I declare that the research report is my own, unaided work. It is being submitted for the Degree of MSc Education at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any university.



……

(Signature of the Candidate)

day…15th…of… July…year… 2017…Place… Centurion

Ethics no: M160408

Abstract

Introduction and background: Carbapenem-resistant Enterobacteriaceae (CRE) refers to gram-negative bacteria that are resistant to Carbapenem antibiotics and is currently an emerging threat to healthcare facilities.

Problem statement: Due to contact isolation protocols, time constraints and high workload, facilitators may show reluctance to support and guide nursing students caring for CRE patients. Nursing students become stressed and prone to break isolation precautions when expected to nurse these patients without adequate support. If the learning and facilitation needs of nursing students in these circumstances are identified, clinical facilitators will be able to address these needs better.

Aim: To explore the nursing student's experience and needs while caring for a CRE patient.

Design: The descriptive qualitative research design was used.

Method: Semi-structured interviews and digital audio recordings were used to collect data for this study.

Population: Full-time first-year bridging programme (R683) nursing students who were registered during the June 2016 intake and have been enrolled at a private nursing education institution.

Sample: Non-probability, purpose/judgmental sampling method was used.

Data analysis: The conventional approach was used.

Setting: Private nursing education institution.

Results: Considering the results from the semi-structured interviews, the researcher was able to identify the nursing students' desires and recognised that the educational programme did not meet the nursing student expectations. Therefore the educational

team should ensure that nursing students are placed in a clinical environment that is conducive to learning and develop a curriculum that reinforces infection prevention principles throughout the academic year to ensure applied competency by the nursing students. Furthermore, nursing students should receive emotional support to address their emotional and safety desires.

Acknowledgement and dedication

Firstly, and foremost, I would like to acknowledge my Almighty God for giving me my passion for nursing and opportunity to complete this research report.

This research paper was made possible through encouragement from my husband, children, mother, colleagues, and especially my supervisor, Lizelle Crous.

I want to thank Lizelle Crous for her unconditional guidance and perseverance as evident by the multiple emails that were exchanged between us.

Thank you to Estelle Bester and Bianca Pretorius for their support during the last two years and standing in for me when I was in class.

Lastly, I would like to thank my husband for his patience, reassurance and belief in me. Without your love, this research report would not have been possible.

Reflection is a process that allows a person to think about his personal experiences, thought and feelings, to analyse a specific situation for deeper learning and personal growth. The researcher would like to use this opportunity to reflect on her own experiences during the research process and share it with the readers of this report.

Through the process of conducting and writing the research report, the researcher mastered new writing and research skills. The personal journey and obstacles that were endured and overcome during the past two years enriched my life as a human being. But mostly it prepared me for the important role and nurse educator.

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Table of abbreviations

BC 1	First-year bridging programme (R683) nursing students
CDC	Centers for Disease Control and Prevention
CRE	Carbapenem-resistant Enterobacteriaceae
HRCE	Health and Research Ethics
IPP	Infection Prevention Practitioner
PPE	Personal Protective Equipment
SANC	South African Nursing Council
SAQA	South Africa Qualification Association

1 INTRODUCTION

1.1 Introduction

In this chapter, the problem statement, research question, purpose, objectives, clarification of operational definitions and methodology of the research study are discussed.

1.2 Background

Carbapenem-resistant Enterobacteriaceae (CRE) is an emerging threat in healthcare facilities because these organisms produce enzymes that destroy Carbapenem antibiotics and cause resistance. Carbapenem antibiotics are used in hospitals as a last line of defence against gram-negative organisms. The Centers for Disease Control and Prevention (CDC) has declared beta-lactamase-producing Enterobacteriaceae as a multidrug-resistant organism that must be approached as a national public health priority to prevent the spread of infection (CDC, 2015b; Tschudin-Sutter, Frei, Dangel, Stranden and Widmer, 2012).

Enterobacteriaceae are gram-negative organisms that form part of the normal flora present in healthy human intestines. These organisms can be found in patients' stools and on their skins – especially near the anus area because of colonisation. If a patient's immune system has been compromised because of illness, Enterobacteriaceae might contribute to infections such as pyelonephritis pneumonia, peritonitis, ventilator-associated infections and diarrhoea (CDC, 2015a, Toleman, Walsh, Bagaria, Butt, Balakrishnan, Chaudhary, Doumith, Giske, Irfan, Krishnan, Kumar, Maharjan, Mushtaq, Noorie, Paterson, Pearson, Perry, Pike, Rao, Ray, Sarma, Sharma, Sheridan, Thirunarayan, Turton, Upadhyay, Warner, Welfare, Livermore and Woodford, 2010).

In November 2015, the CDC released new facility guidelines for controlling CRE in hospital environments (CDC, 2015b). These recommendations for isolation precautions in hospitals are currently being implemented worldwide, including South Africa.

Facilities are expected to do regular surveillance, ensure good hand hygiene practices, implement contact precaution for colonised patients (high-risk patients), and ensure mandatory use of personal protective equipment (PPE) where applicable. A system for tracking patients with CRE in hospitals should be implemented; healthcare personnel should receive education; and laboratories should ensure timely notification of patients at risk (CDC, 2015b). An antimicrobial steward programme should focus on the indication and appropriate duration of antibiotic use to reduce resistance. Furthermore, facilities should ensure that both adequate routine and terminal cleaning are performed after a patient's discharge (CDC, 2015b). The environment can serve as a source for transmission; therefore, the patient's environment should be cleaned daily with detergent as per hospital protocol (CDC, 2015b).

In this study, terminal cleaning on patient discharge implies that all surfaces, including the mattress and equipment in the room, are wiped down three times with hydrochloride and fogged with hydrochloride according to hospital policy.

Studies (Morgan, Day, Harris, Furuno & Perecevich, 2011; Morgan, Pineles, Shardell, Graham, Mohammadi, Forrest, Reisinger, Schweizer & Perencevich, 2013; Pyrek, 2013; Stelfox, Bates and Redelmeier, 2003) have shown that contact isolation has a negative effect on a patient's emotional wellbeing. Patients receive fewer visits from staff, which result in increased "mortality" risk due to poor monitoring. The article "Contact precautions: More is not necessarily better" by Dhar, Marchaim, Tansek, Chopra, Yousuf, Bhargava, Martin, Talbot, Johnson, Hingwe, Zuckerman, Bono, Shuman, Poblete, Tran, Kulhanek, Thyagarajan, Nagappan, Herzke, Perl and Kaye (2014) concluded that the more legislation and rules are in place to protect patients, the less staff comply with basic

isolation protocols, thus placing patients at significant risk. Furthermore, due to the time required to don gloves and comply with PPE guidelines, staff might not interact with the patient regularly. Evidence shows that patients receive less discharge information, reduced vital monitoring, poor recording and minimal counselling (Morgan et al., 2011; Stelfox, Bates and Redelmeier, 2003). Dhar et al. (2014) supported this evidence and continued by stating that an increase in non-compliance with isolation precautions may occur due to an increased patient load.

If patients in isolation experience these problems, it is likely that nursing staff, whom are "isolated" with them for extended periods of time while providing care, will also be affected negatively. This is particularly common with student nurses who need continuous support from nursing staff while nursing patients. Limited research has been done in South Africa on the importance of providing clinical guidance to nursing students when caring for isolation patients (Al-Hussami and Darawad, 2013; Gould and Drey, 2013).

The clinical environment plays a vital part in nursing education, as nursing is a practice-based profession (Kaphagawani and Useh, 2013). During these clinical placements, nursing students gain necessary practical experience by developing cognitive, psychomotor and effective nursing skills. Nursing students need to be accompanied by clinical facilitators and senior staff. Facilitators and senior staff support nursing students in applying theory to the clinical environment to bridge the gap between theory and practice (Al-Hussami and Darawad, 2013; Jokelainen, Turunen, Tossavainen, Jamookeeah & Coco, 2011; McClure and Black, 2013).

The clinical environment is very complex, because the nursing student is directly responsible for patient care, while also still learning through constructive feedback and mentoring from staff and facilitators. Facilitators, together with a safe supporting environment, reduce fear and anxiety levels experienced by nursing students during

clinical placement (Tiwaken, Caranto and David, 2015) and promote constructive learning.

Previous research has found that student nurses are committed to infection protocols (Al-Hussami and Darawad, 2013), but that permanent staff do not always follow isolation protocols, thus setting a poor example for new student nurses (Gould and Drey, 2013; Tiwaken, Caranto and David, 2015). Facilitator accompaniment sessions encourage compliance with isolation protocols due to the facilitators educational role in the clinical environment (Gould and Drey, 2013). Without a good support system, nursing students may feel confused and anxious, thus resulting in compromised adherence to isolation precautions (Gould and Drey, 2013).

According to Abraham Maslow's theory of human motivation (Maslow, 1943; Neto, 2015; Quin and Hughes, 2007), needs of people can be identified and put into a hierarchy according to their importance to emotional and physical wellbeing. "Needs" is defined as the gap between what the nursing student currently experiences and what the nursing student desires (Bruce, Klopper and Mellish, 2013). People first have physiological, safety, belonging, self-esteem and self-actualisation needs that need to be met for fulfilment thus enabling the nursing student to learn and develop further.

If nursing student's needs are identified while nursing CRE patients, more efficient clinical accompaniment can be planned by clinical facilitators to address nursing students' particular needs. This will improve nursing education and close the gap experienced by nursing students while nursing patients with CRE in contact isolation.

1.2.1 Physiological needs

All nursing students have basic physical needs for food, water and clothes (McLeod, 2016). Nursing students, who have previously been placed in contact isolation, identified

that they experienced uncertainty because of not having enough single rooms, and limited equipment and time allocated to perform tasks (Cassidy, 2006; Dos Santos, Corrêa and Salgado, 2013). If the nursing student's physical environment is not conducive to learning, the nursing student's experience during clinical placement may be influenced negatively (Bruce, Klopper and Mellish, 2013).

1.2.2 Need for knowledge

Knowledge is the starting point for improving practice and changing behaviour in the infection prevention field as emphasised by Cox et al. (2015) in the article "Re-thinking microbiology/infection control education to enhance the practice-readiness of nursing students". Nursing students, who nursed patients in isolation, identified that their knowledge and practical experience may be inadequate and more exposure to these situations are required (Cox, Simpson, Letts and Cavanagh, 2015; Dehkordi and Tavakol, 2011; Dos Santos, Corrêa and Salgado, 2013; Tiwaken, Caranto and David, 2015).

Nurses are responsible for the most direct contact during routine daily care, especially when patients are placed in contact isolation due to CRE. Therefore, nurses should have deep knowledge about infection prevention principals and comply with isolation protocols.

1.2.3 Emotional needs

All nursing students have a need for friendship, trust and recognition by their colleagues according to McLeod (2016). According to Cox et al. (2015), and Darawad and Al-Hussami (2012), traditional training and the curriculum covering infection prevention and isolation protocols are inadequate. Literature shows that nursing students experience stress while nursing isolation patients. This may be an indication that they are not emotionally prepared to cope with this high-risk environment. Anxiety, fear, crying, and sadness are some emotions experienced by nursing students. This might lead to them making excuses for not wanting to care for patients in isolation. Stress and anxiety may

contribute to nursing students breaking isolation protocols, thus resulting in the spread of CRE in the clinical environment (Al-Hussami & Darawad, 2013; Dehkordi and Tavakol, 2011).

1.2.4 Self-actualisation and self-esteem needs

In literature, nursing students identified that they feel that staff do not respect them. Nursing students said that they follow protocols and that they try to care for patients correctly, which results in them being accused of being the "perfect nurse" and treated differently thus leading to poor self-esteem and self-actualisation (Tiwaken, Caranto and David, 2015). If a nursing student's desire for independence and achievements are not recognised by colleagues, nursing students' motivation for further development will be compromised.

Abraham Maslow expanded on his original five-stage model an included cognitive, aesthetic and transcendence needs (Maslow, 1970; McLeod, 2016). Cognitive needs can be deveined as the need for meaning, understanding and predictability. Aesthetic needs are when an individual appreciate and desires beauty, steadiness and structure. Lastly, transcendence needs can be explained as the aspiration to help others achieve self-actualisation (McLeod, 2016).

These are some of the needs that nursing students have identified; however, nursing students may reveal more and different needs than discussed due to the unique South African context. This research will explore the specific needs of nursing students caring for CRE patients in contact isolation during clinical placements in a private hospital setup in South Africa. Thus, this research will help facilitators and academic staff understand the challenges that nursing students may experience.

1.3 Theory Versus Practice

“Theory forms the basis for learning which nursing students have to apply in the clinical practice to make meaning from the theory” (Kaphagawani and Useh, 2013). The CDC’s guidelines (2015b) also support this view, which state that health care workers need to understand the reason for implementing infection prevention principles to enhance compliance and to implement the protocols correctly (Cox et al., 2015).

A study done by Cox et al. (2015) showed that Jordanian nursing students had poor knowledge regarding, and compliance with, infection prevention protocols. In contrast with these studies, some nursing students from England portrayed a positive attitude towards infection prevention and asserted that knowledge in practice because their training explained the importance of infection prevention protocols (Cassidy, 2006). When nursing students understand the reasoning behind their actions, it is much easier to implement protocols and ensure compliance according to Gould and Drey (2013), and Ward (2010).

Although nursing students receive theory regarding infection prevention (Al-Hussami and Darawad, 2013; Gould and Drey, 2013), some studies have shown that this is inadequate because nursing students need a greater depth of information, for example, microbiology and the application thereof. In addition, nursing students struggle to implement theory because it does not meet the real needs and limitations of the clinical environment (Tiwaken, Caranto and David, 2015).

Given the foregoing Cox et al. (2015) and Ward (2010) argued that the nursing student infection prevention curriculum should be integrated throughout their courses resulting in a deeper understanding of the “why” rather than only implementing scientific knowledge (Ward, 2010).

In South Africa and Namibia, the knowledge of nursing students regarding infection prevention protocols is also limited as indicated by Ojulong, Mitonga and Lipinge (2013),

and Van der Berg and Daniels (2013). This is of great concern because South Africa currently has a high incidence of tuberculosis and HIV infections. Poor compliance with isolation and contact protocols is a risk for health care workers and the public (Sissolak, Marais and Mehtar, 2011).

Further investigation may be needed to consider why implementation and compliance to protocols are still lacking as is evident by the spread of CRE between patients in the same wards.

1.4 Statement Of The Problem

Due to contact isolation protocols and personal protection procedures, facilitators may show reluctance to support and guide nursing students caring for CRE patients due to time constraints and high workloads. Evidence shows that nursing students become anxious, stressed and prone to break isolation precautions when expected to nurse these patients without adequate support from their clinical facilitators (Cassidy, 2006; Dos Santos, Corrêa and Salgado, 2013). With the new isolation protocols of the CDC (2015b), which involve a great deal more than traditional handwashing and waste management protocols, it is anticipated that the nursing students' needs might increase.

Currently, there is little research evidence in the South African context regarding how to encourage clinical facilitators to support and guide nursing students caring for patients in isolation. If the learning and facilitation needs of nursing students in these circumstances are identified, clinical facilitators will be able to understand and address these needs better. Considering the CDC's (2015c) declaration that CRE patients are high risk and a national threat, educators should put more emphasis on facilitating nursing students in isolation to prevent the spread of infection and break in isolation protocols.

1.5 Research Questions

- What are nursing students' experiences while nursing CRE patients in contact isolation?
- What are the specific needs of nursing students while caring for patients with CRE in contact precaution isolation?

1.6 Purpose Of The Study

The purpose of the study is to determine the needs of nursing students while caring for patients with CRE in contact isolation.

1.7 Objectives Of The Study

The following objectives were pursued:

- To explore the experiences of nursing students while caring for CRE patients.
- Extrapolating from above, to identify nursing student needs to enable the clinical facilitator to accommodate the nursing student.

1.8 Significance Of The Study

Nursing CRE patients according to isolation protocols is a very important skill that all nursing students should have, in line with the South African Nursing Council's (SANC) "Regulations relating to the scope of practice of persons who are registered or enrolled under the Nursing Act, 1978" (R2598) (SANC, 1984) and "Regulations setting out the acts or omissions in respect of which the Council may take disciplinary steps" (R767) (SANC, 2014). Patients' mortality and morbidity rates will be reduced by following the guidelines set by the CDC (2015b), thus supporting nursing student knowledge and skills during their training to comply with protocols and isolation principles.

By conducting this study, the nursing students' needs will be identified while caring for CRE patients. Once identified, training programmes, clinical placement and accompaniment by nursing staff and facilitators can be adapted to accommodate these needs. This will ensure that nursing students are better prepared to care for CRE patients.

This study will therefore be significant to:

- **Nursing students:** If nursing students' needs are addressed, they will be better prepared to nurse patients in contact isolation and comply with protocols.
- **Hospitals:** Patients in isolation will receive better care, which will reduce their anxiety. The CRE contamination risk will also be minimised due to nursing students better prepared to comply with protocols.
- **Training facilities:** Nursing students will experience their clinical placement environment in a positive way, which will contribute to adult learning.
- **General public:** Because nursing students are more prepared for their roles, they will minimise the spread of CRE in hospitals, thus contributing to infection control.

1.9 Operational Definitions

For the purpose of this study, the following concept will be explained for this clinical environment setting.

The nursing students' "needs" have been defined as the gap between what the nursing student experienced and what the nursing student desires while nursing patients in contact isolation. Needs are not only physical but can also be classified under emotional, lack of knowledge and self-actualisation requirements.

"Nursing student" refers to first-year bridging programme (R683) nursing students who were registered during the June 2016 intake and were enrolled at a private nursing education institution from July–August 2016.

CRE are gram-negative organisms that form part of the normal flora present in healthy human intestines. These organisms can be found in patients' stools and on their skins – especially near the anus area because of colonisation. If a patient's immune system has been compromised because of illness and the spreading of mobile genes on the plasmids throughout the host, the patient will become resistant (Kumarasamy et al., 2010). Enterobacteriaceae might contribute to infections such as pyelonephritis pneumonia, peritonitis, ventilator-associated infections and diarrhoea. Due to the patients' exposure to antibiotics, they might develop a resistance to Carbapenem antibiotics.

"Nursing staff" refers to the unit manager, professional registered nurses, enrolled nurses, auxiliary nurses and nursing students allocated to work in the specific unit where the nursing students were placed for clinical experience. The academic facilitator and infection prevention practitioner (IPP) will also form part of this nursing staff team that is responsible for delivering holistic care to patients during their stay in hospital.

"Infection prevention practitioner" refers to a professional nurse who is registered with the SANC and employed by a hospital. An IPP's specific role is to detect risk patients early and to ensure correct implementation of isolation precautions throughout the hospital facility. Furthermore, the IPP is also responsible for coordinating decontamination, ensuring correct management of waste and linen and, lastly, educating nursing staff and family members (Wiehahn, 2012).

1.10 Research Design

A qualitative design will be used to describe the experiences of the nursing student while caring for a CRE patient in the particular context and time that shape the nursing students' experience (Grové, Burns and Gray, 2013). This will be done through semi-structured interviews of BC 1 nursing students who have been placed in a medical ward in the previous month. This will be discussed further in Chapter 3 under the heading Research Methodology.

1.11 Summary

In Chapter 1, a brief overview of the background and research purpose and objectives were described. In Chapter 2, an extensive and comprehensive literature review regarding the nursing students' needs in the clinical field will be discussed.

2 LITERATURE REVIEW

2.1 Introduction

The main focus of the literature review is to explore published research on the needs that nursing students might have experienced while caring for CRE patients in contact isolation. In Chapter 2, a brief overview of the international and South African published articles will be discussed to identify the significance of the study.

2.2 Background

The literature review section forms part of a research document according to Brink, Van der Walt and Van Rensburg (2012). The literature review can be defined as an analysis of recent scholars' articles on a single topic to discover if there is any correlation or similarities in the existing research. The literature review supports the researcher in identifying the research problem and comparing evidence-based practices currently in use (Brink, Van der Walt and Van Rensburg, 2012; Grové, Burns and Gray, 2013).

In the electronic data review, the researcher reviewed articles that were published mainly in English in the last five years, and were available on Google Scholar™, CINAHL and PubMed.

Currently, nursing students worldwide are exposed to different patients throughout their clinical placement during which they integrate theory and clinical skills, and develop critical thinking by building on their existing knowledge (Quinn and Hughes, 2007; Tiwaken, Caranto and David, 2015). Because of the current high incidence of CRE patients in the global hospital environment (Brooks, 2016; Perez and Van Duin, 2013), it is important that nursing students are prepared to manage and care for these patients in contact isolation.

However, research done in Iran has shown that undergraduate fourth-year nursing students experience stress when they are placed in contact isolation and that clinical guidance is not adequate (Dehkordi and Tavakol, 2011). Nursing students from the United Kingdom and Brazil were breaking isolation protocols due to a lack of knowledge, limited equipment and experience, thus leading to increased risks and mortality rate of patients (Dos Santos, Corrêa and Salgado, 2013; Ward, 2010).

In the private institution where the study will be conducted, BC 1 nursing students receive a two-week block period of infection prevention that covers an introduction to microbiological and all isolation principles. This limited training is not enough in the light of the importance and risk involved for patients and the general public as evident by research done in Amman, Jordan, and Australia (Al-Hussami and Darawad, 2013; Cox et al., 2015).

In the South African context, limited literature is currently available regarding infection prevention education for nursing students (Ojulong, Mitonga and Lipinge, 2013; Sissolak, Marais and Mehtar, 2011). Poor compliance to infection prevention protocols place our nursing students at high risk in both private and government institutions due to possible limited resources, lack of knowledge, poor implementation, limited staffing and poor theoretical and clinical guidance of nursing students during clinical placement (Ojulong, Mitonga and Lipinge, 2013; Sissolak, Marais and Mehtar, 2011). Thus, this research is very important to the African continent and especially the private sector in South Africa because of its current training capacity and contribution that it is making to nursing standards and its future role in the National Health Insurance plan set out by government (Bruce, Klopper and Mellish, 2013).

If educators can address the needs of nursing students, nursing education will be improved, which will ultimately reduce patient mortality and morbidity (Cox et al., 2015)

through purposeful clinical accompaniment and development of critical thinking skills (Cassidy, 2006; Tiwaken, Caranto and David, 2015).

During a literature search, the following elements, which could have influenced or affected nursing students and staff breaking isolation protocols, were identified. These elements will be discussed under the following headings.

- Training
- Theory versus practice
- Contact isolation as clinical placement
- Environmental barriers
- Clinical supervisor/facilitator/mentoring
- Nursing student's distress to contact isolation

2.3 Training

As stated previously, through regulations R2598, the SANC (1984) sets clear guidelines regarding the responsibilities of registered nurses or midwives. Furthermore, these regulations lay the foundation for nursing education to prepare nursing students for the vital role that they must perform after their training (Bruce, Klopper and Mellish, 2013). Currently, South Africa has a triple-burden disease profile; therefore, nursing education should focus on preparing nursing students for the great responsibility of managing and preventing hospital transmission of communicable disease.

Nursing students in South Africa can complete their nursing diploma or degree in either the private or government sector, or do a bridging programme to become registered nurses (Bruce, Klopper and Mellish, 2013; SANC, 1985). Depending on their different institutions, nursing students must complete their clinical hours in the respected hospital environments as stipulated by the SANC. Currently, nursing students from the University of the Witwatersrand receive a module on standard precautions in their first year. They

only attend microbiological block in their third year after their medical and surgical clinical placement in first and second year. In the private institution where the study will be conducted, BC 1 nursing students receive a two-week block period of infection prevention that covers an introduction to microbiological and all isolation principles.

In the light of this, there is an urgent need to investigate the nursing students' needs while caring for CRE patients to improve their programme and coordinate training with their clinical placements. Thus, preventing poor compliance and breaking of isolation protocols set by the institution.

2.4 Contact Isolation As Clinical Placement

A wealth of research has already been done worldwide regarding the importance of clinical placement and infection prevention (Cassidy, 2006; Dehkordi and Tavakol 2011; Kaphagawani and Useh, 2013; Tiwaken, Caranto and David, 2015; Ward, 2010). Nursing students are prepared and gain valuable knowledge if they are exposed to these settings because they can apply theory into practice, gain valuable experiences, and "practice real nursing by doing" (Kaphagawani and Useh, 2013:183). Cox et al. (2015) support this statement by stating that nursing students need time to apply theory and develop their own professional identity. But although they gain valuable information, nursing students still find the clinical environment challenging because of the constant conflict between theory and practice (Kaphagawani and Useh, 2013).

Literature clearly shows that nursing students need to care for patients in isolation during their clinical placements, because it gives nursing students valuable experience and time to apply theory into practice. Nursing students find this environment challenging (Kaphagawani and Useh, 2013); therefore, nursing students should receive clinical guidance during this time (Tiwaken, Caranto and David, 2015; Ward, 2010).

Research done in South Africa confirms this statement. Some government institutions lack appropriate, accessible and clear guidelines leading to nursing students managing patients inadequately (Sissolak, Marais and Mehtar, 2011). Because there is limited literature that clearly contradicts this statement, it can be assumed that compliance with these protocols may also be compromised in the private setting if there is not clearly communicated guidelines regarding the management of patients in isolation.

Nursing training programmes, both in private and public settings, are not always aligned with nursing student needs due to limited clinical exposure and nursing student numbers. These issues may contribute to individual nursing student's needs not being met during clinical placement.

2.5 Environmental Barriers

From the literature reviewed, environmental barriers were identified that had a direct impact on nursing students and staff while caring for patients in source/contact isolation. This will be discussed under the headings Staff, Workload and Equipment.

2.5.1 Staff

Nursing students (874) from a preregistration course in the United Kingdom, Scotland and Northern Ireland took part in survey about compliance with infection control. The researchers concluded that safe infection control compliance practices at hospital level are still a challenge in the clinical environment (Gould and Drey, 2013). Gould and Drey (2013) continued by indicating that staff are not always "good role" models for correct practice. He furthermore suggested that managers should put clear rules in place, such as keeping nails short and not wearing jewellery, to improve compliance with infection prevention protocols.

Ward (2010) confirmed that some nursing students had to lower their standard of practice to be accepted and to fit in during clinical placement (Cassidy, 2006). However, some

nursing students have indicated that when confronted with “wrongdoing” and “bad practices”, they were motivated not to conform and place the patient in danger but rather to apply correct knowledge, skill and attitude (Cassidy, 2006; Ward, 2010).

Nursing students from a South African university in Port Elizabeth confirmed that their biggest challenge in wards was to fit in and to be accepted by permanent staff. Staff attitude influence the way nursing students feel about themselves. Some nursing students feel rejected, isolated and incompetent when senior staff do not want to help them (Carlson, Kotzé and Van Rooyen, 2003).

2.5.2 Workload

Due to the skill mix, cross-cultural care, cultural diversity of staff and great shortage of personnel in the government and private sector in South Africa, some nursing students experience clinical placement negatively. Nursing students state that they do not receive clear guidance and support from clinical staff. Some professional nurses have a negative attitude towards nursing students. They have a heavy workload and feel that nursing students take a great deal of time to teach (Rikhotso, Williams and De Wet, 2013).

In the private sector where the study is conducted, nursing students form part of the workforce. A challenging patient-nurse ratio places a great burden on staff who must train nursing students, who in turn are expected to deliver a service and not be observers only. In the light of this, nursing students should be well-trained and able to implement the knowledge, which they have learned in the clinical environment, independently with limited guidance.

International research indicates that learning opportunities for nursing students are compromised when the workload is too much and nursing students are expected to conduct non-nursing tasks (Cassidy, 2006; Cox et al., 2015; Kaphagawani and Useh, 2013). The researchers conclude by stating that nursing students should be given enough

learning opportunities (stimulating cognitive thinking and reflection) to promote “clinical judgment” and self-assurance (Kaphagawani and Useh, 2013:183).

The workload in the South African context will not change soon due to the shortage of staff and limited resources both in the government and private sector. In this study, the nursing students’ personal experiences will be researched to discover if workload could have an impact on their compliance with contact isolation precautions.

2.5.3 Equipment

Nursing students find it difficult to implement isolation protocols appropriately if there are not enough single rooms available. If the room’s design and structure are not suitable for isolation, this puts extra stress on nursing students and leaves them confused (Cassidy, 2006). Nursing students also do not feel comfortable to share equipment such as blood pressure monitors because of the difficulty cleaning them.

In the government setting, nursing staff also complains that equipment is limited. They are sometimes forced to care for patients without the correct PPE due to stock not being available (Sissolak, Marais and Mehtar, 2011). Due to limited research done in the private nursing setting that contradicts the above statement, it can be assumed that nursing students in the private sector also find it difficult to share and co-hort with infective patients. Therefore, more in-depth research into nursing students’ needs during clinical placement is needed.

2.6 Clinical Supervision

A “clinical facilitator” is a clinical nurse who works in the clinical field and supports and guides nursing students to develop professionally by giving positive reinforcement and creating a positive learning environment (Quinn and Hughes, 2007; Tiwaken, Caranto and David, 2015). It is a facilitator’s responsibility to create favourable conditions for clinical learning, to guide and support nursing students, and to conduct appropriate assessments (Kaphagawani and Useh, 2013; Tiwaken, Caranto and David, 2015).

An article written by Tiwaken, Caranto and David (2015) emphasises the importance of clinical guidance next to the bedside. Clinical guidance forms the basis of clinical teaching because it allows the nursing student to develop clinical competency and skills by integrating theory into practice. Facilitators should accompany nursing students in the clinical setting (Henderson and Scott, 2011) and regularly update their knowledge to stay relevant with new technological and nursing practices (Gould and Drey 2013; Tiwaken, Caranto and David, 2015). In contrast, some nursing students feel that facilitators focus more on evaluation than facilitation. This may contribute to nursing students’ inability to integrate theory and practice, and reduce infection prevention compliance (Sharif and Masoumi, 2005).

In the South African context, accompaniment of nursing students in the clinical setting is a SANC requirement which is supported by the Nursing Education Association, Private Health Education Providers of South Africa, and Democratic Nursing of South Africa. Clinical accompaniment optimises learning and produces competent nurses and midwives (NES, 2012). Accompaniment of nursing students is of vital importance to develop critical thinking and integrate theory into practice. Thus, the quality of nursing education and support of nursing students in the clinical field are ensured.

Currently there is a shortage of facilitators and the suggested facilitator-to-nursing student ratio of 1:15–20 (NES, 2012) in the clinical field is not met in the government and private

sector. The result is that nursing students are not supervised during clinical placement, which contributes to a possible break in isolation protocol. Although clinical accompaniment of nursing students is of vital importance, nursing students in South Africa are currently receiving inadequate and minimal guidance from academic and clinical staff during clinical placement (Carlson, Kotzé and Van Rooyen, 2003; Rikhotso, Williams and De Wet, 2013).

Facilitation is clearly important, which is supported by previous research. Facilitation can fill the gap between nursing students' actual and perceived knowledge and use the real environment as a learning opportunity (Henderson and Scott, 2011). Thus, it is of vital importance that nursing students' needs during contact isolation placement have to be investigated to ensure that their educational needs are met more sufficiently during training.

2.7 Nursing Student Distress During Contact Isolation

Research has found that more patients than before are now placed in contact isolation due to colonisation or infection by multi-resistance organisms such as methicillin-resistant Staphylococcus aureus, clostridium and CRE (Morgan et al., 2011; Morgan et al., 2013). Patients are placed in single rooms or co-hort environments and staff are required to don gloves and gowns before entering the area (Morgan et al., 2011; Morgan et al., 2013). Patients receive 50% less visits from staff when isolated, general quality care indicators were worse, and incorrect vital documents and missing nursing and physicians' notes were observed (Morgan et al., 2011, Morgan et al., 2013). In research done by Morgan et al. (2013) on patients in contact isolation in four acute care facilities in the United States, they further found evidence of increased adverse events, depression, delirium, and poor patient satisfaction.

Nursing students also conveyed that they feel scared as they might be exposed to infection when nursing patients in isolation (Cassidy, 2006). Some nursing students

reported taking unnecessary measures: “Handwashing isn’t good enough, I nearly have to bleach them” (Cassidy, 2006:1250) and put on two sets of gloves. In an article written by Dehkordi and Tavakol (2011), nursing students reported having emotions such as sadness, crying, fear and uncertainty about transmission, unbelief and rejection. Due to limited research done in South Africa on the distress of nursing students nursing patients with CRE, we can assume that our nursing students experience the same emotions when confronted with the same situation.

However, some nursing students replied that because they have received the correct theory and it is constant in their minds, they want to do the right thing because it makes them feel good (Cassidy, 2006). Clinical experience in isolation protocol contributes to less anxiety. Some nursing students even realise the same psychological effects of rejection experienced by some patients in isolation (Cassidy, 2006). In addition to gaining more experience, nursing students also developed confidence and responsibility resulting in them taking control of the situation and starting to be more involved when caring for patients in isolation (Dehkordi and Tavakol, 2011).

International and South African literature clearly support the importance of infection prevention education and reiterated that it should form part of nursing students’ clinical and theoretical training. This will ensure that nursing students are adequately prepared to nurse CRE patients in contact isolation.

Literature also confirmed that nursing students identify barriers in the clinical field that may contribute to them being scared and prone to break isolation protocols due to a lack of knowledge and experience. In contrast to this, literature has also indicated that infection prevention education and the support from facilitators in the clinical field are preparing nursing students for this stressful environment, and that nursing students feel more equipped and less anxious.

2.8 Summary

In Chapter 3, research setting, sampling process, population, sample, data collection, reliability and ethical considerations will be discussed in greater detail.

3 RESEARCH METHODOLOGY

3.1 Introduction

The aim of Chapter 3 is to describe the research design and methodology the researcher used to investigate the research problem. Attention will be given to the research setting, sampling process, and the data collection method used. A more in-depth explanation regarding the reliability and ethical considerations that were applied during the study will be given.

3.2 Research Design

"According to Brink, Van der Walt and Van Rensburg (2012), researchers normally use descriptive qualitative designs when additional information is necessary to answer the current problem in practice, or to defend contemporary practices. The researcher therefore does not influence any variables but rather focuses on the information that presents itself during the phenomenon as it occurs naturally. Data is normally collected through methods such as structured observation, questionnaires and interviews (Brink, Van der Walt and Van Rensburg, 2012)."

A descriptive qualitative design was used to understand the human experience better by describing the experience, rather than looking at the experience using statistics only. This allowed meaning to emerge through critical analysis of the raw data. The researcher therefore sees the nursing students as an integral part, who are in constant interaction with their environment and surroundings (Brink, Van der Walt and Van Rensburg, 2012; Grové, Burns and Gray, 2013; Wojnar and Swanson, 2007).

In a qualitative research design, every part of the research process is characterised by certain basic actions taken by the researcher. The process involves the researcher analysing the nursing students' unique experiences by reviewing the data received and

applying attentive listening skills to really understand the nursing students' experiences. Furthermore, the researcher should implement "bracketing" by setting aside own beliefs and experiences to stay objective and to prevent generalisation. The researcher should also apply "intuiting" when emerged in the raw data. This means trying to better understand how the nursing students experienced the event placed in the specific time and environment that shaped their experiences (Grové, Burns and Gray, 2013).

According to Hsieh and Shannon (2005), the conventional content analysis method is used for "concept development or model building". Therefore, it can be applied in nursing education to develop and improve the nursing curriculum. The benefits for using the conventional approach to content analysis is obtaining information about the nursing students' personal experiences, rather than trying to fit the response into preconceived themes (Grové, Burns and Gray, 2013; Hsieh and Shannon, 2005).

In the pursuit to answer the research question, the researcher followed the conventional content analysis method to analyse the raw data. Data was collected by means of semi-structured interviews. Using the information from each nursing student, the researcher read the transcripts carefully, highlighted the exact statements that were unique and had meaning, coded the information and, lastly, defined each theme. The process was repeated until all emerging themes describing the experiences of the nursing students caring for the CRE patients had been identified.

3.3 Research Method

"To collect data from nursing students, the researcher chose semi-structured interviews as method. According to Brink, Van der Walt and Van Rensburg (2012: 157), an interview is a "face-to-face" encounter with a person during the semi-structured interviews using recordings devices. Data collection interviews are commonly organised under two headings, namely, "structured" and "unstructured".

Structured interviews contribute to research rigidity due to the use of reformulated questions. However, this method limits the researcher to factual information with limited responses from the participants. However, during semi-structured interviews, the researcher formulates specific questions, which can be “open” or “closed (Brink, Van der Walt and Van Rensburg, 2012: 158). Additional probing questions may be used during the interviews to ensure richness of the responses from the participants.

“The context of this research is the natural private acute care clinical environment where BC 1 nursing students are placed for clinical experience and role taking. Nursing students rotate through surgical, medical and speciality wards in the respective hospitals where they are stationed throughout their training. Medical patients that are high risk for developing CRE, due to suppressed immune system or previous exposure, are placed in contact isolation to minimise the risk and spread of CRE through contact to co-horting patients.

Because nursing students are expected to care for these medical patients placed in contact isolation, the “**context**” deals with important aspects of infection prevention and control. Furthermore, because the study focuses on the students’ experiences, the needs of the nursing students could be analysed using Maslow’s framework. Thus, facilitating nurse educators to accommodate and improve nursing students’ preparation for the clinical environment.”

3.3.1 Research setting

A natural setting was chosen for this research that was “partially controlled” to minimise outside disturbances during the interview process (Grové, Burns and Gray, 2013). The interviews were conducted on campus where nursing students receive formal lectures and clinical practical demonstrations. The room was set up to encourage participation in a non-threatening environment. This was accomplished by placing chairs facing one another and removing any barriers that might affect the comfort of the nursing students. Other factors considered to promote a relaxed atmosphere were lighting and noise levels.

The nursing students’ identities were protected by closing the door and placing a “Do not disturb” sign during the interview process. This created a sense of safety and anonymity. To promote the nursing students’ eagerness to disclose information, the researcher dressed in smart casual attire. A uniform is perceived as a sign of authority and power, which might prevent nursing students from being truthful during the interview (Englander, 2012; Grové, Burns and Gray, 2013).

3.4 The Sampling Process

A non-probability, purpose sampling method was used as it gave the researcher the opportunity to intentionally select nursing students based on their knowledge about the specific situation or because they formed part of a specific group that has rich information about a specific situation due to their exposure (Brink, Van der Walt and Van Rensburg, 2012; Grové, Burns and Gray, 2013; Oppong, 2013).

To be eligible to participate, nursing students had to have been allocated to a medical ward in the previous 30 days for either night or day duty. Allocation ensured that they had recent exposure to CRE patients. The reliability of the data was dependent on how well the nursing students could recall their experience as the study focused on feelings and

needs. Being exposed to caring for a CRE patient within the last 30 days ensured that memories and experiences were still fresh in the nursing students' minds.

Nursing students from the private nursing education institution are placed in eight different hospitals for clinical exposure. To ensure credibility and reduce bias during the selection process, ward allocation lists were obtained from all clinical placement hospitals. Generally, all hospitals had one nursing student allocated to a medical unit for this one-month period, larger hospitals had two nursing students. A name list was compiled and these nursing students received invitations to participate in the study.

Ten nursing students from the different hospitals were invited to participate in the study (see information letter in (Appendix A). All ten nursing students gave consent to participate in the study (see letter of consent in Appendix B). However, only eight nursing students were available on the two days due to unforeseen circumstances and they could not be reached for interviews.

3.5 Population

A population may refer to an entire group of individuals or objects under consideration or of interest to the researcher (Brink, Van der Walt and Van Rensburg, 2012; Grové, Burns and Gray, 2012). The distinguishing descriptors for this population will be described in the paragraphs that follow.

The population for this study consisted of first-year bridging enrolled nursing students who were part of a two-year Professional General Nursing Diploma (R683). The nursing students were enrolled as full-time nursing students at a private nursing education institution and as required by the SANC, these nursing students are expected to complete a theoretical and practical component to be registered.

The nursing students formed part of the June 2016 intake. Due to the block system, the approached nursing students were at campus for formal theory classes during October

2016. The study was conducted four months after their training has commenced. This ensured that nursing students have been exposed to nursing CRE patients, or have been exposed to protocols implemented by the different hospitals in the region on how to nurse or screen patients with CRE.

The population comprised 110 nursing students; thus N = 110.

Inclusion criteria for this study were based on nursing students' allocation to a medical ward in the previous 30 days. Hospital A and Hospital B are classified as larger hospitals due to the number of nursing students placed there. Two nursing students from each of these two hospitals were invited because their BC 1 groups consisted of more than ten nursing students. Hospital C has no medical wards, thus no nursing students from this hospital could be invited.

The first exclusion criterion was all nursing students that have not been allocated to a medical ward in the previous 30 days. Nursing students from Hospital J and Hospital K were also excluded because these hospitals do not form part of the private hospital group and are not familiar with the private hospital groups CRE protocols.

3.6 Sample

According to Grové, Burns and Gray (2013), and Oppong (2013), the sample size for qualitative research should be large enough to describe the differences and associations between the nursing students taking part in the research. Therefore, the sample size should be determined by the study's purpose and the quality of data gathered through the semi-structured interviews. Because the purpose of this study is very clear, thick descriptions were made from the semi-structured interviews. As no new themes emerged during interviews, a smaller sample size was appropriate.

In this study, the depth and themes that emerged from the data guided the researcher to determine the size. The following resources were identified for each of the hospitals:

- Hospital A × 2
- Hospital B × 2
- Hospital C × 0
- Hospital D × 1
- Hospital E × 1
- Hospital F × 1
- Hospital G × 1
- Hospital H × 1
- Hospital I × 1
- **n = 10**

3.7 Data Collection

The purpose of semi-structured interviews according to Grové, Burns and Gray (2013) is to allow interaction between the researcher and nursing students to produce data in the form of conversations stimulated by set questions developed by the researcher (see Appendix C for questions). Digital recordings were transcribed into words/text and analysed by the researcher (Brink, Van der Walt and Van Rensburg, 2012). This method is appropriate when a new area and nursing students' experiences in a particular situation are researched (Hsieh and Shannon, 2005).

Data collection commenced after proposal (Appendix D) and ethical clearance by the Health and Research Ethics Committee (HREC) of the University of the Witwatersrand (Appendix E), company research committee (Appendix F) and approval from private nursing education institution management (information letter, Appendix G) and (Appendix H) were granted.

Nursing students that appeared on the allocation list for medical wards received their information letters on 10 September 2016 (Appendix A) informing them about the

research. Nursing students had to sign a consent form (Appendix B). Arrangements were made for when nursing students were to be interviewed. Time slots and the venue were discussed with nursing students during the discussion session by the researcher.

The format of the interviews was semi-structured interviews. Three open-ended questions were formulated in advance with some supporting or prompting questions (Brink, Van der Walt and Van Rensburg, 2012). This enabled the researcher to guide and narrow the interview to address the specific research problem. The semi-structured interview lasted approximately 20–25 minutes depending on nursing students' responses.

The interview questions are given in Appendix C. The questions were developed to focus on the nursing students' experiences and to identify the needs and possible obstacles that they may have experienced while nursing CRE patients in contact isolation. The spoken words were recorded using a transportable Dictaphone. The researcher employed a transcriber who signed a confidentiality document (Appendix I) for ethical and confidential reasons. To protect the nursing students' anonymity, the respondents' names were not mentioned during the recording. The nursing students were called Nursing student 1 (S1) or Nursing student 3 (S3) for example.

No real problems were experienced during the interviews except that the interview lasted only for 20–25 minutes and two nursing students could not be reached.

The researcher's role during the data collection phase was first to carefully plan the data collection process and identify the data that should be collected through meticulous formulation of the semi-structured interview questionnaires (Grove, Burns and Gray, 2013). The researcher furthermore should be vigilant and anticipate problems such as poor response to the "open-ended" questions that may result in lack of depth and authenticity of the data. Therefore, the researcher should be able to adapt to the situation by asking probing questions and giving the nursing students adequate time to respond to the "open-ended" questions.

3.8 Reliability And Validity/Trustworthiness

Trustworthiness was based on “Lincoln and Guba’s 1985 model” (as cited in Brink, Van der Walt and Van Rensburg, 2012:172), which ensured that data collected was valid, deemed credible and of high quality. Credibility, confirmability, and transferability will be discussed in more detail below.

Credibility in the data and interpretation thereof was reached through data saturation and member-checking (Brink, Van der Walt and Van Rensburg, 2012). Different nursing students with their own experiences were interviewed. These nursing students were from different hospital sites where they nursed patients – each with unique situations and comorbidities (Babbie and Mouton, 2002). Data saturation was reached after no new themes emerged during the interviews. The themes were also presented to nursing students to ensure authenticity and completeness (Brink, Van der Walt and Van Rensburg, 2012).

Confirmability was ensured by validating the findings of the research with the raw transcribed data to ensure correctness (Babbie and Mouton, 2002). All data was presented to the supervisor or co-coder to ensure that coding was done accurately and that all themes were identified during the analysis process (Brink, Van der Walt and Van Rensburg, 2012; Hsieh and Shannon, 2005). Confirmability was reached because the data collected during interviews reflected the same themes in different situations. The themes and findings were returned to nursing students for validation. No new information was added but themes were confirmed by nursing students (Brink, Van der Walt and Van Rensburg, 2012).

Transferability was ensured with thick descriptions from the nursing students’ experiences, purposeful selection of nursing students and data saturation (Babbie and Mouton, 2002; Brink, Van der Walt and Van Rensburg, 2012). Using first-hand

experiences of critical incidents from nursing students guarantees authenticity and prevents generalisation.

To ensure that dependability is reached in the study, the researcher meticulously recorded and documented the entire process that was followed. This documentation process will also enable future researchers to repeat the study, which may deliver similar results (Shenton, 2004). It therefore contributes to the study's dependability.

In addition, "Overlapping methods" described by Shenton (2004: 71), which support Lincoln and Guba's 1985 model, explain the use of interviews and focus groups as methods for ensuring reliability and dependability. The data gathered during the interviews was evaluated and validated by the researcher during the analysis phase to achieve reliability and dependability based on similarities in the data recorded.

3.9 Ethical Considerations

The researcher presented the proposal to the Department of Nursing Education and at the postgraduate assessors committee at the Faculty of Health Science at the University of the Witwatersrand for peer review during October 2015 in the form of Microsoft PowerPoint™ slides. Some corrections were made after feedback was given and the presentation was resubmitted as required by the university.

Ethical clearance was obtained from the Health and Research Committee of the Witwatersrand University by clearance certificate (No M160408) that gave the researcher permission to continue with the research regarding the needs of nursing students caring for CRE patients (Annexure E). The researcher showed respect for the nursing students and ensured anonymity throughout the research and research paper generation. Data

was not influenced and misrepresented by the researcher (Brink, Van der Walt and Van Rensburg, 2012).

3.10 Summary

Chapter 3 explained the research process as well as how the researcher ensured that it was conducted in an ethical manner. In the next chapter, the findings will be presented.

4 DATA ANALYSIS AND FINDINGS

4.1 Introduction

Chapter 3 described the research design and methodology used while the study was conducted. Chapter 4 includes the findings from the semi-structured interviews, analysis and discussion. The researcher's objective during this process was to identify, analyse and report the experiences of nursing students caring for CRE patients in contact isolation.

4.2 Data Analysis

The researcher used a conventional content analysis approach during the analysis process. The conventional content analysis method is normally applied when a study aims to describe the emotional response from nursing students and limited literature is available on the phenomenon (Hsieh and Shannon, 2005). See figure 4.1: Cycle of content analysis for clearer description of the analysis process that was followed by the researcher.

It was originally thought during the proposal phase that the Colaizzi method would be the most suitable to analyse the data. However, due to the limited information received during the semi-structured interviews from the eight nursing students the supervisor advised that the method should be changed to a conventional content analysis method as confirmed by Hsieh and Shannon (2005).

With the conventional analysis method, open-ended questions are used during the interviews (Hsieh and Shannon, 2005). The researcher extracted meaningful statements from the nursing students' responses during the semi-structured interviews, to identify themes and patterns that could describe the nursing students' experiences (Brink, Van

der Walt and Van Rensburg, 2012; Grové, Burns and Gray, 2013; Hsieh and Shannon, 2005).

The conventional content analysis method consists of transcribing entire semi-structured interviews in words. This is followed by reading the transcripts for the first time to obtain a sense of the whole. The second and third word-for-word readings of the data are described as a process of “dwelling” in the data as the researcher underlined key feelings and concepts to highlight their importance (Brink, Van der Walt and Van Rensburg, 2012; Hsieh and Shannon, 2005; Tesch, 1990).

The advantage of the conventional content analysis is the ability to collect meaningful statements from nursing students without relying on preconceived ideas and categories (Brink, Van der Walt and Van Rensburg, 2012; Hsieh and Shannon, 2005).

During this process, the researcher also noted first impressions and made field notes on the side of the transcripts. Key phrases emerged during this stage and similarities in the responses from the nursing students were identified and coded. Meaningful statements from nursing students were later grouped into categories and connections were made between categories based on their similarities and relationship (Brink, Van der Walt and Van Rensburg, 2012; Hsieh and Shannon, 2005). Furthermore, the researcher defined each of the categories to create better understanding and place the nursing students’ responses into context.

The researcher used the emotions of the students as indicators, for example, “afraid, helpless and lack of experience”. The indicators were then classified secondly into emotions and needs to form the two main themes of the research as indicated by Table 4.1. Only then did the researcher realise that the indicators and themes illustrated a logical relationship and consistency with the “parent” theory, which is Maslow’s Theory for Human Motivation (1943,1970) (Grove, Burns and Gray, 2013: 129). After this realisation, the comparison was drawn. Only after forming the two main themes did the researcher

considered Maslow's Framework of Safety, Belonging, Self-worth, Cognitive and Self-actualisation, it was incorporated into the indicators to form the sub-themes as illustrated by Table 4.2. The critical thinking process during the analysis process and incorporation of an already accredited framework added valuable structure and relevance during the interpretation phase of the research and writing of the conclusion.

Maslow focused on an individual's potentials and believed that humans strive to achieve their highest potential (Maslow, 1970; Neto, 2015). According to Maslow, human beings are not encouraged by stimuli and reinforcement but rather by desire for self-actualisation. This motivation process is only possible if the nursing students' needs are met, or at least partially satisfied (Quinn and Hughes, 2007). According to Neto (2015), human beings have an inner desire to develop meaningful relationships and to ensure survival of their community. This characteristic of self-actualisation to do "good" forms the foundation and goal for education and humanism (Neto, 2015; Quinn and Hughes, 2007). As adults, this desire to self-actualisation becomes more prominent. A different approach is therefore needed when teaching adults as described by the Knowles Andragogy Theory (Quinn and Hughes, 2007).

Malcolm Knowles was a pioneer in the field of adult learning in 1943 and the 1970s who based his theory on the six characteristics of an adult learner. According to Knowles, adults are self-motivated, do constructive learning on previous experiences, have high levels of engagement and are self-directed learners. Adults also want to apply new skills into their field of practice (Bruce, Klopper and Mellish, 2013).

Nursing students may demonstrate self-actualisation through caring, being selfless, trying new things, evaluating their own experiences and showing concern for patients. More characteristics of self-actualisation are, for example, being problem-centred, having highly creative thoughts, having strong moral and ethical standards, being honest, and taking responsibility for your own actions (McLeod, 2016).

From the interviews, the researcher identified the following needs and compared the findings with Maslow's hierarchy of human motivation. Abraham Maslow was the greatest humanist in the 1970s and believed that people attempt to reach the maximum level of their capability "… peak experience" (Milheim, 2012; Quinn and Hughes, 2007). According to Maslow, this can only be achieved if the hierarchy of basic human needs is met. In mounting order, Maslow has identified the basic human needs as shown in Figure 4.2 (Quinn and Hughes, 2007:40).



Figure 4.1: Maslow's triangle for human motivation

Abraham Maslow expanded his five-stage model an included *cognitive, aesthetic and transcendence* needs in the 1970s to make his theory more reliable (Maslow, 1970; McLeod, 2016).

Cognitive needs can be deveined as the need for meaning, understanding and predictability. Furthermore, aesthetic needs are when an individual appreciate and desires beauty, steadiness and structure. And, lastly, transcendence needs can be explained as the aspiration to help others achieve self-actualisation (McLeod, 2016).

The researcher, after extracting the nursing students' experiences, categorised the identified needs under the headings as described by Maslow.

Table 4.1: Maslow's (1943) five basic human needs

1.	Physiological needs: food, rest, water and oxygen are the physiological drivers and the most basic need for survival.
2.	Safety and security needs: include protection from danger and fear, and a need for ordered surroundings.
3.	Love and belonging needs: these manifest in satisfactory relationships between nursing students, peers, senior nurses and members of the multi-disciplinary team.
4.	Self-worth and self-esteem: positive feelings of self-worth and pride in work, competency and sense of achievement are only possible if all the previous needs have been met.
5.	Self-actualisation: when a person reaches and fulfils his or her highest potential.

The thinking process during the analysis process and in cooperation of an already accredited framework added valuable structure and relevancy during the interpretation phase of the research and writing of the conclusion.

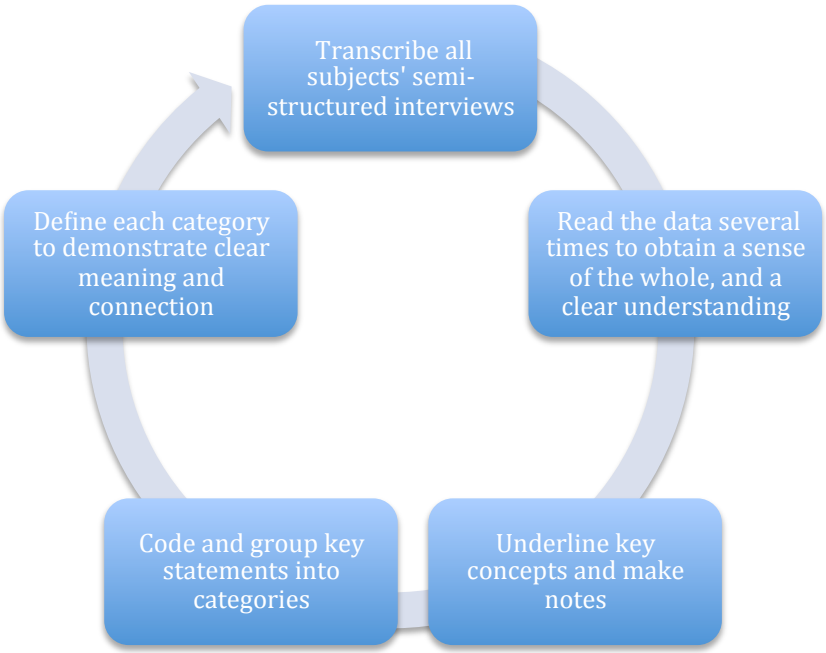

Figure 4.2: Cycle of content analysis

4.2.1 Stage 1: Transcribe digital audio recordings of semi-structured interviews

All eight semi-structured interviews were recorded and transcribed word for word to ensure a true reflection of the nursing students' responses. The researcher used a transcriber during this phase. The transcriber signed a confidentiality clause to ensure nursing student anonymity and prevent any information of being disclosed (Appendix I). Codes were allocated to each nursing student's transcribed interview, for example, S1, S2 and S3. (Q) was used on transcripts to indicate the researcher's questions, and (A) to indicate the nursing students' responses (Brink, Van der Walt & Van Rensburg, 2012).

4.2.2 Stage 2: Extract meaningful statements from each transcript

The transcripts were read for the first time to get an overview of the nursing students' responses. The transcripts were read carefully a second time and meaningful words and sentences were identified and extracted. After all transcripts were analysed, a table of meaningful statements were compiled (Table 4–1). A total of 18 meaningful statements were identified and tabulated (Brink, Van der Walt and Van Rensburg, 2012).

Table 4.2: Selected nursing student statements that describe the emotion and feeling the best

Selected nursing student meaningful statements	Nursing student	Indicators	Themes
1. *"… every time they say isolation patients, you know there is some goggos there, bacteria running around, so you are thinking, uh-oh …"*	S1	Afraid	Emotions
2. *"I was terrified, because it is not like I was sat down and told that it's OK"*	S2	Terrified	Emotions
3. *"… so, we are scared that it is spreading in the hospital and we do not have any more antibiotics …"*	S2	Scared	Emotion
4. *"For me, because they taught me before about the infection and the precautions, just must be careful … not difficult"*	S7	Responsibility, self-actualisation	Desire
5. *"… today they said so, tomorrow it is changed …"*	S8	Reliable information	Desire
6. *"… they just assume that we are in the hospital, we are dealing with these things and we know, of which is not the case"*	S2	Self-esteem/ self-worth	Desire
7. *"… you were just thrown in the pit, oh you know, just get in … yes, in too deep"*	S2	Helpless	Emotions
8. *"I do feel exposed because most of the time we realise that the patients, they have CRE"*	S6	Exposed	Desire
9. *"For the first time I was worried, because I did not really actually know, because we heard that it is a superbug …"*	S6	Worried	Emotions
10. *"… you can give medication, it is fine, you can go to CRE. And then, as you go on, you learn as you go …"*	S2	Lack experience	Desire

Selected nursing student meaningful statements	Nursing student	Indicators	Themes
11. *"I wanted to learn more about nursing these patients … wish I can learn more"*	S2	Desire to learn more	Desire
12. *"… and you are going to take that home with you and then some of us have kids …"*	S5	Vulnerable, safety	Desire
13. *"… because I want to nurse the patient according to the protocol. Because I will tell myself that this is the right thing …"*	S4	Responsibility, Self-worth	Desire
14. *"I would not say it was sufficient, since I still have questions …"*	S2	Insufficient training	Desire
15. *"… we had to go and ask infection sister to come and show us … it is learning on the job"*	S3	Insufficient accompaniment	Desire
16. *"It is true, because at some point none of us wanted to do it and if you were told to and were allocated to be there, you get mad the whole day …"*	S4	Frustrated	Emotion
17. *"…it is isolation …, so you make sure you put the gloves, apron and mask when you go there, especially when you are close to the patient"*	S7	Obligation to protect the patient needs, self-actualisation	Desire
18. *"… not nice with the staff … when the bell is ringing, they said it must be you who answer the bell only … I feel isolated with the patient"*	S8	Isolated	Desire

4.2.3 Stage 3: Organise formulated meanings into clusters of themes

The 18 marked statements were organised into clusters according to similar ideas to form themes based on the indicator word that made classification easier. The researcher

printed all the statements, cut them into individual strips and grouped them together based on similarities and connections. After this process, two themes emerged from the meaningful statement, namely, emotions and desires (refer to Table 4–2).

Table 4.3: Themes

Theme	Sub-themes
Emotions	• Afraid • Terrified • Scared • Helplessness • Worried • Frustrated
Desires	• Safety – Exposed • Safety – Vulnerable • Belonging – Feel isolated • Self-worth – Responsibility • Self-worth – Fear of failure • Cognitive – Reliable information • Cognitive – Lack knowledge • Cognitive – Not sufficient training • Cognitive – Insufficient accompaniment • Cognitive – Lack experience • Self-actualisation – Desire to learn more • Self-actualisation – Obligation to protect the patients' needs • Self-actualisation – Responsibility

The researcher confirmed extracted themes by referring to the original interview transcripts to validate the themes and clusters. The researcher recognised both physical and emotional desires and organised these in context for clear understanding by the reader (Brink, Van der Walt and Van Rensburg, 2012; Hsieh and Shannon, 2005).

Furthermore, the researcher consulted with her supervisor who assessed the findings in terms of richness and completeness and discussed the comparison with Maslow theory (1943,1970) on human motivation. Based on this realisation of the similarity between the students' needs and Maslow Theory of human motivation (1943,1970) the Needs of the nursing students were further sub-divided into sub-themes as illustrated in Table 4.2. by the researcher. The supervisor ensured that the themes and sub-themes identified were a true reflection of the nursing students' responses and confirmed that data saturation was reached. The supervisor confirmed the validity and reliability and gave the researcher permission to proceed with the process (Brink, Van der Walt and Van Rensburg, 2012).

4.2.4 Stage 4: Return to nursing students for validation

The researcher presented the descriptive results to each nursing student. This was done to validate the essence of their responses, and to ensure that their responses were reflected in the themes identified by the researcher. The nursing students made no new statements thus no new information was added to the data gathered. Confirmation was received that the meaningful statements were a true reflection of the nursing students' emotions that captured the essence of their experiences.

4.2.5 Stage 5: Define themes and responses by the nursing students

4.2.5.1 Theme 1: Emotions

The nursing students reported negative emotions while caring for CRE patients in isolation. Nursing students clearly experienced stress and anxiety as reflected by the following statements:

- *"For the first time, I was **worried**, because I did not really actually know, because we heard that it is a superbug …"* (S6)
- *"… so, we are **scared** that it is spreading in the hospital and we do not have any more antibiotics …" (*S3)

- *"… Every time they say isolation patients, you know there is some goggos there, bacteria running around, so you are thinking,* ***uh-oh*** *…"* (S1)
- *"I was* ***terrified****, because it is not like I was sat down and told that it's OK"* (S2)

4.2.5.2 Theme 2: Desire

a) Desire for safety

The nursing students reported during the interviews that they felt that the learning environment and lack of knowledge left them exposed. They were also **concerned** about the safety of their families due to the risk of contamination.

- *"I do feel exposed because most of the time we realise that the patients, they have CRE"* (S6)
- *"… and you are going to take that home with you and then some of us have kids …"* (S5)

b) Desire for belonging

Nursing students indicated their belonging needs were not met while caring for CRE patients. They felt isolated and alone and not supported.

- *"… not nice of the staff … when the bell is ringing, they said it must be you who answer the bell only … I feel isolated with the patient"* (S8)

c) Desire for self-worth and self-esteem

The nursing students indicated that they wanted to nurse the patient according to the protocols because it gives them pride and confidence. This reflects on self-worth and self-esteem. Due to limited knowledge and support, nursing students fear that they might compromise the patient's care, which therefore, has a negative effect on their self-esteem.

- *"… because I want to nurse the patient according to the protocol. Because I will tell myself that this is the right thing …"* (S4)
- *"… they just assume that we are in the hospital, we are dealing with these things and we know, of which is not the case"* (S6)

d) Desire for knowledge

The nursing students indicated that their desire for knowledge and understanding were not met and that they needed more theoretical and clinical guidance at the bedside during their clinical placement.

- *"… you can give medication, it is fine, you can go to CRE. And then, as you go on, you learn as you go …"* (S2)
- *"I wanted to learn more about nursing these patients … which I can learn more"* (S2)
- *"I would not say it was sufficient, since I still have questions …"* (S2)
- *"… we had to go and ask infection sister to come and show us … it is learning on the job"* (S3)
- *"… today they said so, tomorrow it is changed…"* (S8)

e) Desire for self-actualisation

The desire to deliver quality care and strive to self-actualisation is clearly demonstrated by the following remarks from the nursing students.

- *"I wanted to learn more about nursing these patients … which I can learn more"* (S2)
- *"For me, because they taught me before about the infection and the precautions, just must be careful … not difficult"* (S7)
- *"… it is isolation … so you make sure you put the gloves, aprons and mask when you go there, especially when you are close to the patient"* (S7)

4.3 Findings

The researcher's goal was to find meaning and value from the nursing students' feedback by analysing the findings. The researcher therefore evaluated the feedback by putting it into context, to form a true reflection of the nursing students' experiences that lead to their individual needs.

4.3.1 Theme 1: Emotions

4.3.1.1 Worried and scared

The nursing students reported that they were **worried** and concerned because they heard from other staff members that CRE are a "superbug".

- *"For the first time I was worried, because I did not really actually know, because we heard that it is a superbug …"* (S6)

Superbug in this context means that the organism shows resistance to Carbapenem, which is one of the antibiotic classes, thus making treatment very difficult and place the patient at a greater risk and demanding more from nursing care. One of the nursing students supported this concern for the patients as evident by this remark:

- *"… so, we are **scared** that it is spreading in the hospital and we do not have any more antibiotics …"* (S3)

Nursing students are scared that if the CRE organism spreads in the hospital and community, more patients may die. There is limited treatment for these patients currently and there for the urgency to treat these patients correctly. CRE is a major threat to the patient and increases the morbidity and mortality rate of patients due to its resistance to Carbapenem antibiotics. Furthermore, the chance of patients in contact isolation developing depression and having adverse events due to less contact from nursing staff increases dramatically, thus putting patients at higher risk.

4.3.1.2 Afraid and terrified

Nursing students are not only afraid for the patients, but also for themselves as manifested in these remarks:

- *"… every time they say isolation patients, you know there is some goggos there, bacteria running around, so you are thinking, uh-oh …"* (S1)
- *"I was **terrified**, because it is not like I was sat down and told that it's OK"* (S2)

The nursing student highlighted that she was panicky because nobody explained the isolation management and protocols to her, thus leaving her vulnerable especially in the isolation environment.

The nursing students are also scared and frightened as a result of their possible exposure to infections because they have to care for these patients in isolation.

4.3.1.3 Helpless and frustrated

The nursing students furthermore indicated through the powerful descriptions of their feelings that they are in a deep hole and feeling afraid:

- *"… you were just thrown in the pit, oh you know, just get in … yes, in too deep"* (S2)

They are clearly not comfortable and do not have enough knowledge to nurse CRE patients by themselves. They are feeling afraid and **helpless** due to limited support, knowledge and experience.

Because of this constant exposure and limited support, nursing students are left **frustrated** as evident by them not wanting to nurse the patients anymore:

- *"It is true, because at some point none of us wanted to do it and if you were told to and were allocated to be there, you get mad the whole day …"* (S4)

This is clearly a defence mechanism that will have a negative impact on their training and patient care at the hospital.

Because the nursing students experience negative emotions when they do not receive enough support and theoretical training before being exposed to stressful environments Their frustration will influence their behaviour directly as evident by the guilt and neglect "none of us wanted to do it".

4.3.2 Theme 2: Desire

4.3.2.1 Desire for safety

One of the nursing students indicated that their safety need was not met and that she felt **exposed** and vulnerable because the patient was CRE-positive. Due to limited knowledge and possible contamination their welfare is at risk and compromised.

- *"I do feel exposed because most of the time we realise that the patients, they have CRE"* (S6)

Nursing students were not only afraid and concerned for their own safety, but felt their children and family members may also be at risk and **vulnerable**, because they can expose them through contamination as indicated by this remark from the nursing student:

- *"… and you are going to take that home with you and then some of us have kids …"* (S5)

Because of the increasing resistance to antibiotics and underdeveloped children's immune systems, the nursing students fear can be explained because they are also mothers who do not always have the opportunity to bath and put on new clothes before fetching their children from day-care for example. Nursing students need to feel safe and not fear that they are placing their families and love ones at risk.

4.3.2.2 Desire for belonging

One of the nursing students reported that while caring for the patient in **isolation**, staff were reluctant to assist. The nursing student felt **isolated** and not supported by the nursing personnel in the ward:

- *"… not nice with the staff … when the bell is ringing, they said it must be you who answer the bell only … I feel isolated with the patient"* (S8)

Nursing students also have a need to be **accepted** by others and be part of a team based on this remark. They also felt used and not supported because staff did not want to assist. This may because the students were allocated there and staff are not allowed to work with contaminated patients to prevent the spread. This was clearly not explained to the student and that is why she felt isolated and not accepted.

The negative effects of isolation such as increased risk, loneliness and frustration has on nursing staff is clearly visible from the student's remark. Isolation furthermore limits visual observation, which therefore affects communication between nursing student and patient. Donning protective equipment such as mask and gloves takes extra time, that may also be a reason why staff did not want to assist the student contributing to her feeling of isolation.

Nursing students are placed in the clinical environment to socialise and learn critical skills from role models in a safe environment. Therefore, if a nursing student feels **isolated** and unsupported during their clinical placement, learning will be compromised. This is critical to nursing education if this need is not met.

4.3.2.3 Desire for self-worth and self-esteem

- *"… because I want to nurse the patient according to the protocol. Because I will tell myself that this is the right thing …"* (S4)

This nursing student wanted to follow protocols to protect her patient. Contact isolation precautions require nursing staff to comply with infection precaution protocols that stipulate handwashing before and after patient contact, donning gloves and gowns, and using designated equipment to prevent spreading. From the first day of nursing it is installed to the nursing students to care and do no harm, thus one can see the students' commitment here "to do the right thing" according to the protocols and prevent spread to other patients in the ward.

One nursing student showed frustration when she was expected to nurse patients in isolation with limited experience and knowledge:

- *"… they just assume that we are in the hospital, we are dealing with these things and we know, of which is not the case"* (S6).

Nursing staff are the healthcare workers who have the most contact with patients in contact isolation. Therefore, nursing students should be well-prepared and have foundational knowledge to prevent a break in protocols. To improve practice and compliance with isolation protocols, nursing students' knowledge and skill should be the starting point. However, it is clear from student's comment that she felt inadequately prepared both theoretically and clinically and that she is not receiving the adequate guidance from the nursing staff, "assuming" that she knows what is expected of her.

This fear of compromising the patient's care and not possessing enough knowledge and skills will negatively affect the **self-image** of the nursing student and therefore limit **self-esteem**. It therefore will compromise the learning ability of nursing students during clinical placement.

4.3.2.4 Desire for knowledge and understanding

"… you can give medication, it is fine, you can go to CRE. And then, as you go on, you learn as you go…" (S2)

One nursing student felt that she was allocated to nurse a CRE patient based only on the fact that she knew how to administer medication. The student nurse knew that she was not well enough equipped to do what was expected of her. Her experience came from working with the patient and just “copying” what other people do. This is clearly inadequate training method, thus placing both the patient and the student at risk. Isolation nursing has principals that need to be followed rigorously to prevent contamination. Without enough **foundational knowledge** and **skills** both the student and patients live are at risk.

- *“I wanted to learn more about nursing these patients … wish I can learn more”* (S2)

It is clear from this student’s remark that she desired more knowledge about the students training. Clinical exposure is of value only if the nursing student receives support and guidance during this exposure. Support and guidance will enable them to create meaning and make connections from the experience.

This student also presented with one of the characteristics of an adult learner, to take control of her learning and therefore realised that to care for her patient adequately she needed much more foundational knowledge about CRE and the effective way to manage and prevent spread.

One of the nursing students indicated that although they have received formal and informal training regarding infection prevention and management of patients in isolation, the training is **not sufficient** to prepare them for the challenges of caring for a CRE patient in contact isolation as evident by this remark:

- *“I would not say it was sufficient, since I still have questions …”* (S2)

The following nursing student also implied that there is a need for more **in-service training at the bedside** by the IPP and supporting staff in the clinical field:

- *"… we had to go and ask infection sister to come and show us … it is learning on the job"* (S3)

Clearly this nursing student's remark is an indication for the desire for more training and accompaniment in the clinical field. The nursing student also values the IPP's knowledge and trusts her judgment to enable them to learn practical skills and incorporate knowledge through constructive learning at the bedside. Furthermore, one nursing student indicated that they also receive **mixed messages** about the management and protocols:

- *"… today they said so, tomorrow it is changed …"* (S8)

Nursing students are left confused. Nursing students rotate between wards for clinical placement and are not always aware of what is expected of them in the different disciplines. Therefore, **reliable information** that is current and correct is of vital importance to ensure that quality nursing care and constructive learning do take place.

Nursing training in the clinical context can be divided into two components, namely, theoretical and practical

a) Theoretical preparation

It is clear from the nursing students feedback that they lack knowledge about infection prevention. One of the contributing factors that were identified from the feedback were inadequate infection prevention programme and theoretical preparation. Although included in the nursing students curriculum. Nursing students have a module on infection prevention and a workbook that need to be completed during the BC 1 academic year. Students indicated that this is not adequate and they needed more sound knowledge about CRE microbiology and understanding of infection prevention principles. Skills to assist them to accurately assess patients that are at risks and generally management of

CRE patients placed in contact isolation are not properly covered during their theoretical preparation.

b) Clinical preparation

It is also clear from the nursing students feedback that knowledge about infection prevention is not enough to ensure compliance and change in behaviour in nursing students. As it is expected of nursing students to learn new skills during their clinical placement by observing and experiential learning, nursing students need good role models and support at the bedside. To facilitate learning, these role models should have deep knowledge and skills to guide nursing students during their clinical placement. From the feedback from the semi-structured interviews students felt that the information they received are constantly changing. So, it can be assumed that the role models also give them incorrect information because of the lack of standardisation of nursing care for the CRE patient in isolation.

Unit managers, staff members, IPP sisters and clinical facilitators are responsible for supporting nursing students during their clinical placement according to the clinical model implemented in the clinical learning environment of the BC 1 nursing students. During the semi-structured interviews, there was clear indication of lack of support in the clinical setting. Some staff members also lack deep understanding about the management of the CRE patients thus putting the nursing students in a difficult position with limited support. This is evident by a nursing student commenting:

- "*Sometime they are unsure*" (S5)

4.3.2.5 Desire for self-actualisation

Self-actualisation can be defined as nursing students' desire to achieve everything that is expected of them and delivering optimal nursing care to their patients and community.

One nursing student clearly portrays one of the characteristics of self-actualisation by taking responsibility for herself and other's safety by implementing what was taught to her:

- *"For me because they taught me before about the infection and the precautions, just must be careful … not difficult"* (S7)

The nursing student was problem-centred and calm by indicating that caring for the CRE patient is not difficult. She only implies that she needs to correctly implement her knowledge when care is given to the CRE patient. Another nursing student confirmed responsibility for herself and other's wellbeing by indicating to wear PPE, especially close to the patient to prevent contamination:

- *"… it is isolation…, so you make sure you put the gloves, apron and mask when you go there, especially when you are close to the patient"* (S7)

Another nursing student stated during the interview that there is a need for **more training** and deep knowledge regarding the care for of a CRE patient in contact isolation:

- *"I wanted to learn more about nursing these patients … wish I can learn more"* (S2)

This is one of the characteristics of an adult learner and self-actualisation need because the nursing student takes responsibility for herself and her educational need. She wants to develop further to reach her highest potential.

It is clear from the nursing students feedback that they desired fulfilment and personal and desired professional growth in their nursing career. Therefore, nursing students need support during their training to achieve this highest level of professional growth as characterised by personal stability, autonomy and respect for others through delivering optimal nursing care to patients.

It is clear from the nursing students feedback, in order to addressing nursing students' physical, emotional, social, learning and self-actualisation needs both in the clinical and theoretical environment. More attention should be given to the BC 1 nursing students Infection Prevention Module included in their curriculum in order to prepare them for their professional role.

4.4 Summary

In Chapter 4, the nursing students' experiences were identified by the researcher and grouped under two themes. This will be further discussed in Chapter 5. Recommendation and limitation of the study will also be discussed.

5 DISCUSSION OF FINDINGS, CONCLUSION AND SUMMARY, LIMITATIONS AND RECOMMENDATIONS

5.1 Introduction

In Chapter 4, the data was analysed using the conventional content analysis method to identify themes. The researcher then extracted the nursing students' statements and arranged them into sub-themes.

Chapter 5 is a summary of the main findings and limitations of the study will be discussed followed by recommendations for nursing education, nursing research and nursing practices.

5.2 Discussion Of Findings

5.2.1 Physiological and resources desires

In any isolation environment, following protocols is key to safe patient care. To ensure that nursing students comply with isolation protocols and are not at risk due to physical and emotional destructions (Martin and Joomis, 2007; Milheim, 2012; Quinn and Hughes, 2007), it is important that their most basic physiological needs (including thirst, hunger and physical clothes) are satisfied.

Thus, the importance for nursing education is to prevent nursing students from being "dominated" by the desire to meet their basic needs. This will influence their ability to focus on safety, critical thinking, constructive learning and patients' needs until their own physiological needs are satisfied (Maslow, 1943; Neto, 2015; Quinn and Hughes, 2007).

In the healthcare environment, one such basic need is the availability of scrubs for nursing students working in contact isolation. They must change into scrubs to minimise the risk of contamination and prevent taking CRE organisms home on their clothes. Nursing students did indicate that scrubs and PPE were available. Two nursing students said that you only have to phone the laundry to get scrubs and gowns. At one hospital, the IPP even went above and beyond what is required to ensure that PPE is available for all nursing staff.

During the interview, some of the nursing students indicated that equipment had to be shared between ward and isolation patients; for example, the stethoscope and blood glucose monitor. From personal observation, wards only have one portable fan and scale. This becomes a challenge when a patient in an isolation room is on strict intake and output, and needs daily weighing.

Limited resources may lead to contamination and a break in isolation protocols. There is also evidence in literature that indicates the negative effect that limited resources, such as equipment, has on nursing staff. Frustration levels increase and quality of patient care decrease (Cassidy, 2006) because nursing students are in constant emotional conflict as they have to perform the task on time and do not have the resources available to do it according to protocols. This leaves them with feelings of guilt and despair.

Nursing students get confronted with the real environment when placed in wards. From personal observation and nursing students' feedback during the interviews, this daily struggle to get everything they need before being able to go into a patient's room were noted. It is seen as a real obstacle experienced by the nursing students. PPE may not always be available because of budget constraints. Stock such as gloves and alcohol wipes are not always ordered in time, thus leaving nursing students with additional stress and even exposed.

Thus, there is a need for designated equipment, such as thermometers, stethoscopes, washbasins and sphygmomanometers, in isolation rooms. This equipment should be cleaned and disinfected as per hospital protocol and CDC (2015b) recommendations. Unit staff and management should ensure that enough stock and dedicated equipment are always available for patients in isolation (CDC, 2015b). Clinical guidance at the bedside is of vital importance for all nursing students (Cassidy, 2006; Tiwaken, Caranto and David, 2015). To ensure that equipment and PPE are used correctly to minimise patient and nursing student risk, nursing students should be orientated and taught about infection prevention principles.

To conclude, by ensuring the availability of PPE and equipment, and providing knowledge about how to use it correctly, hospital and nursing education institutions demonstrate their commitment to evidence-based practices and quality nursing care. This will alleviate any possible stress that nursing students might experience and will meet their first basic need, allowing them to provide safe and quality nursing care while in isolation.

5.2.2 Safety and security desire

Being at a new school, and being summoned to the principal's office for the first time will surely cause stress and anxiety for any new nursing student. When confronted with a new environment and situation, any person may experience some form of anxiety – either a dry mouth or a feeling that your heart is racing. It is normal for human beings to have some form of emotional and physical response when confronted with stress and uncertainty.

Nursing students reported that they were scared and afraid of the "superbug". They experienced anxiety and helplessness because they lack deep knowledge and understanding about the risks and what were expected of them while caring for CRE patients in contact isolation. Thus, they were left exposed and vulnerable.

Nursing students have indicated that it was the first time that they have nursed these patients and were unfamiliar with the protocols and even unsure about when and where yellow aprons have to be worn. Furthermore, they were also concerned that they could take the CRE home to their children due to the risk of contamination. One nursing student even indicated that she is thinking of testing herself because of the fear that she has been working with these patients and could also be contaminated.

Milheim (2012) defines safety as having a sense of familiarity and comfort. The feeling of safety can only be accomplished when nursing students know and realise that no harm will befall them their immediate family physically, mentally or emotionally (Dehkordi and Tavakol, 2011; Tiwaken, Caranto and David, 2015). Therefore, nursing students need to feel safe in their clinical environment because it is only possible for nursing students to reach self-actualisation, and apply constructive learning and critical thinking when their deficiency needs (basic needs) are met according to Maslow's (1943; 1970) hierarchy of human motivation (Martin and Joomis, 2007; Quinn and Hughes, 2007). Again, if nursing students feel unsafe and exposed, it has a negative effect on nursing education and on them practising as per protocol.

If a nursing student or staff member is exposed to stress that exceed their knowledge, skill and capability level, the person will experience a sense of despair as supported by Van der Berg and Daniels (2013). This was observed by the nursing students' remarks that they were in a "*deep pit*" and "*I do feel exposed*".

Nursing students who are exposed to increased stress for long periods may even present with lower cognitive and physical performance according to Quinn and Hughes (2007). Some of the remarks confirming their stress and uncertainty include the following: Simple tasks such as giving medication and taking a patient's blood pressure are becoming more difficult if nursing students have to make sure they have everything with them. Donning gloves and gowns are time-consuming and nursing students cannot always call someone

to come and help because they are in isolation and the person will not hear them in the room next door.

All these factors may have a negative effect on the ability of nursing students to build on previous knowledge and to learn constructively (Quinn and Hughes, 2007). Their minds are so occupied just complying with protocols and coping with the new stressful environment, that self-reflection and time for critical thinking may be limited.

Based on Blooms Taxonomy, nursing students need to master basic theoretical concepts (Quinn and Hughes 2007; Van der Berg and Daniels 2013) such as microbiology, transmission, isolation protocols and pathophysiology of CRE (Kaphagawani and Useh, 2013) that would ensure that the knowledge gap is improved. Skills to manage patients in isolation are developed that will minimise the fear when nursing students are exposed to stressful situations. Without clear foundational knowledge, higher cognitive problem-solving skills and application would be very difficult for the nursing student to master. This will cause unnecessary feelings of fear and anxiety within nursing students, which will hinder them in performing their tasks to their full potential (Al-Hussami and Darawad, 2013; Kaphagawani and Useh, 2013; Ojulong, Mitonga and Lipinge, 2013; Tiwaken, Caranto and David, 2015; Van der Berg and Daniels, 2012).

The curriculum should aim to minimise fear, anxiety and stress experienced by nursing students through focus group discussions and problem-based learning – not only during theoretical sessions but also in the clinical environment (Dehkordi and Tavakol, 2011; Kaphagawani and Useh, 2013; Ward 2010). Ward (2010) reiterated the importance of small group discussions to improve application and compliance with infection prevention protocols. Small groups foster confidence under nursing students that will reduce fear and facilitate critical thinking processes when they are in the clinical environment.

One nursing student indicated that because she did not receive adequate guidance at the bedside, she only realised after two hours when she was corrected by the ward manager, that she has done something wrong and put the patient and herself at risk.

Therefore, more clinical support and mentorship by facilitators and nursing staff in the clinical environment should be encouraged to ensure nursing students are more self-assured, and develop needed skills to foster professional development when caring for CRE patients (Al-Hussami and Darawad, 2013; Kaphagawani and Useh, 2013; Tiwaken, Caranto and David, 2015; Ward, 2010). The immediate pressure will be less when there is someone to rely on and whom they trust.

Facilitators and mentors in the clinical field should also support nursing students to recognise emotional distress experienced by patients and themselves. By recognising stress and anxiety, nursing students will be assisted to develop coping mechanisms when placed in contact isolation, which will improve nursing care; for example, what to do when you are responsible for two patients and their medication is due at the same time (Tiwaken, Caranto and David, 2015).

Kaphagawani and Useh (2013) suggest that facilitators provide constant feedback during accompaniment and after assessment. This will cause nursing students to gain insight about their implementation of isolation protocols and help them to identify areas of improvement. Through support and guidance, nursing students will be able to react appropriately to risks and will be able to implement the needed protocols with confidence. Their level of fear will also be less, giving nursing students the confidence to try new skills, and ask questions that will improve their knowledge about infection prevention thus improving quality nursing care.

5.2.3 Love and a sense of belonging

The third criterion of Maslow's need hierarchy is the need to belong, for example, to be accepted by fellow colleagues, to have friends and meaningful relationships (Quinn and

Hughes, 2007). The adult learning theory is greatly influenced by the humanistic psychology theory. Malcolm Knowles Andragogy Theory believes that adult nursing students are self-directed and want to take responsibility for their own learning. However, due to the stressful environment, lack of knowledge and experience, nursing students need substantial positive support from facilitators and staff members. This would enable a nursing student to foster and develop the characteristic of self-direction and sense of achievement in a safe environment conducive to learning (Bruce, Klopper and Mellish, 2013). The humanistic theory supported by Hamachek, as cited in Quinn and Hughes (2007) claims that a person's experience and feelings of the lived event are far more important to the individual than the event itself (Quinn and Hughes, 2007). Therefore, nurse educators should ensure that not only the physical environment but also the human interpersonal environment is beneficial to learning (Neto, 2015; Quinn and Hughes, 2007).

During the semi-structured interviews, two nursing students reported that they felt that nursing staff do not want to help them with isolation patients and that nursing staff were reluctant to answer bells or even clean patients. Due to time constraints and isolation protocols, nursing contact time with patients is reduced thus increasing the risks for patients. The feeling of isolation is both experienced by the nursing students and patients, which is supported by literature (Jones, 2010; Kelly and Pyrek, 2012; Stelfox, Bates and Redelmeier, 2003).

Nursing staff, shift leaders, unit managers and clinical facilitators are responsible for supporting nursing students emotionally during their clinical placement. The importance of emotional support and knowledge about nursing students' specific needs (for example, emotional belonging need and the importance of a stress-free interpersonal environment for learning) cannot be stressed enough. Nursing student desired knowledge but, more importantly, they required respectable role models who can help them apply theory into practice and prepare them holistically for nursing patients (Cox et al., 2015; Kaphagawani and Useh, 2013).

Education programmes and workshops about teamwork, nursing student allocation, and the importance of emotional and clinical supervision of nursing students should be implemented. These programmes should be compulsory for nursing staff that are responsible for nursing student placement and accompaniment. Knowledge about the nursing students' specific needs (for example to be accepted by colleagues and be part of the team) will improve the work environment for nursing students, reduce stress, and address belonging needs of nursing students (Cox et al., 2015; Kaphagawani and Useh, 2013).

Therefore, more focus should be placed on nursing student allocation. Nursing students can be allocated to teams or given a more experienced nurse to guide them in the beginning. This will reduce stress and build confidence. Nursing students will also be more willing to engage with patient care if they know how to do it the right way the first time according to the protocols and have someone with them to guide and assist should they need it.

On the one hand, nursing students want to be accepted and be part of a team. However, there is also clear conflict for nursing students who want to do things according to the book "being the perfect nurse" (Cassidy, 2006). Two of the nursing students indicated during the semi-structured interviews that they have to make sure that they have everything with them before entering a patient's room. When confronted with compromised isolation practices, such as medical staff not washing their hands and breaking isolation practices, some nursing students are left with a sense of frustration and helplessness (Cassidy, 2006; Ward, 2010).

Nursing students have even indicated during the semi-structured interviews that they are reluctant to report poor performance by their seniors because of the fear that their "procedures will not be signed of" and that they will be rejected by colleagues (Ward, 2010). Therefore, effective role modelling by nurses, facilitators, mentors and IPP nurses,

and deep knowledge about isolation protocols are of vital importance to support nursing students and prepare them for their clinical roles. This will foster confidence and help them find meaning in their practice (Kaphagawani and Useh, 2013; Tiwaken, Caranto and David, 2015; Ward 2010).

Ward (2010) also suggests that workshops rather than large group lectures give nursing students a platform to ask questions, thus stimulating constructive learning. This can have a positive change in behaviour if nursing students understand the "why" (Al-Hussami and Darawad, 2013). Nursing students have indicated during the interviews that their current infection prevention orientation week is not nearly enough to answer all their questions. They have not received adequate guidance from staff members and facilitators, thus leaving them unsure and isolated. Two nursing students also confirmed that they want the IPP to come and see them in the ward as they value her input and knowledge.

Adult learners want to apply new skills into practice immediately (Quinn and Hughes, 2007), therefore, they require an environment where they feel free to try new skills and apply knowledge. They need assistance in the beginning, for example, how to screen patients and implement protocols. The moment that a nursing student masters the basics and fear is removed, the facilitator can challenge the nursing student's deep knowledge; for example, the reason why a doctor placed a patient on a specific class of antibiotics, and interpret the blood results and compare microbiology results. This will facilitate deep learning and improve the nursing student's skill with practical application. If nursing students understand the protocols and their role in the management of the CRE patient, their feelings of isolation will be less and they will be able to be confident in the daily routine care. Nursing staff will see their confidence, and accept them as part of the team because of their commitment and valuable contribution.

5.2.4 Self-esteem and self-worth

Self-worth and self-esteem can be explained as the feeling of worth that an individual possesses or strives towards. People need to be respected by others and feel that they can make a positive contribution to their communities (Milheim, 2012).

One of the nursing students indicated that she wanted to nurse the patient according to the protocols because it is the right thing to do. This clearly indicates that self-worth and pride in her work is very important to her. However, nursing students' self-worth and esteem will be negatively affected if they doubt themselves in the clinical field and feel that they place the patient and themselves at risk. This is evident by the nursing students reporting that they are allocated to a patient without enough knowledge and experience. Additional to this uncertainty, six of the nursing students indicated that they need more training and were unsure about what is expected of them because of mixed messages from unit managers and nursing staff. It is vital that information and protocols should be universal and messages from all stakeholders should be consistent to minimise risks.

Therefore, nursing students' self-esteem and self-worth may be compromised because their training and what is expected of them during clinical placement are not always aligned (Tiwaken, Caranto and David, 2015; Van der Berg and Daniels, 2013; Ward 2010).

Literature has indicated that nursing students desire to feel safe, part of a group and secured before a sense of self-esteem can develop (Martin and Joomis, 2007). During nursing students' clinical placement, it is expected that they become competent. This can only be possible if nursing students have gained enough skill and knowledge, and can apply critical thinking to the specific scenario (Dos Santos, Corrêa and Salgado, 2013; Gould and Drey, 2013; Ward 2010). For nursing students to develop this level of clinical competency, they need to develop emotionally as well as cognitively (Tiwaken, Caranto and David, 2015; Van der Berg and Daniels, 2013).

Because emotional development and self-worth is so important for professional development, it should receive more focus during accompaniment and group discussions to boost the nursing student's confidence (Tiwaken, Caranto and David, 2015; Van der Berg and Daniels, 2013). Additionally, nursing students' uncertainty and low self-esteem may be impaired when they do not receive constant positive feedback from good role models and facilitators (Milheim, 2012).

A "buddy" system between a more senior nursing staff member and a nursing student can also create a platform for the nursing student to develop confidence and self-worth. Nursing students will feel that they are part of a team and not alone. They will have someone to go to for support and to ask questions. Nursing students will therefore receive constant reassurance during the day and have less negative thoughts because their mistakes can be corrected on the spot by their "buddies". Nursing students reported that they feel more confident when they know they do not place the patient and themselves at risk thus improving their self-worth and esteem.

5.2.5 Cognitive desire

Cognitive needs can be described as the inner desire for knowledge and understanding. Knowles based his adult learning theory on the principle that adult learners are self-directed learners who value and learn from their own experiences. Their motivation to learn come from their desire to address problems that they encounter in their daily lives by applying new knowledge and skills (Bruce, Klopper and Mellish, 2013).

It is clear from the nursing students' remarks that due to the limited knowledge, mixed messages and minimal guidance from clinical facilitators, staff members and IPP, nursing students felt confused.

The researcher discovered that the different hospitals implement protocols in different ways due to a lack in standardisation of the protocols and different interpretation of hospital standard operating procedures. Some nursing students indicated that they must

change into scrubs while other nursing students reported that it is not required by their hospitals to do so. This difference in implementation of the protocols may contribute to nursing student confusion because they receive different information at campus and hospital. These mixed messages cause confusion and uncertainty that may contribute to poor compliance with isolation protocols. This may ultimately lead to CRE spreading and a rise in mortality rates of patients.

It is also evident from literature that nursing students have a low level knowledge of infection prevention and disease profiles (Dos Santos, Corrêa and Salgado, 2013) because their educational programme lacks a specific course or continuous integration focusing on infection prevention and correct management of CRE patients (Al-Hussami and Darawad, 2013).

The researcher noted that all nursing students could only repeat basic facts that they were taught through rogue learning, for example, how CRE spreads and what kind of PPE was required. Very limited internalisation and constructive learning took place as evidenced by "*… do not understand what is going on*" (S8), and "*some sort of bacteria*" (S6). The researcher noted that five of the nursing students were unable to pronounce Carbapenem-resistant Enterobacteriaceae correctly and needed assistance to pronounce the words.

Considering this, it is vital that nursing students receive adequate theoretical preparation and clinical guidance that would enable them to apply critical thinking during their clinical placement and comply with infection prevention protocols (Al-Hussami and Darawad, 2013; Dos Santos, Corrêa and Salgado, 2013; Gould and Drey, 2013; Tiwaken, Caranto and David, 2015; Van der Berg and Daniels, 2013; Ward, 2010).

If nursing students are not able to think critically and internalise the infection prevention principles when nursing CRE patients (for example, when confronted with two patients

with different types of CRE resistance such as “GES” and “OXA”), they will be unable to understand or comply with the protocols.

Literature has indicated that the attitude, confidence, compliance and perception of infection prevention of student nurses improved after receiving appropriate theoretical support (Al-Hussami and Darawad, 2013). Therefore, nursing students need to have foundational knowledge of infection prevention, internalise the knowledge and be able to apply their knowledge to real scenarios. This critical thinking can be developed during clinical rounds and in the classroom by group discussions of real patient scenarios.

a) Theoretical guidance

Formal teaching should focus on reinforcing basic principles. Nursing students should be given opportunity during clinical placement to apply new knowledge and skills under supervision to improve practice (Van der Berg and Daniels, 2013).

Nursing students attend a one-week infection control programme presented to them at the nursing college. During this programme, the focus is on the following: basic microbiology, history and importance of infection prevention methods, modes of transport of organism and ways to prevent spread in the hospital and community. Nursing students are also expected to visit the microbiology laboratory to see first-hand how organisms are cultured and screening is done for the appropriate antibiotic classes.

From the nursing students’ responses, it is clear that one week is not enough and grouping them all together in a lecture does not guarantee every nursing student gains understanding into infection control protocols. Nursing students stated they need more training and that there is a difference between what is taught in the class and what is happening in the hospitals. They clearly struggle with implementation if they receive mix messages from college and the nursing staff in the ward, for example, when to wear scrubs and do double-bagging of linen.

It is also important that nursing students recognise the perceived risk for themselves and their patients. According to Cox et al. (2015), if theory on infection control and identifying risks are combined, nursing students' compliance to protocols increase because they understand the need for infection prevention protocols.

These guidelines and protocols should be explained to the nursing students before placement to clarify any uncertainty. Facilitators can also implement an online preclinical placement learning platform for nursing students in the clinical field. Nursing students can use this platform to ask the supervisor questions and clarify concepts if the facilitator is not able to be physically present at the bedside to accompany the nursing student (Cox et al., 2015).

Real-life videos and patient studies can also help the nursing student to internalise the information. This will promote deep learning. When nursing students understand the risks, nursing students will be more willing to comply with protocols, thus improving nursing care at the end.

b) Clinical guidance

Educational programmes should not only focus on giving nursing students knowledge about infection prevention, CRE and microbiology but should also promote behaviour modification to improve compliance with protocols. Therefore, protocols and infection prevention principles should be practised by all nursing staff in the clinical placement (Al-Hussami and Darawad 2013, Cox et al., 2015). All nursing staff should attend audits and regular in-service training on new compulsory protocols to improve compliance, thus improving the clinical placement area for nursing students.

To improve foundational, practical and reflexive competency (Bruce, Klopper and Mellish, 2013), facilitators and academic staff should incorporate infection prevention principles throughout the year, both inside and outside the classroom, to ensure reinforced knowledge, improved practical skills and applied competency in the clinical setting (Cox

et. al., 2015; Van der Berg and Daniels 2013). Nursing students can be tested on their knowledge and understanding by completing case studies. They can also be formally assessed by including isolation principles as a clinical skill in the clinical portfolio of evidence that have to be formally evaluated before exam entry.

Outside the classroom, facilitators and ward personnel should set clear guidelines for the nursing students by adhering to protocols and infection standards (Cox et al., 2015). It is also very important that nursing students are regularly accompanied in practice at bedside by facilitators who are up-to-date with new practices (Tiwaken, Caranto and David, 2015).

The current training programme exposes nursing students to one week of theoretical orientation. They are then placed in a clinical setting where they rely on hospital staff to guide them. During the semi-structured interviews, nursing students referred to donning gloves and aprons as time-consuming. Therefore, nursing staff may show reluctance to enter the patient's rooms because of time constraints, thus leaving nursing students alone to figure out the patients' care for themselves." This poses a risk not only to the nursing student but also to the patient who might not receive the correct care. This does not facilitate good practices and a different approach should be used. Nursing students have indicated they want to learn more and they do not know enough – yet they are placed unsupervised with isolation patients. One nursing student stated wishing the IPP could be around more. This statement indicates a need to learn on a one-on-one basis next to the patient's bed. Therefore, nursing students should be paired with a senior staff member or senior nursing student for emotional and clinical guidance. This nursing staff member is then responsible for ensuring that the nursing student follows the correct procedures. The nursing staff member is the-go to person if the nursing student has questions regarding the correct implementation of protocols. This will reduce fear and ensure that nursing students are complying with infection prevention protocols.

Case studies, small group discussion and integrated practical simulation can be introduced to facilitate clinical teaching and develop critical thinking (Al-Hussami and Darawad 2013; Van der Berg and Daniels 2013). Narratives and visual aids that reinforce appropriate everyday practices have been reported by Cox et al. (2015) to enhance relevance during theoretical teaching for nursing students. Nursing student should not only know “what” and “how”, but also when to implement appropriate isolation protocols. This is possible through open-ended case studies that are incorporated throughout the academic year (Cox et al., 2015).

Nursing students should be placed in a clinical learning environment that supports and positively influences nursing students’ learning, bridges the gap between theory and practice, and promotes nursing student professional socialisation (Tiwaken, Caranto and David, 2015). A conducive learning environment according to Cox et al. (2015) and Kaphagawani and Useh (2013) is when there is a good relationship between staff members. Staff members are happy and friendly, they foster high morals and promote a calm ward atmosphere. Learning will be negatively affected when staff members are unfriendly, have bad attitudes and are antagonistic towards nursing students, thus leaving nursing students with a sense of frustration and discouragement (Kaphagawani and Useh, 2013).

5.2.6 Self-actualisation desires

The last and highest class of need is self-actualisation. According to Maslow, this is when a person reaches and fulfils his highest potential (as cited in Milheim, 2012). For the researcher, this is when an adult learner demonstrates confidence, is a self-directed learner, is able to function independently, is a lifelong scholar, and delivers holistic patient care with self-assurance that is evidence-based (Quinn and Hughes, 2007). This is supported by Milheim (2012) who states that Maslow (1970) has indicated that self-

actualisation is when a person is able to listen to his/her own voice, direct his/her actions, take responsibility and is motivated to grow.

According to South Africa Qualification Association (SAQA), nursing students have to demonstrate applied competence. This implies that they can distinguish between a range of possibilities, have a clear understanding and knowledge about CRE, are able to direct their actions, and are able to adapt to change independently (Bruce, Klopper and Mellish, 2013). An example is managing a CRE-positive patient in contact isolation who needs to go to theatre immediately without risking other patients.

Although some nursing students indicated that they felt that they wanted to do the right thing for their patients, the majority of nursing students indicated that their knowledge was inadequate and they were not able to function independently. It was clear from the interviews that the nursing students are unable to demonstrate this higher level of actualisation. Therefore, more training and emotional support are needed to develop nursing students to reach their highest professional level. This will enable them to function independently and implement evidence-based practice with confidence.

Literature also supports this “low” level of self-actualisation amongst nursing students. This is evident when nursing students do not adhere to isolation protocols as evident by poor washing of hands; breaking isolation protocols and poor environmental cleaning (Gould and Drey, 2013). Jordanian nurses had poor knowledge about infection prevention standards and therefore were prone to break protocols and put patients at risks (Al-Hussami and Darawad, 2013).

Therefore, nursing education of infection prevention must ensure behavioural change under nursing students to reduce the risk to patients (Cox et al., 2015). The aim is that all role players of the education team, the hospitals and the curriculum developers should strive to achieve this level of competency when preparing nursing students for their

clinical role (Tiwaken, Caranto and David, 2015). If not, we are setting our nursing students up for failure.

The main driver for nursing education is to achieve this level of competency. Firstly, nursing student physical and emotional needs have to be addressed according to Maslow (1943) and Brink, Van der Walt and Van Rensburg (2012). Secondly, more attention should be placed on educational needs and the clinical environment where nursing students are placed.

Currently, nursing students are just orientated regarding infection control protocols for one week and are then exposed to a clinical setting that is not learner-focused with limited knowledge and support. Is it then fair to expect them to develop in such a way with the current support to become reflective critical thinking practitioners who will be able to reach their self-actualisation goal?

Therefore, more focus, action and thought are needed in nursing education to prepare the nursing students effectively for their clinical role if we want nursing students to demonstrate applied competency and address their self-actualisation needs (Cox et al., 2015). Case studies and clinical placement in an environment that is conducive to learning could help nursing students apply theory into practice. Discussion groups afterwards could clarify difficult scenarios and possible actions. These are just some examples of methods that could be implemented to promote nursing students' self-actualisation needs (practical and foundational competency) (Bruce, Klopper and Mellish, 2013, Kaphagawani and Useh, 2013).

5.3 Summary And Conclusion

The purpose of the study was to determine the needs of nursing students while caring for patients with CRE in contact isolation. This would enable the educational team to

accommodate and address the nursing students' needs in the clinical environment. The objectives were firstly to explore the experiences of student nurses while caring for CRE patients. Secondly, to identify student nurses needs while caring the CRE patient.

The conventional content analysis method demonstrated to be an appropriate method as the objectives were met. The nursing students could share their experiences caring for CRE patients in contact isolation with the researcher. This allowed the researcher to analyse the statements of the nursing students and identify the needs of the nursing students while they cared for CRE patients in contact isolation.

Two themes emerged during the analysis process namely emotions and desires of nursing students. The nursing students' desires were further divided into the following sub-themes: safety, belonging, cognitive, self-worth and self-actualisation needs.

The ensure that nursing students comply with isolation protocols and are not put at risk due to physical and emotional destructions, it is important that their most basic physiological needs are satisfied. Literature indicated that nursing students should receive adequate resources and knowledge about how to use PPE correctly. By addressing the nursing students' first basic physical desire, nursing students will experience less stress thus allowing them to provide safe and quality nursing care for CRE patients in contact isolation.

The second desire identified by the nursing students were their need for safety and security. Nursing students reported that they were scared and afraid of the "superbug" because they lacked deep knowledge and were unfamiliar with the protocols. Therefore, based on evidence from literature, more focus should be given to curriculum development, accompaniment of nursing students in the clinical field and supporting nursing students to develop techniques to manage stressful situations.

Nursing students reported that they felt isolated and not supported by the nursing staff during their clinical experience, thus their need for "love and sense of belonging" was not

met – leaving them isolated and alone. Based on the literature, nursing staff should be made aware of their vital role they play in meeting the nursing students' needs during clinical placement, through attending educational programmes and workshops. Nursing students should also have the opportunity to apply new skills in a safe environment that will enable deep learning. This is only possible if nursing staff support nursing students' needs for acceptance and value their contribution and part of the health care team.

Nursing students have indicated that they are expected to care for CRE patients with limited knowledge, support and experience, thus putting themselves and their patients' safety at risk and negatively affecting their "self-esteem and self-worth". Because of the importance of the nursing student's self-worth for professional development, literature has indicated that more focus should be placed on positive feedback during facilitation of nursing students by role models.

Nursing students have indicated that although they do receive theoretical and clinical guidance –both formal and informal at hospital and campus. Their need for deep knowledge was not met due to mixed messages and limited support during clinical placement by nursing and academic staff, thus leaving them confused. Lack of standardisation in protocols and a course in the curriculum for nursing students focusing specifically on infection prevention throughout the year are also contributing factors to the knowledge "gap". Therefore, literature suggests that nursing students should receive theoretical preparation that foster critical thinking, develop attitudes and confidence of nursing students regarding infection prevention both inside and outside the classroom.

However, nursing students did indicate during the semi-structured interviews that they wanted to do the right thing. Due to limited knowledge and skill, they could not function independently thus leaving nursing students' self-actualisation need not met and fostered. If nursing education wants to develop nursing students who will be able to deliver optimal care to CRE patients, and reach their highest self-actualisation needs, much more need

to be done both inside and outside the classroom, for example, curriculum development and addressing nursing students' needs, and developing clinical staff who can support nursing students in the infection prevention environment.

5.4 Limitations

The study has several limitations that should be considered when results are evaluated.

5.4.1 Difficulties

- Interviews could only be conducted at 13:00 after formal classes. It can be assumed that their concentration and responses to questions could have been affected. Being tired impacts on how willing nursing students would be to reflect on their own performance and experiences.
- A venue close to where the interviews were conducted was not available which could also affect the nursing students' physical wellbeing and how they responded.
- Finding literature that focused on nursing students' needs while caring for a CRE patient in isolation proved difficult to find. Research has been done on contact isolation and implementation of standards, but this literature did not focus on the nursing students' needs while caring for these patients and their impact on nursing education. Furthermore, no research was available that focused on nursing students' needs while caring for CRE patients in acute care environments.

5.4.2 Factors that may have affected the results

- Although data saturation was reached, only a small portion of nursing students from a private nursing institution was sampled to take part in the semi-structured interviews. This might limit the generalisability of the results.

5.4.3 Barriers

- Because of them responding in their second or even third language their answers were sometimes monosyllabic. This may have influenced the richness of their answers.
- Although the researcher was not directly responsible for the nursing students' theoretical and clinical preparation, nursing students were known to the researcher. This could have influenced the nursing students' willingness to share information and please the researcher.

5.5 Recommendations

5.5.1 Recommendation for future research

- Due to the difficulty responding to questions that need higher cognitive thinking and emotional reflection in their second language, more reliable and true reflection of the nursing students' emotions would have been possible if the nursing students could have responded in their home langue rather than English. This would, however, have had an impact on time and availability of a transcriber that has knowledge about the nursing students' languages (for example, Xhosa, Zulu and Northern Sotho). This should be considered when the study is repeated to ensure better results.
- During the interviews, nursing students should be allowed to elaborate more. Questions should be used as probes to guide the interview, not to structure the interview. This will allow the nursing students to elaborate more on their feelings and will require less direction/input from the researcher. This restricted their responses as experienced during the research. In-depth interviews that allow more time, and more appropriate timeslots that match the nursing students'

energy and concentration level during the day will ensure richer feedback, thus enabling the researcher to identify the needs.

- Based on the findings, further research has to be conducted on curriculum development to identify ways to include microbiology in the infection prevention programme throughout the year.
- The importance of accompaniment of nursing students in the clinical field was evident from the study. The knowledge and attitude of academic staff about the importance of accompaniment in the clinical field should be researched.
- As identified during the interviews, nursing students received mixed messages from clinical staff about managing CRE patients. Thus, more research is needed to assess staff attitude, knowledge and compliance to CRE protocols that would improve compliance and standardisation of care.
- Because the needs of permanent staff may vary due to age, exposure and professional experience, their needs may be different. Therefore, more research is needed to determine the permanent nursing staff's needs while caring for CRE patients in contact isolation.
- Due to the importance of the nursing students' clinical environment and the current negative experiences of nursing students placed in the clinical setting when expected to care for CRE patients, more focus should be placed on their clinical environments by ward supervisors. This will ensure that enough resources are available to meet nursing students' physical needs, for example scrubs, designated equipment and PPE. Nursing students should also receive orientation on how to use the equipment correctly according to hospital protocols.
- Formal teaching should focus on basic principles, microbiology and perceived risk identification to ensure foundational knowledge and to promote critical thinking. Smaller workshops rather than formal lectures are suggested to improve constructive learning and behaviour modification. Open-ended case studies,

narratives and small group discussions are just some of the teaching methods that can be implemented to facilitate teaching.

- Clinical facilitation and mentoring of nursing students are important and should be enforced throughout nursing students' clinical placement. This will ensure that nursing students receive guidance and positive reinforcement at the bedside that would foster compliance and confidence.

5.5.2 Recommendations for nursing education

- Clinical environments should have enough resources available, for example scrubs, designated equipment and PPE, to ensure that nursing students' physical needs are met and that patient nursing care is not compromised. Nursing students should also receive orientation on how to use the equipment correctly according to hospital protocols.
- Formal teaching should focus on basic principles, microbiology and perceived risk identification to ensure nursing students receive foundational knowledge, which promotes critical thinking. Smaller workshops rather than formal lectures are suggested to improve constructive learning and behaviour modification. Open-ended case studies, narratives and small group discussions are just some of the teaching methods that can be implemented to facilitate teaching.
- Clinical facilitation and mentoring of nursing students are important and should be enforced throughout nursing students' clinical placement. This will ensure that nursing students receive guidance at bedside and positive reinforcement that would foster compliance and confidence.

5.5.3 Nursing practice

- Infection prevention protocols should be standardised – not only in the hospital but also throughout the company. This will improve compliance, patients' mortality rate and streamline implementation.

- Regular audits should be implemented to ensure compliance. These audits should form part of the quality insurance programmes conducted at the different hospitals.
- All nursing and academic staff responsible for nursing student placing and accompaniment should attend regular workshops on teamwork, nursing student allocation, importance of emotional support during facilitation and positive learning environment to ensure the clinical environment is conducive to learning thus satisfying the physical and safety needs of nursing students.

5.6 Summary

Carbapenem-resistant Enterobacteriaceae (CRE) refers to gram-negative bacteria that are resistant to Carbapenem antibiotics and are currently an emerging threat to healthcare facilities. Due to contact isolation protocols, time constraints and high workload, facilitators show reluctance to support and guide nursing students caring for CRE patients. Nursing students become stressed and prone to break isolation precautions when expected to nurse these patients without adequate support.

The objectives of the study were to explore the nursing student's experience and needs while caring for a CRE patient.

The researcher used a qualitative design to collect data through semi-structured interviews and digital audio recordings. Full-time first-year bridging programme (R683) nursing students who were registered during the June 2016 intake and have been allocated to a medical ward in the previous 30 days were invited to participate. After transcribing the data, it was analysed using the conventional approach.

According to Maslow, it is important that nursing students' physical and physiological needs are met to enable them to reach their highest potential (self-actualisation need) and deliver optimal care to patients during their professional life. Based on Maslow's theory (1943,1970) for human motivation and Malcolm Knowles' adult learning theory (Knowles,

1980), the need for knowledge and value from personal experience are drivers for personal development. Therefore, nursing students need foundational knowledge and a clinical environment that is conducive to learning to foster critical thinking and promote self-actualisation.

Considering the results from the semi-structured interviews, the researcher was able to identify the nursing students' emotions and desires while caring for CRE patients in contact isolation. The researcher based the recommendations on the main findings that would enable academic staff, nursing education institutions and hospital management to meet the nursing students' needs and improve their infection prevention educational programme in the future, thus reducing the risk to CRE patients.

The researcher recognised that the current educational programme does not meet nursing students' needs. Improvement is therefore needed by the nursing education and nursing practice professionals to ensure that nursing students are guided and assisted to reach their highest self-actualisation needs and deliver optimal care to patients.

Therefore, the educational team should ensure that nursing students are placed in a clinical environment that is conducive to learning. A curriculum should be developed that reinforces infection prevention principles throughout the academic year to ensure applied competency by the nursing students. Furthermore, nursing students should not only receive theoretical knowledge about microbiology, risks and infection prevention protocols but also receive emotional support and debriefing after stressful situations to address their emotional and safety needs.

Listening to and analysing nursing students' experiences in the workplace, it was clear that we as educators fail our nursing students, and in essence fail the profession. If we cannot prepare self-confident professionals who are able to reflect on practices, we will never change or improve nursing care. From the interviews, it was clear that most of their needs were not met. Realising the impact of unmet needs, nursing students will continue

to rogue-learn and do things to please their seniors. They will not challenge the system to bring about improvement that is needed to deliver the evidence-based care that is demanded by the community in the future.

The only way that nursing students can be equipped to bring about change in the future is if the infection prevention education curriculum receives “a major renovation” by all nursing professionals involved in their training. This “renovation” should include the curriculum, which should focus more on evidence-based practice in infection prevention. The way the nursing students are educated in the class and outside the classroom should facilitate deep learning and critical thinking rather than just follow rules, which is currently the case.

From a professional view point, needs of nursing students and the direct impact that they have on nursing education were highlighted by this research report. It is surely putting the focus first on the nursing students’ needs as holistic beings. Preparing the nursing students for the clinical field involves much more than accompaniment and lecturing. Nursing students are individuals with their own dreams that we as nursing educators have to develop and nurture in order for them to reach their self-actualisation needs without fear and restrictions.

Lastly, continuous professional development programmes that promote compliance and behavioural change for all nursing professionals are vital if we want to improve education and reduce risk to CRE patients in the acute care environment.

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Appendix A – Information Letter To Participants

Dear Nursing Student,

I am currently conducting a research study, which is a requirement of the University of the Witwatersrand for completing the practical component of my Master's degree in Nursing Science.

The research study focuses on the needs and experiences of nursing students who are caring for Carbapenem-resistant Enterobacteriaceae (CRE) patients. I will conduct in-depth interview to identify these needs and experiences. An improved understanding of nursing students' needs will support the facilitation of nursing students who care for patients with CRE in contact precaution isolation.

You are invited to participate in this study because of your previous unique exposure in a hospital setting (medical ward) during the past 30–60 days. Your input and suggestions are valued due to your hands-on approach and unique position as a nursing student undergoing training at a private nursing institution in Gauteng.

All discussions will be recorded during the interview. These audio recordings will be transcribed for use during the analysis part of the research. You have my assurance that your name cannot be linked to your response as I use coding methods to ensure nursing student anonymity – for example, nursing student 1= participant A.

A list of all the participants' names and all transcripts will be kept safely. Only the research team will have access to these documents. Thus, no possible link can be made between your comments and your surname when the report is published.

I appeal to you to participate in this research study to improve the facilitation and clinical placement of nursing students during their training. However, there is no immediate

financial and/or academic benefits to participants in the study. Participation will not under any circumstance affect your working relationships or pose any risks to nursing students.

If you agree to participate, you will be expected to take part in an in-depth interview during which you will have to answer general questions concentrating on the needs and lived experience that you may have had during this clinical episode caring for a CRE patient in contact isolation. The in-depth interviews will last between 30–45 minutes and will take place in a classroom allocated by the campus.

Your participation is voluntary. You can decide to withdraw at any time without any disadvantage. Confidentiality and anonymity will be ensured through allocation of numbers to participants – there will be no way to identify you. During the transcription of the data, only this numbering system will be used. If a quote is used from the digital recording, it will be done anonymously. There will be no direct benefit to you, but the findings of the study will be made available to you upon completion.

Please do not hesitate to contact me should you have any questions. Should you agree to participate in this study, please sign the attached documentation: *Consent Form for Participation* and *Consent for Audio Recording by Participants*.

If you find this experience traumatising, please feel free to contact our support provider ICAS on 0860 061 1036.

Thank you for your time.

Yours faithfully,

Sarie de Villiers
012 523 3000
084 557 2743

Appendix B – Consent Form For Participation

I, _____, acknowledge the contents of this information letter and purpose of this study. I willingly give consent to participate in this study, which aims to identify the needs of nursing students caring for Carbapenem-resistant Enterobacteriaceae patients.

I am aware that participation in this study is voluntary and that I can withdraw at any stage without being disadvantaged academically or workwise. I understand that the researcher respects my privacy and will do coding of all data to ensure anonymity.

Signature of participant: _____

Date signed: _____

Sarie de Villiers

012 523 3000

084 557 2743

Appendix C – Possible Questions To Be Asked During The Semi-structured Interviews

1. Let's talk about your experiences while caring for the CRE patient.

   Probing Questions:

   - Do you know what CRE is?
   - How does it spread?
   - How should it be managed?
   - What are the risks to staff and patients?
   - Why are we so concerned about the spread of CRE?

2. Can you describe your feelings while caring for the CRE patient?

   Probing Questions:

   - Did you feel isolated, scared and not adequately prepared?
   - Did you feel exposed?
   - Was there any incident that stands out to you, or something that you could not manage?
   - Were equipment and PPE available?

3. Did you receive sufficient training on CRE patient management?

   Probing Questions:

   - Did you receive sufficient training on the contact isolation protocols?
   - Could clinical facilitators and educators prepare nursing students for these situations?
   - Do you feel that you were supported, and if not, how can it be addressed?

Appendix D –Proposal Approval From Faculty Of Health Science

Please find attached an official communication from the University.

Yours sincerely
University of the Witwatersrand, Johannesburg

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Mrs Sandra Benn
E-mail: sandra.benn@wits.ac.za

03 June 2016
Person No: 1228783
PAG

Mrs SM De Villiers
Posbus 51377
Wierdapark
0149
South Africa

Dear Mrs De Villiers

Master of Science in Nursing: Approval of Title

We have pleasure in advising that your proposal entitled *Needs of nursing students caring for carbapenem-resistant enterobacteriaceae patients* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

Appendix E – Ethical Clearance From The University Of The Witwatersrand

R14/49 Ms Susara Maria Sarie De Villiers

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M160408

NAME: (Principal Investigator)	Ms Susara Maria Sarie De Villiers
DEPARTMENT:	Nursing Education Netcare Education, Gauteng North East Campus Lyttelton, Centurion
PROJECT TITLE:	Needs of Nursing Students Caring for Carbapenem-Resistant Enterobacteriaceae Patients
DATE CONSIDERED:	06/05/2016
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Lizelle Crouse
APPROVED BY:	Professor P. Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	08/06/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004,10th floor, Senate House/2nd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/We fully understand the the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated,from the research protocol as approved, I/we undertake to resubmit to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. in this case, the study was initially review in April and will therefore be due in the month of April each year.

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix F – Approval Letter From Netcare Research Committee

RESEARCH OPERATIONS COMMITTEE FINAL APPROVAL OF RESEARCH

Approval number: UNIV-2016-0029

Miss SM de Villiers

E mail: sariedevilliers@gamil.com; 1228783@students.wits.ac.za

Dear Miss De Villiers

RE: NEEDS OF NURSING STUDENTS CARING FOR CARBAPENEM-RESISTANT ENTEROBACTERIACEAE PATIENTS

The above-mentioned research was reviewed by the Research Operations Committee's delegated members and it is with pleasure that we inform you that your application to conduct this research at Private Nursing Education Institution, has been approved, subject to the following:

i) Research may now commence with this FINAL APPROVAL from the Committee.

ii) All information regarding the Company will be treated as legally privileged and confidential.

iii) The Company's name will not be mentioned without written consent from the Committee.

iv) All legal requirements with regards to participants' rights and confidentiality will be complied with.

v) The Company must be furnished with a STATUS REPORT on the progress of the study at least annually on 30th September irrespective of the date of approval from the Committee as well as a FINAL REPORT with reference to intention to publish and probable journals for publication, on completion of the study.

vi) A copy of the research report will be provided to the Committee once it is finally approved by the relevant primary party or tertiary institution, or once complete or if discontinued for any reason whatsoever prior to the expected completion date..

vii) The Company has the right to implement any recommendations from the research.

viii) The Company reserves the right to withdraw the approval for research at any time during the process, should the research prove to be detrimental to the subjects/ Company or should the researcher not comply with the conditions of approval.

ix) APPROVAL IS VALID FOR A PERIOD OF 36 MONTHS FROM DATE OF THIS LETTER OR COMPLETION OR DISCONTINUATION OF THE STUDY, WHICHEVER IS THE FIRST.

We wish you success in your research.

Yours faithfully

21/7/2016

Prof Dion du Plessis
Full member: Research Operations Committee & Medical Practitioner evaluating research applications as per Management and Governance Policy

Shannon Nell
Chairperson: Research Operations Committee
Date: 28/7/2016

This letter has been anonymised to ensure confidentiality in the research report. The original letter is available with author of research

Appendix G – Information Letter To Management of Netcare Gauteng North East

Dear Ms Reneé Sheafer,

I am currently conducting a research study, which is a requirement of the University of the Witwatersrand for completing the practical component of my Master's degree in Nursing Science. The purpose of the study is to determine the specific needs and experiences of nursing students while caring for Carbapenem-resistant Enterobacteriaceae (CRE) patients during their clinical placement in hospitals.

My sample will consist of First-year Bridging Programme R683 nursing students attending the Gauteng North East campus of Netcare Education. They should also have worked in a medical ward in the previous 30–60 days.

Nursing students will be asked to take part in in-depth interviews that reflect on the clinical episode (nursing patient with CRE) in contact isolation. Nursing students will be asked to explain how this incident made them feel, and to identify their needs experienced during this episode. They will be invited to make possible suggestions on how the clinical facilitators could have addressed their needs. These in-depth interviews will be done on campus during block to reduce the impact on patient care in the different hospitals. The interview sessions will be audio recorded and will last between 30–45 minutes.

There will be no immediate benefit to the participating nursing students. However, the research study will improve accompaniment of nursing students in isolation settings by clinical facilitators, because their needs have been identified and can thus be addressed.

Confidentiality and anonymity will be ensured through coding and all information from participants will be kept confidential. All participation will be on a voluntary basis and nursing students may withdraw from the study with no obligation to participate.

I would appreciate your support and request your permission to conduct the study at the GNE Netcare campus. Thank you in advance for your assistance.

Your sincerely,

Sarie de Villiers

012 523 3000

084 557 2743

sariedevilliers@gmail.com

Appendix H – Letter Confirming Knowledge Of Non-trial Research To Be Conducted At Netcare Facility

Netcare Education
For Carers of the Future

Netcare Hospital Management (Pty) Limited
Trading as **Netcare Training Academy** known as
Netcare Education Gauteng North East Campus, S1588
Tel: + 27 (012) 644-4900 | Fax: + 27 086 767 3762
Block B, Crystal Park Office, 249 Basden Ave, Lyttelton, South Africa
PO Box 22041, Lyttelton, 0140, South Africa

LETTER CONFIRMING KNOWLEDGE OF NON-TRIAL RESEARCH TO BE CONDUCTED IN THIS NETCARE FACILITY

Dear **Susara de Villier** (Name of applicant)

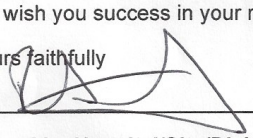
Re **Needs of Nursing students caring for Carbapenem- resistant Enterobacteriaceae patients** (Title of research)

We hereby confirm knowledge of the above named research application to be made to the Netcare Research Operations Committee and in principle agree to the research application for **Netcare Gauteng North East Campus** Hospital/site/division, subject to the following:

1. That the data collection may not commence prior to receipt of FINAL APPROVAL from the Netcare Research Operations Committee.
2. A copy of the research report will be provided to the Netcare Research Operations Committee once it is finally approved by the tertiary institution, or once complete.
3. Netcare has the right to implement any recommendations from the research.
4. That the Hospital/Site/Division Management reserves the right to withdraw the approval for research at any time during the process, should the research prove to be detrimental to the subjects / Netcare or should the researcher not comply with the conditions of approval.

We wish you success in your research.

Yours faithfully



8/6/16.

Signed by Hospital/Site/Division Management **Date**

GNE Campus

(Specify destination)

Appendix I – Confidentiality Document From Transcriber

Confidentiality Agreement
Transcriptionist

I, Susara Johanna Elizabeth Deysel (Ronté) transcriptionist, agree to maintain full confidentiality in regard to any and all audio recordings received from Sarie de Villiers related to her research study, Needs of nursing students while caring for the CRE patients.

Furthermore, I agree:

1. To hold in strictest confidence the identification of any individual that may be inadvertently revealed during the transcription of audio-recordings interviews, or in any associated documents.
2. To not make copies of any audio recordings or computerized titles of the transcribed interviews texts.
3. To store all study-related audiotapes and materials in a safe, secure location as long as they are in my possession.
4. To return all audio recordings materials to Sarie de Villiers after transcribing were done.
5. To delete all electronic files containing study-related documents from my computer hard drive and any back-up devices.

I am aware that I can be held legally responsible for any breach of this confidentiality agreement, and for any harm incurred by individuals or company, if I disclose identifiable information contained in the audio recordings to which I will have access.

Transcriber's name (printed)
Susara Johanna Elizabeth Deysel

Transcriber's signature



Date
12/10/2016.

Appendix J – Copy-Editing certificate

In a Word

Marike van Rensburg
Editor
082 820-4716

Po Box 11823
Wierdapark South
0157
marike.vanrensburg@gmail.com

FOR:

Susara Maria de Villiers
University of the Witwatersrand
Faculty of Science
Student Number 1228783

1228783@students.wits.ac.za

28 January 2017

Proof of copy-editing

This document serves to confirm that the following mini-dissertation has been copy-edited:

Student Name: Ms SM de Villiers (1228783)

Document: Needs of nursing students caring for Carbapenem-resistant Enterobacteriaceae patients

The edit included:

- Checking spelling, grammar and punctuation
- Checking consistency of terminology and style
- Checking the Harvard referencing style against the style guide supplied by the student (accuracy of source information remains the responsibility of the student)

The edit was done using the Microsoft Word® track changes functionality. Issues were pointed out to the student using comments. However, it remains the student's choice which changes to accept or reject. Final responsibility for correctness rests with the student.

The document remains the original work of the student. I have not added any additional information.

Sincerely,

Marike van Rensburg

in a word