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Mamalelala, Tebogo T

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QUALITY OF HANDOVER ASSESSMENTS BY REGISTERED NURSES ON TRANSFER OF PATIENTS FROM EMERGENCY DEPARTMENTS TO INTENSIVE CARE UNITS

Tebogo T Mamalelala

A research report submitted to the

Faculty of Health Sciences, University of the Witwatersrand, Johannesburg

In partial fulfilment the requirements for the degree

of

Master of Science in Nursing

Johannesburg, 2017

DECLARATION

I, Tebogo T Mamalelala declare that this report is my own work and is being submitted to the faculty of Health Sciences, as a requirement for the fulfilment of a master's degree in Nursing. This report has never been submitted or published for any other degree or purpose before.

Signature:.....

.....day of.....2017

Protocol no: M160553

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Thanks are to God Almighty who has kept me well throughout my study period at the university and to Dr Shelley Schmollgruber my supervisor for assisting me with research procedure and believing in me.

Thanks to all nurses who took part in this research and to my family and also thank my husband (Chris) for all the support. I dedicated this work to my daughters (Kutlwano and Thomo) and my son (Lefa) who has been affected by this school process. Thanks to my baby sister (Lorato) at the University for the Support during the research period.

To God be all the Glory

QUALITY OF HANDOVER ASSESSMENTS BY REGISTERED NURSES ON TRANSFER OF PATIENTS FROM EMERGENCY DEPARTMENTS TO INTENSIVE CARE UNITS

Abstract

Name: Tebogo T Mamalelala
Student number: 1055795
Degree: Msc Nursing (course work)
Department of Nursing education, School of therapeutics, Faculty of health Sciences
Supervisors: Dr Shelley Schmollgruber & Mrs Meghan Botes
Department of nursing education

Background: Continuity of quality care and patient safety depends mainly on the effective handover. Gaps in communication might lead to omissions of vital information affecting continuity and safety of care and leading to negative consequences and sentinel events.

Purpose: The aim of this study was to describe the opinions of nurses regarding the effectiveness of handover practices between nurses in the Emergency Departments and Intensive Care Units in an academic hospital in Johannesburg using a handover rating tool. The recommendations for clinical practice and education were provided thereafter.

Method: A descriptive quantitative cross sectional survey was used. Convenience sampling was used. A sample size of hundred and eleven handovers (n=111) was used. Data was collected using a 16 item handover evaluation tool developed by Manser *et al*. (2010). The handover rating tool is divided into two sections. The first section was the demographic data, the second section asks about the information transfer, shared understanding, working atmosphere, overall handover assessment and circumstances of handover. Data analysis was done by means of descriptive and non parametric statistics using graphs, frequency distributions, medians and interquartile ranges, Wilcoxon rank sum and logistic regression. Testing was done at the 0.05 level of significance.

Results: A higher level of qualification and years of experience in trauma and Intensive Care Unit were significant factors related to information transfer, shared understanding and overall handover quality. Univariate ordinal model showed statistical that respondents handing over were more likely to agree with information transfer, shared understanding, working atmosphere, overall handover quality and circumstances of handover compared with those receiving. Univariate ordinal model showed statistical difference that non specialist handing over were likely to agree to overall handover quality whereas multivariate ordinal model also showed statistical difference that non specialist handing over were likely to agree with circumstances of handover.

The study suggests that it is necessary for ED and ICU nurses to have an agreement on the content of the structured handover framework as different specialists have different expectations.

Key words: Emergency Department, handover, information transfer, Intensive Care, quality, shared understanding, working atmosphere.

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CHAPTER ONE
OVERVIEW OF THE STUDY

1.0 INTRODUCTION

Patient care involves change in caring staff as the patient moves from one department to another and during this time, there are changes in specialists and other healthcare professionals. Information regarding the patients' care has to be shared between those caring for the patient. Nurses, like other health professionals, have the responsibility of ensuring that information regarding these patients is shared amongst themselves and other healthcare professionals during handing over periods. A good handover, without omissions, is vital for continuity and safety of care to prevent negative consequences (McFetridge, Gillespie, Goode & Melby, 2007). Patient handover is defined as 'the transfer of responsibility and accountability for the care of patients from outgoing to incoming healthcare teams across shifts, across disciplines and across care settings' (Johnson & Barach, 2009).

The World Health Organization (WHO) has listed communication during patient handover as one of its 'High fives' in patient safety initiatives (WHO, 2007). The Mission of the 'High fives' initiative is to 'facilitate implementation and evaluation of standardised patient safety solutions within a global learning community to achieve measurable, significant, and sustained reductions in high risk patient safety problems' (WHO, 2007).

Handover situations, as stated by Hilligoss and Cohen (2013), are between unit and within unit. Between unit occurs when a patient is moved from one unit to another, whereas within unit involves change in personnel on duty within a single ward. Cohen, Hillgoss and Amaral (2012) stated the primary focus of a handover is to provide patient information that will allow the receiving party to perform to the fullest capacity, employing all the necessary safety actions. Inadequate and ineffective interpersonal communication between healthcare professionals during handover are key factors contributing to errors and procedural mistakes, which may lead to adverse effects, delays in diagnosis and treatment and inappropriate omission in care (Payne, Stein, Leong & Dressler, 2012; Rabol, Andersen, Ostergaard, Bjorn, Lilja & Mogensen, 2011; Thomas, Schultz, Hannaford & Runciman, 2013; World Health Organisation, 2007).

There are two types of handover: within unit handover, which is triggered by changes in personnel, whereas between unit handover is triggered by changes in a patient's condition or perceptions that they require a type of care that can be provided by a different unit.

1.1 BACKGROUND OF THE STUDY

The Emergency Department is the entry point for most critically ill patients admitted to Intensive Care Units (ICU's). Critical Care nursing is the umbrella term used for nurses trained in either ICU or trauma nursing and is the term used to describe the specialties including ICU, trauma and emergency, coronary care and cardiothoracic (De Beer, Brysiewick & Bhengu, 2011).

Handover between Emergency Departments and ICU involves communication between nurses with different specialties. Communication failure is particularly prominent because communication crosses specialty boundaries (Horwitz, Meredith, Schuur, Shah, Kulkarni & Jenq, 2009a); nurses of different specialties are trained to communicate differently and have different expectations about information acquisition and interpretation, leading to conflict and misunderstanding (Horwitz *et al*., 2009a; Rabol *et al*., 2011). The transfer between the two departments is irregular and unpredictable, as the Emergency Department is a walk-in unit and cannot predict when to expect patients. Unpredictable transfers of patients between these units leave the nurses who participate in the handover with no time to prepare in advance (Hillgoss *et al*., 2012). ICU equipment such as alarming monitors and intravenous pumps have shown to interrupt handovers, which might lead to omission of critical information affecting continuity of care (Spooner, Corley, Chaboyer, Hammond & Fraser, 2015).

Although these are specialists units, owing to the shortage of qualified ICU nurses, newly qualified comprehensive nurses and agency-employed nurses are usually deployed in these units to assist with the pressure that ICU nurses undergo. The study by Scribante and Bhagwanjee (2007) revealed only 25% of nurses in ICU's were qualified ICU nurses, but this has improved although not yet reflected in research studies. It can be seen clinically in the proposed setting, as a preliminary record review taken in February 2016 indicated there were approximately 69% (n=22) qualified nurses in ICU Neurosurgery ICU and 49% (n=19) ICU trained or Trauma trained nurses in Casualty. Non-specialist nurses deployed to

specialised units have shown to be unable to cope with the demands in such units compared to specialist nurses (Colff & Rothmann, 2014). Agency-employed nurses were reported to display a lack of commitment and poor standards in the quality of patient care (De Beer *et al*, 2011). Understaffing has shown to be associated with compromised care (Klopper, Coetzee, Pretorius & Bester, 2012).

There is delayed patient flow as patients are kept in the Emergency Department due to shortage of beds in the ICU. In the Emergency Department, patients' receive acute care and handover is meant to occur immediately after definitive care has been given. Abraham and Reddy (2010) illustrated a setback in information transfer, which has a negative effect on the quality of the handover. The untimely transmission of information at handover compromises the quality of information shared between departments, which consequently increases potential risks, such as medication errors (Abraham & Reddy, 2010).

The layout of specialised units is different and they make use of different technology and structures. Hillgoss *et al.* (2012) stated several factors, such as unit boundaries, interaction between different specialties and changes in care, produced unique challenges for negotiation and coordination during patient transfer from one unit to the other. Contextual features, such as interpersonal differences, infrequent face to face communication and lack of awareness of the other unit status, also contribute to the challenges of handover practices (Hilligoss *et al*., 2012).

The factors found to contribute to ineffective communication include lack of formal policies and standardised protocols regarding health provider communication (Stoyanov, Boshuizen, Groene, Van der Klink, Kicken, Drachsler & Barach, 2012). Studies have emphasised the need for standardisation of the handing over processes to reduce the negative consequences of discontinuity of care (Agarwal, Saville, Slayton, Donahue, Daves, Christian, Bichell & Harris, 2012; Craig, Moxey, Young, Spenceley & Davidson, 2012; Kicken, Van der Klink, Barach & Boshuizen, 2012 ; Stoyanov *et al*., 2012; Thomas *et al*., 2013; Starmer, Spector, Srivastava, West, Rosenbluth, Allen, Noble, Tse, Dalal, Keohane & Lipsitz, 2014). Although the use of a standardised tool is strongly supported by literature, no singular tool is considered suitable for all clinical areas (Anderson, Malone, Shanahan & Manning, 2015), hence the need to create a tool specific to the respective units.

Currently, no standardised handover procedure is in place between the Critical Care areas in the Academic hospital where the study was to be carried out. Toccafondi, Albolino, Tartaglia, Guidi, Molisso, Venneri, Peris, Pieralli, Magnelli, Librenti and Morelli (2012) reported that the common understanding across teams involved in patient care will contribute to improved information transfer and that common ground constructed while participating in a shared endeavour will render handovers more safe, resilient and effective.

1.2 PROBLEM STATEMENT

Handover between Intensive Care and Emergency Department implies communication crosses specialty boundaries that have different expectations about information acquisition and interpretation. Where patients are transferred between specialities, clinical handover acts as a bridge and are important sites for communication breakdown (Rixon, Braaf, Williams, Liew & Manias, 2017). Ineffective communication between people of different specialties has been described as a contributing factor to errors, procedural mistakes, near misses or even incidents (Winter, 2010; Rabol *et al*, 2011; Toccafondi *et al*., 2012; Spooner, 2014). Although standardisation of handover is emphasised, there is no such procedure in place between Emergency Departments and Intensive Care Units in the proposed setting of this study. A standardised procedure helps to have a shared set of content items, which may assist in creating common ground to enable effective communication (Toccafondi *et al*., 2012); this would reduce inconsistency and omission of important information affecting the quality and continuity of care. Therefore, this study will assess the quality of handover amongst nurses during patients' transfers between the Emergency Department and Intensive Care Units.

The study attempted to answer the following research questions:

- What is the quality of handover between nurses during admission of patients to Intensive Care Unit (ICU) from the Emergency Department?

1.3 PURPOSE OF THE STUDY

The purpose of the study was to assess the quality of handover practices between nurses in the Emergency Departments and Intensive Care Units.

1.4 RESEARCH OBJECTIVES

The objectives of the study were:

- To describe the demographic characteristics in relation to the aspects/items of handover among nurses (handing over and receiving).
- To compare the aspects/items of handover among the nurses (handing over and receiving nurses, the novice and the experienced nurses, specialist and non-specialist).
- To investigate the factors associated with quality of handover among nurses.

1.5 SIGNIFICANCE OF THE STUDY

The significance of the study is found in the description of current practices, which enabled identification of the strengths and weaknesses of the handover practice that is currently in place. Recommendations were also made improvement purposes. Findings may assist in development of a standardised tool or policy regarding handovers. This will promote a complete and efficient handover which is significant in giving a good quality care and ensuring continuity of care, meeting the needs of a patient in a timely manner.

1.6 RESEARCHER'S ASSUMPTIONS

A set of assumptions about the basic types of worldwide entities, how they interact and the correct methods for constructing and testing the theories of these entities are called paradigms (Brink, van der Walt & van Rensberg, 2012). The paradigms used in this study are called Meta-theoretical, theoretical and methodological assumptions.

1.6.1 Meta-theoretical Assumptions

Nursing meta-paradigm distinguishes the nursing profession from other disciplines and emphasises its functional characteristics (Arnold & Boggs, 2011:3). Concepts of person, health, environment and nursing appear to be general amongst scholars and specify the distinctive perspective of the nursing profession (Brink *et al*, 2012:26).

1.6.1.1 Person

A person in this instance refers to the critically ill patient, Trauma and Emergency nurse and Intensive Care nurse. The person is the holistic being that comprises of the body, mind and spirit. Knowledge of a client as a person, his/her preferences, beliefs, perceptions and awareness is combined with the nurses self-awareness as a basic understanding needed in all professional nursing relationships (Arnold & Boggs, 2011). The critically ill patient is the central focus of both the ED nurse and the ICU nurse. The ED nurse has the initial contact with the patient and has to provide essential information that will allow the ICU nurse to continue with care. Intra-hospital transfer from ED is considered a threat to patients' safety as three changes occur at the same involving the clinician, the unit and even the physical environment (Horwitz *et al*., 2009a), therefore both nurses should ensure that all relevant information is communicated.

1.6.1.2 Health

The aim of nursing is to maintain good health. Critically ill patients depend on nurses to provide holistic care. Transition in care is the perception that care can be best provided by ICU nurses, therefore it is essential nurses are provided with all essential information to ensure continuity of care and prevent adverse effects. Multiple trauma causes serious effects and rapid deterioration of condition within the first 24 to 48 hours, therefore it is important to detect severity of injury, ensure intense observations and optimal interventions (Peng, Mayner & Wang, 2014) and is why it is important for Emergency Department nurses to provide all the vital information to prevent omissions in care.

1.6.1.3 Environment

Environment is both external and internal factors that influence the health of an individual and can be cultural, psychological, spiritual or developmental. According to Arnold and Boggs (2011) a person and environment are inseparable; as a result, a person cannot be regarded individually, isolated from healthcare. The extreme technical environment in an ICU requires nurses to be knowledgeable and during handing over of patients, the ICU nurses need to be well-informed as the handover is shaped by information needs of the healthcare providers, especially where a standardised handover is not used.

1.6.1.4 Nursing

The International Council of Nurses (2006 cited in Arnold & Boggs, 2011) defines nursing as ‘encompassing autonomous and collaborative care of individuals of all ages, families, groups and communities, sick or well in all settings.’ The ED nurse ensures all necessary information is communicated for continuity of care. The handover should provide a shared understanding as it creates an opportunity for clarifications of ambiguities as both nurses will bring different perceptions and experiences from their field of expertise.

1.6.2 Theoretical Assumptions

Assumptions are statements that form the basis for defining concepts and propositions and are accepted as truths which represent values and beliefs without being tested (Grove, Burns & Gray, 2013:41; Meleis, 2007:32). The researcher accepts Schramm’s Circular Model of Communication (Arnold & Boggs, 2011) from which the following assumptions were made:

- The sender is the source of information. The sender encodes the information, uses verbal and non-verbal language, interpretations and field of experience to ensure the message is understood by the receiver. In this study, the person handing over the patient is the initiator of communication. As the sender, the nurses handing over encode the message according to the field of experience (Emergency Department). The model emphasises the two-way flow of dyadic communication, which is as the ICU nurse receives the information, it is decoded and feedback is given; the Emergency nurse then encodes the information provided as feedback. This is done to clear ambiguities and to clearly understand the management of the patient. This implies communication is a circular process and that nurses are both the encoder and decoder.

- The receiver is the recipient of the message. The receiver decodes the message the message so that it can be understandable within his field of experience. The nurses in the ICU encode the information provided to them during handover of the patients. They will decode the message according to their educational background, values, beliefs and experiences.

- Field of experience includes all the things that influence the way the message is sent and understood, such as educational background, the speciality, length of experience in the unit, values and social background. Handover between ED and ICU involves transition in care and participants from different specialities with different perspectives, which leads to conflicting information expectations as the specialities have different cultural differences and at times, patients will have pending results creating high levels of omissions. Handover gives both nurses the opportunity to create a shared awareness and seek clarification as they are from different fields of experience.

- The people involved in communication must have something in common to talk about; contextual relationship. The ED nurse and ICU need to talk about critically ill patients requiring ICU care.

- Communication is influenced by the situation of both nurses. It can be influenced by the crowding of the unit, the status of the patient and even the time at which the handover is conducted.

- Use of metaphors makes communication easier, as people try to relate things so that it becomes easier. The ED nurse relates the laboratory blood results and X-rays to the clinical picture of the patient to make it easier for the ICU to understand the information during handover.

The information is shared in the field of experience of both the ED nurse and the ICU nurse. Both parties are encoding, interpreting and decoding information. Feedback is continuous between both parties as they both seek clarification on the patient's condition.

1.6 3.1 Operational definitions

Definitions for the purpose of this study are as follows:

- Emergency Department

An area in a hospital designated for people who require immediate medical attention. This is where initial evaluation of patients with life threatening conditions is done, whether traumatic or medical (Moskop, Sklar, Geiderman, Schears & Bookman, 2009). In this study, Emergency department refers to medical and trauma casualty, as they admit the patients to four selected ICUs used in this study. The terms Emergency Department and trauma/medical casualty will be used interchangeably.

- Intensive Care Unit

The Intensive Care Unit is a technological unit in a hospital where critically ill patients are provided with comprehensive and multidisciplinary care. In this study, ICU is defined according to the South African Society of Anaesthesiologists, SASA (2013), guidelines. General and Trauma ICUs are described as 'category three as they admit patients with multiple organ dysfunctions, whereas Coronary Care Unit and Neurosurgical ICU are considered level two ICUs as they admit patients with single organ dysfunction.'

- Registered Nurse

For the purpose of this study, a registered nurse is someone who has completed a four-year diploma or degree in nursing, a three-year diploma in general nursing, completion of a two-year bridging course from staff nurse to professional nurse and the conversion of a foreign qualification to a South African Nursing Council (SANC) equivalent. The professional nurse should be registered with SANC, under section 16 of the Nursing Act 33 of 2005 (SANC, 2007). The terms registered nurse and professional nurse were used interchangeably.

- Intensive Care Nurse

A Critical Care or Intensive Care nurse is registered and has an extra diploma or degree in Intensive Care or Critical Care, at an institution approved by the South African Nursing Council, under regulation number 212 of February 1993 as amended by regulation number 74 of January 1997.

For the purpose of this study, the Intensive Care nurse refers to registered nurses currently working in the Coronary Care Unit, Neurosurgery ICU, Trauma ICU and General ICU.

- Trauma and Emergency Nurse

A Trauma and Emergency nurse is a registered nurse who has obtained an additional qualification in trauma and emergency at an institution approved by the South African Nursing Council, under regulation number 212 of February 1993 as amended by regulation number 74 of January 1997. For the purpose of this study, Emergency nurse refers to the registered nurses currently working in Trauma and Medical casualty.

- Handover

Handover is the process of transferring patient specific information and clinical care between healthcare professionals and settings to maintain the patients' continuity of care (Kicken *et al*., 2012). For the purpose of the study, handover refers to transfer of essential information from an Emergency Department registered nurse to an ICU nurse.

- Quality

Quality refers to 'the attributes of excellence which are however regarded differently by the respective players in nursing and each of these role players has different expectations concerning excellence in nursing' (Muller, 2009:250). For the purpose of this study, quality of handover refers to transfer of essential clinical information in a timely and efficient manner to ensure continuity of care and safety of patients.

- Shared Understanding

This is when a group of people understand each other's perspectives and have a collective way of organising relevant information. For the purpose of this study, shared understanding refers to discussion about the critically ill patient relating to possible risks and complications and also resolving questions and ambiguities.

- Quality handover

In this study, the quality of handover was determined quantitatively using an instrument development by Manser, Foster, Gisin, Jaeckel & Ummenhofer (2010) which comprises of 16 items related to five construct (information transfer, shared understanding, working atmosphere, overall handover quality and circumstances of handover. The three factors that predicted handover quality were information transfer, shared understanding and working atmosphere; and a single item assessed the overall handover quality, additionally two items that involved the time pressure of both the receiving and the handing over professional nurses were collected as another construct.

1.6.3 Methodological Assumptions

Methodological assumptions of this study were in line with the scientific method. The scientific method uses a systematic approach in which a researcher moves in an orderly fashion through a series of steps according to a predetermined plan of action (Brink *et al*, 2012; 8).

The knowledge generated was evidenced based and included recommendations based on the latest evidence, thus increasing patient satisfaction and outcomes, nurses' confidence and skills.

The research process generated the knowledge that was applied and helped in improving the handover of patients' thus improving safety of care and enhancing continuity of care. The generated knowledge provides the insight or nurses who work in the Emergency Department and the ICU, and to others who act as change agents in the patient care focus teams. The knowledge generated will also be applied for development of hospital policies, guidelines and protocols in the hospitals.

1.7 OVERVIEW OF METHODOLOGY

Research methodology is the systematic process the researcher used in the assessment of handover by registered nurses as patients were transferred from the Emergency Departments to four selected ICUs in an academic hospital in Johannesburg.

1.7.1 Research Design

A descriptive quantitative cross sectional survey was used. The nurses were asked to describe the handover using a handover rating tool at one point in time. Cross sectional designs were used to examine data at one point in time, collected on one occasion from different participants (Brink *et al*, 2012:101). The views of the nurses with regard to the current handover practices were described in detail so as to identify strength and weakness and recommendations for improvement

1.7.2 Research setting

The study was conducted in four adult ICUs and two Emergency Departments at a 1200-bedded tertiary Academic Hospital in Johannesburg, Gauteng. Intensive Care Units include the Trauma, Neurosurgery, General and Coronary Care Units and the casualties include Trauma and Medical casualty. These ICUs are highly specialised, and admit critically ill patients from both Trauma and Medical casualty and are considered homogenous.

1.7.2 Research Methods

Research method refers to the techniques used to structure a study and to gather and analyse information in a systematic fashion relevant to the research question (Polit & Beck, 2012:11). The techniques include selection of population and sample, data collection and analysis strategies.

The study population were all handovers performed between any of the four ICUs (Trauma, Neurosurgery, Coronary, General), with either one of the two casualties (Trauma and Medical Casualty). One hundred and eleven handovers was taken as the minimum sample size. Data was collected by the use of 16 item handover rating tool (Appendix A). The nurse handing over and the one taking responsibility of the patient completed the quality-rating tool independently Data were analysed using STATA version 13 and non-parametric statistics.

1.8 ETHICAL CONSIDERATION

The following ethical requirements were taken into consideration before commencement of this study:

- The protocol was submitted for peer review at the Department of Nursing Education to assess feasibility of the proposed study.
- To ensure the anonymity and confidentiality of all participants, numbers were allocated to completed instruments instead of using names during data collection and reporting.
- The protocol was submitted to the University of the Witwatersrand's Postgraduate Committee for approval to conduct the study.
- Permission to use the instrument has been obtained (Appendix G). Ethical clearance (Appendix E) was obtained from the University of the Witwatersrand's Human Research Ethics Committee.
- Permission was obtained from the academic hospital management and Department of Health to conduct research at the hospital (Appendix D).
- Participants were provided with an information letter (Appendix B) relating to participation in the study and given time to read and sign the consent post reading and understanding of the content. Participants were informed that participation was voluntary and no penalty measure would be incurred in case of withdrawal.
- Coded memory sticks and computer codes only assessed by the researcher and the supervisor were used.

1.9 VALIDITY AND RELIABILITY OF THE STUDY

A pilot testing procedure was conducted and validity scores were done to ensure feasibility of the study and to detect possible flaws in the instrument used. Face and content validity was ensured by asking five expert local domain specialists, both medical and nursing, to review the relevance of the instrument content for the local study setting. The researcher solely performed the process of data gathering. Data coding and capturing were done precisely to ensure maintenance of reliability. Assistance was sought from the statistician office on the suitable sample size that would be representative of the study population bearing in mind there might be unwillingness to participate. A sample inclusion and exclusion criterion was followed.

1.10 STRUCTURE OF THE RESEARCH REPORT

Chapter one: Overview of the study
Chapter two: Literature review
Chapter three: Research methodology
Chapter four: Data interpretation and results
Chapter five: Discussion of results, conclusion, limitations and recommendations.

1.11 SUMMARY

This chapter introduced the study, background and statement of the problem, purpose of the study, research objectives and significance of study, research methods and ethical considerations. Chapter Two will be a literature review related to the handover practices as patients are transferred from the Emergency Department to Intensive Care Units.

CHAPTER TWO
LITERATURE REVIEW

2.1 INTRODUCTION

The literature review presents and discusses findings of studies that explored handover practices of nurses, focusing on Emergency Departments (ED) as the source of admission and Intensive Care Units (ICUs) as the recipient unit. In addition, this chapter reviews the literature related to the expectations of both transferring and receiving nurses during transfer of patients. The chapter is divided into several sections and begins with the definition of handover, communication during handover, good and bad handover practices, the perception of nurses' handover, barriers to effective handover, effects of ineffective handovers, potential strategies to improve patient during handover and conclusion.

The findings of this literature review support the importance of conducting the proposed study in a 1200-bedded tertiary Academic Hospital in Johannesburg, Gauteng. The review touches on the main concepts of Schramm's Circular Model of Communication, which guided the proposed study.

An online search was conducted in the Medline, Science Direct, CINAHL, PUBMED and Google Scholar databases. The inclusion criteria for reviewed studies were limited to the articles published in English from 2006 to 2016. The search terms included: "handover between Intensive Care Unit and Emergency Department," "handoff," "handover," "sign out," "sign off," "intra-hospital transfer," "patient transfer," "communication between nurses," "between unit handover," "between unit handoff," "inter-shift handover," "end of shift handoff and within unit handoff," "health record" and "electronic health record." In addition, manual searching was done by reviewing an article's reference citations and exploring articles that were cited in the original article of interest.

Studies that did not explore handover practices of nurses during patients' transfer between the EDs and the ICUs, and those that did not explore the expectations of both transferring, and receiving nurses were excluded from the review and included randomised controlled trials, observational and descriptive studies, and systematic reviews. Sixty-three studies were

included in the review; seven were used for the definition of concept, 13 discussed communications during handover, 20 discussed handover practices, eight studies discussed barriers to handover, three studies discussed perceptions and 24 discussed strategies to improve handover expectations, measurement and quality of handovers.

2.2 DEFINITION OF THE HANDOVER CONCEPT

To appreciate the need for the proposed study, it is important that the handover concept is defined. Patients are transferred from one unit to another for different reasons, hence influencing the perception and definition of handover amongst clinicians, whereas some patients are transferred from one unit to another mainly because better care can be provided by the different unit (Hilligoss & Cohen, 2013).

'Clinical handover is the transfer of professional responsibility and accountability for some or all aspects of care for a patient or group of patients to another person or professional group on a temporary or permanent basis' (Australian Medical Association, 2006). However, this is not a view shared by everyone, as Anderson *et al.* (2015) conducted an integrated literature review to understand bedside handover and the issues related to it. The review revealed nurses felt the transfer of accountability and responsibility is at the end of the shift rather than during the handover process of patients, as in inter-unit transfer.

In addition, Cohen and Hilligoss (2010) rightly pointed out that handover definition has not been fully explored, thus leading to uncertainties on what to be included in standardisation. Furthermore, inter-unit handovers have been described as competition handovers, persuasion handovers, and expectation matching handovers and as collaboration handovers (Hilligoss, Mansfield, Patterson & Moffatt-Bruce, 2015). The handover as expectation matching and collaboration promotes information transfer and shared understanding. Indeed, collaborative inter-departmental transfers have been shown to enhance joint evaluation of goals and shared departmental perspectives leading to reduction in interdepartmental conflicts caused by incomplete information, uncertain diagnoses and changes in patient condition (Abraham & Reddy, 2010).

In contrast, handover does not always support collaboration as the reason for transfer differs. For example, Sujan, Chessum, Rudd, Fitton, Inada-Kim, Cooke and Spurgeon (2015)

conducted a qualitative study on seven paramedics, 15 nurses and 16 physicians, which illustrated that Emergency Department clinician's trade off the risk resulting from the delays in treatment due to unavailability of some specialists who might be too busy at the particular moment. The delays due to overcrowding, with the risk of deliberately sending the patient to the wrong specialised unit, were also traded off (Sujan *et al*., 2015). This has led to lack of trust between these two units, which could lead to poor interaction in the future and jeopardises shared understanding.

Given these findings and definitions, it can be concluded that the nature of handover, such as inter-unit or shift to shift, affects the way clinicians perceive and define handover.

2.3 COMMUNICATION DURING HANDOVER

The skill to conduct a handover is not taught during nursing training, it is only learnt 'on the job' in the units (Scovell, 2010). The nursing handover focuses on the content and intervention, as opposed to doctors' handover, which focus on the expectations (Miller, Scheinkestel, Limpus, Joseph, Karnik & Venkatesh, 2009).

Communication during handover can be non-verbal, verbal, through documentation or tape-recorded. Documentation can be done through charts or through the electronic medical records, whereas verbal handover might be physical or telephonically. Govier and Medcalf (2012) add nursing notes as another source of information during handover. Verbal handovers can be done at the bedside to allow participation of the patient or in the office with the patient excluded. Non-verbal communication behaviours include eye contact, posture, gesture, facial expression and physical distance between clinicians.

Schramm's model of communication appreciates the fact that communication is interactive and dyadic; it involves the source of information that encodes data influenced by the field of experience and the destination or recipient who also decodes the message and interprets it. Benner (1984:407) defines nurse experience as the "the refinement of preconceived notions and theory by encountering many actual practical situations that add nuances or shades of differences to theory." It appreciates the fact that both sender and the recipient can be either decoder or encoder. The effect of interaction in the mind of the receiver is what matters most in handover. It has subsequent effects on the ability to make sense of the status of the illness

of the patient rather than the completeness or even the detailed accuracy of the data (Cohen *et al*., 2012). Wise *et al.* (2012) considered the main feature of handover as the clinician's big picture as this shapes the viewpoint of the receiving clinician; however this is often obscured in critically ill patients by a surfeit of physiological variables that this noise degenerates in the handover process. Schramm's (1959) model is shown in **Figure 2.1.**

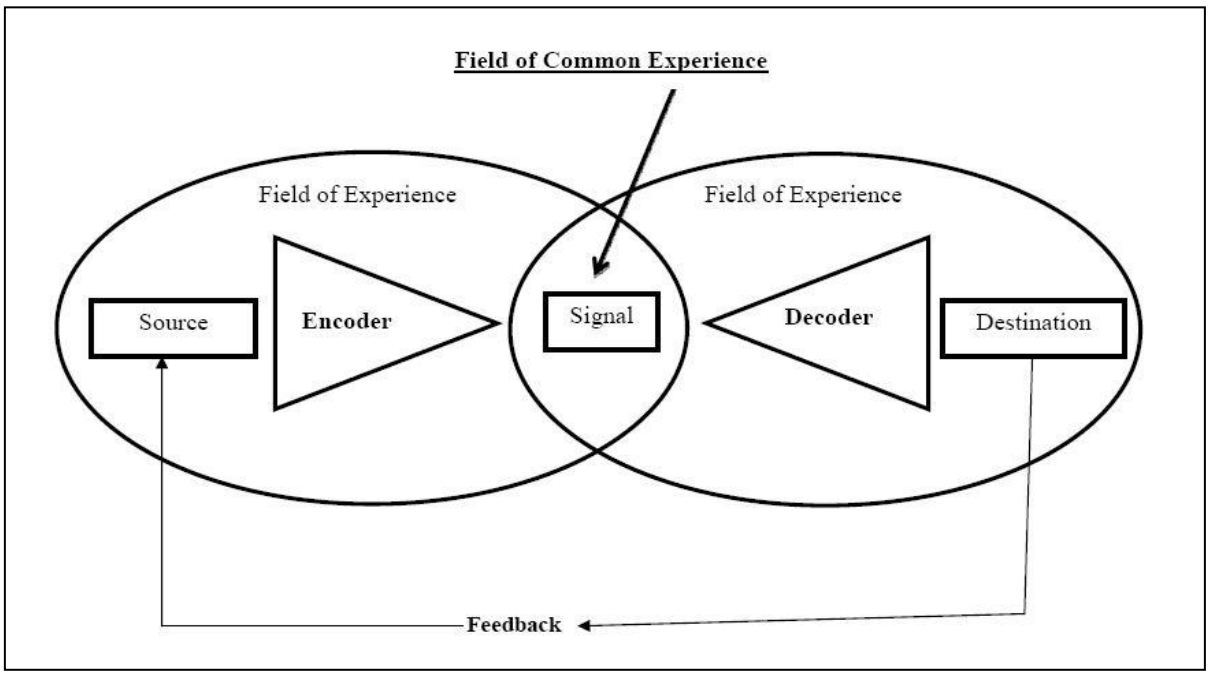

Figure 2.1 Schramm's model of communication (1959 cited in Fleming and Artis, 2012)

Benham-Hutchins and Effeken (2010) conducted a descriptive study to determine methods and patterns of information transfer during handover among healthcare professionals in acute settings. The study revealed overlapping verbal methods either by self or phone, written or electronic charts, with 84% of the providers' preferring verbal handover. The handover was not linear and shaped by the information needs of the providers since there was no standardised method used. Eighty three percentages of the Emergency providers were satisfied with non-linear handovers, whereas almost half of the providers in the admitting units were not satisfied. The use of electronic health handovers and health records was recommended to compliment the non-linear information transfer and the bad attitude associated with it. The use of handover communication modules and multi-professional logs were also supported.

Similarly, Jefferies, Johnson & Nicholls (2012) conducted a secondary analysis of data containing 67 examples of documentation and 195 transcripts of verbal handover; verbal clinical handover was more detailed, comprehensive and interactive with a detailed clinical picture of the patients compared to documentation that only entailed the tasks performed by the nurse. Given this evidence, it can be seen that verbal clinical handovers are of great importance as they allow the clinicians to clarify ambiguities; conversely, documentation is also important as it provides the evidence that care had been provided to the patient.

Furthermore, patient-centred care is determined by the quality of interactions between the patients and clinicians. Several studies have shown that verbal handovers done at bedside have proved to enhance information transfer and patient-centred care (Anderson *et al*, 2015; McMurray, Chaboyer, Wallis & Fetherston, 2010; Johnson and Cowin, 2013; Street, Eustace, Livingston, Craike, Kent & Patterson, 2011). A study by Mcmurray *et al.* (2010) explored factors that influenced handover in two facilities in Australia, which moved from taped handovers to verbal bedside handovers and Starr (2014) emphasises bedside handovers should be performed, following consent from the patient, after determining the level of disclosure they are prepared to release at bedside.

From these findings, it is clear all the handover methods are important and no method can replace the other. It would be of great benefit if all the methods could be used at the same time. As much as patients' records are important, as they provide evidence that care has been provided, verbal handovers also provide opportunity for clarifications of questions and ambiguities. Electronic structured handover processes have shown to be beneficial in promotion of information transfer.

2.4 EFFECTIVE HANDOVER PRACTICE

An effective handover without omissions supports transition of critical information that is vital for the safety of patients and continuity of care**.** A good quality handover also promotes information transfer, shared understanding and establishment of a good working atmosphere (Manser, Foster, Gisin, Jaeckel & Ummenhofer, 2010). Ambiguities and pending issues related to patient care lead to mistrust, conflicts and less information shared amongst nurses. Horwitz, Moin, Krumholz, Wang and Bradley (2009b) identified five factors that determine the quality of handover: familiarity with the patient, the number of handovers to be

performed, sense of responsibility, presence of a senior leader and a comprehensive written handover sheet.

Although several studies have placed more emphasis on the vulnerabilities of handover, Clarke, Werestiuk, Schoffner, Gerard, Swan, Jackson, Steeves and Probizanski (2012), have used the methodology of appreciative inquiry through semi-structured interviews of 29 nurses, five ward clerks, nine allied clinicians, two patients and one family member to explore the positive aspects of inter-unit patient transfers. Themes that emerged were situational variables necessary for the perfect transfer, the mode and content of information to be included during handover and consideration of the patient and family members during patient transfer.

Extrapolating from these findings, it is evident that an effective handover is one conducted under a good atmosphere and promotes information transfer and shared understanding, is influenced by the nurses workload, familiarity with the patient that allows the outgoing nurse to give the clinical picture of the patient, comprehensive and complete documentation, and the mode of communication such as verbal, written, tape recorded or even telephonically. Effects of affective handover are presented in **Figure 2.2**.

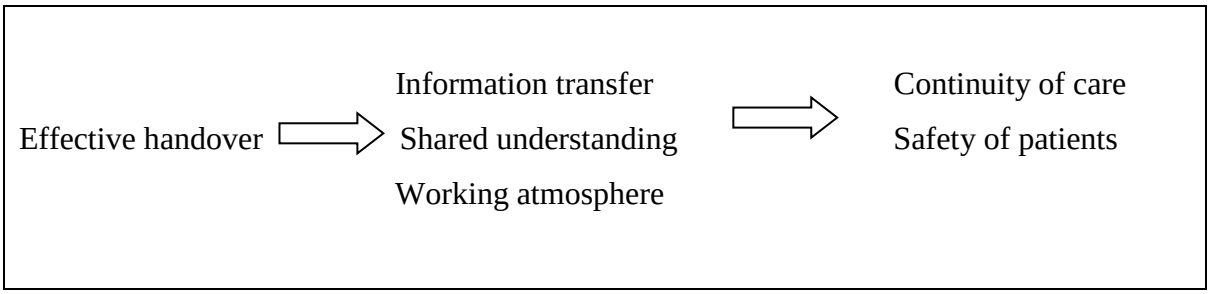

Figure 2.2 Effects of affective handover

2.4.1 Continuity of Care

Continuity of care is concerned with the quality of care over time, and can be viewed from both the clinician and the patient's perspective. Handover standardisation and structure should provide all the key content that is needed for continuity of essential care.

2.4.2 Patient Safety

An accurate handover is also vital for safety of patients. According to WHO (2014), there is a chance of one in 300 being harmed during patient care. WHO (2013) also added that one in ten is harmed while receiving care in developed countries due to a range of errors and adverse effects. The numbers are even higher in developing countries due to lack of resources. A review of human resources for health in South Africa added there is shortage of staff, misdistribution of resources and production of the wrong nursing skill (George, Quinlan, Reardon & Aguilera, 2012).

2.4.3 Information Transfer

Information transfer encompasses all relevant and accurate information with complete documentation and further priorities of care (Manser *et al*., 2010). Manser, Foster, Flin and Patey (2013) rightly point out that that handover is more than the transmission of accurate, complete information as it also includes assessment done, predictions and anticipation of problems and uncertainties, as these provide the clear clinical picture of the patient.

Several studies also supported bedside handover as it enhances information transfer. Kerr, McKay, Klim, Kelly and McCann (2014) conducted structured interviews with 30 Emergency Department patients and revealed their support for bedside handovers, as they were able to clarify discrepancies and provide information that had been omitted. Lu, Kerr and McKinlay (2014) have added that nurses should be trained to minimise the use of the medical technical jargon to allow patients to understand and participate in the handover. This would promote information transfer, as the patients could participate in handover and clarify and add any missed information.

2.4.4 Working Atmosphere

A good working atmosphere entails maintaining a good eye contact, less tension between the outgoing and incoming team and consideration of patient's experience during handover (Manser *et al.*, 2010). Another study by Frankel, Flanagan, Ebright, Bergman, O'Brien, Franks, Allen, Harris and Saleem (2012) examines the use of nonverbal behaviour through 52 videotaped-recorded handovers. Effective nonverbal behaviours, such as maintaining

good eye contact, posture, gesture, facial expression and physical distance, between clinicians have shown to enhance synchronicity of information transfer and shared understanding.

Given this evidence, it is clear that a good working atmosphere is necessary for an effective handover.

2.4.5 Shared Understanding

Inter-unit transfer of patients involves nurses from different units with different specialities and perspectives. It is therefore important for these two teams to establish a shared understanding to have a joint perspective and a common goal.

Most studies have shown that verbal handovers promote shared understanding compared to other methods (Toccafondi *et al*., 2012; Drach-Zahavy, Goldblatt & Maizel, 2015 & Abraham, Kannampallil, Brenner, Lopez, Almoosa Patel B & Patel V. 2016). A standardised, face-to-face bedside handover has shown to provide opportunities to crosscheck information and resolve questions and ambiguities, thus facilitating shared understanding amongst nurses (Drach-Zahavy *et al*., 2015).

A study by Abraham *et al.* (2016) uses sequential conversational analysis to show that verbal handover promotes interactions between nurses, as it allows questioning and clarifications while consistently referring to the documentation, ensuring shared understanding or common ground. This promotes a clear picture and understanding of the patient, which have been shown by Mukhopadhyay, Leong, Lua, Aroos, Wong, Koh, Goh, See, Phua and Kowitlawakul, (2015) to be associated with higher satisfaction with the handover.

Toccafondi *et al*. (2012) conducted a study to assess the continuity of information transfer and the presence of common ground supporting communication during communication between high and low acuity units. Despite the fact that pre-handover conversations amongst physicians created a shared understanding and anticipatory guidance to the receiving unit, the study revealed nurses were not involved. As a consequence, these pre-handover conversations led to a physician not documenting much of the critical information discussed; nurses were unaware of what was discussed, compromising patient care. Given this

evidence, creating a common ground through a shared endeavour will render safe and effective handovers between units.

In conclusion, a good effective handover conducted in a good working atmosphere, allows participation of both parties to ensure that accurate, timely information is transferred.

2.5 INEFFECTIVE HANDOVER PRACTICE

Poor handovers and communication failures are associated with adverse effects and near misses (Horwitz *et al*, 2009a; Thomas *et al*, 2013).

Written, or documentation, is another method of information transfer during handover. Jonsson, Jonsdottir, Moller and Baldursdottir (2011) conducted a study to determine the accuracy of documentation of the parameters that comprise modified early warning score (MEWS) of patients who were emergency admissions from the Emergency Department to ICU. Although the admission diagnosis was respiratory failure for most and was the indication of the deterioration of the patients, respiratory rate was only recorded in 14% of the patients, level of consciousness in almost half of the patients (48%), temperature readings in 69% and oxygen saturation in 80%.

Horwitz *et al.* (2009a) conducted a study amongst physicians to explore if they had encountered any negative incidents during inpatient transfer from the Emergency Department. Thirty-six incidents were mainly due to treatments, diagnosis and disposition errors, of which six patients needed an upgrade to the ICU.

Handovers have been associated with many incidents during patient transfer. Thomas *et al.* (2013) explored 459 incidents related to handover from Australian Health Service's incident reporting system. Thirty percentage (n=132) were transferred with an inadequate handover, 19.2% (n=88) were missing some critical information about the patient, whilst 14.2% (n=65) missed critical information on the care plan. The most prevalent failure in information transfer was whereby the clinician handing over did not meet the expectations of the receiving clinician, this was associated with 35.7% (n=174) incidents. 26% (n=127) incidents were associated with instances whereby the patients' condition did not match the

information provided during handover. Verbal information did not match the documentation in 24% (n= 117) incidences.

Table 2.1 Effects of effective and ineffective handover

Effective handover practice	Ineffective handover practice
Information transfer	Adverse effects, sentinel events
Shared understanding	Poor coordination of care
Good working atmosphere	Inappropriate treatment
Continuity of essential care	Delays in treatment and wasted time
Safety of patients	Omissions
	Duplication and conflicting advices and care
	Errors

2.6 BARRIERS TO AN EFFECTIVE HANDOVER

Good communication is essential for information transfer. Johnson and Cowin (2013) rightly indicate that communication during handover is affected by problems with language, understanding, accents and even racism in patients. It must be acknowledged that the 11 official languages in the study setting, and used by the nurses, definitely affects communication during handover.

Movement of patients to ICU from Emergency Department involves differences in specialties. Hilligoss and Cohen (2013) have drawn attention to the fact that inter unit handovers are unique, hence they have unique challenges compared to the end of shift handover; such challenges include speciality differences, infrequent contact with providers, unit layout, lack of established relationships.

Calleja, Aitken and Cooke (2011) reviewed 45 articles and one policy statement to identify best practices, barriers and interventions that have an impact on information transfer during handover from the ED. The study revealed that trauma teams were multidisciplinary and the discipline from which the team leader came from influenced the effectiveness of the team. Patient factors, such as patient acuity and poly trauma, were shown to influence the

communication between the health teams involved. Other factors including multi-tasking, processes and resources were shown to affect communication between clinicians. Another theme that emerged was lack of a standardised handover process and clarity during handovers including distractions during handover, missing, inaccurate and irrelevant information and poorly documented care. On this basis it may be inferred that the type of specialty influences the type of information provided during handover, hence the need for clinicians of different specialities to meet and decide on the process that will be suitable for both parties.

In a study conducted by Rabol *et al.* (2011) to explore the root-cause analyses of verbal communication errors between staff, 84 reports were reviewed and the raters found there was communication error in almost half of the cases, of which 86% were handover errors. Less than half (43%) were communication errors from different staff groups, whilst almost one-third (30%) were errors due to misunderstandings. Errors during teamwork accounted for 18%, whilst 23% were due to reluctance in speaking. The most vulnerable were unstructured communication and communication between different specialities, with the most challenging information being the use of a telephone.

As inter-handover involves the transfer of patients from one unit to the other, delays in the Emergency Department or lack of hospital beds in the receiving unit might interrupt the handover of a patient, leading to the nurse caring for the patient ending their shift before handing over takes place. Sujan *et al.* (2015) have shown that this influences patient care, as a nurse who is unfamiliar with the patient may have to conduct the transfer and subsequently uses notes as a source of information, but is unable to provide further value to the information transferred. It must therefore be recognised that delays in transfer of patients leads to distortion of information as it passes through several nurses before reaching the receiving nurse in the next unit.

In a study conducted by Lee, Cumin, Devcich and Boyd (2015) to examine whether expressing a concern or directing attention to documentation affected the receiver's confidence in the truth of the information received, the experienced nurses were found to have significantly higher level of confidence in the truth of information expressed in conjunction with expression of concern compared with the control group.

Sujan *et al.* (2015) observed 270 handovers to explore how Emergency Department practitioners align the individual and organisational priorities to the handing over of patients. The study focused on 39 participants, including paramedics, ED doctors and ED nurses. The three themes that emerged were management of patient flow, meeting performance targets and collaboration across organisational boundaries. The participants described the purpose of handover as understanding of departmental priorities and demands. Another theme that emerged was meeting the specific target, which leads to referrals to inappropriate units in order to meet set targets; this leads to mistrust between the ED and specialists units and refusal of transfer of responsibility and accountability. The last theme emphasised the importance of collaboration between the different specialities involved. Given this evidence, it is clear that the purpose of handover was not only the transfer of accountability and responsibility, but also alignment with organisational set targets. As a result, some measures that worked against the benefit of the patient, such as transfer to the wrong units to meet targets, were implemented.

Spooner *et al*. (2015) have described nurses, doctors and intravenous pumps as a source of interruption during handover, which led to omission of some important information. The work of Kowitlawakul, Leong, Lua, Aroos, Wong, Koh, Goh, See, Phua and Mukhopadhyay (2015) observed 90 matched handover's of patients transferred in and out of ICUs; fifty of these were nurse to nurse and involved 100 nurses, and 40 pairs were doctor to doctor and involved 80 doctors. It was found there were 1.26 distractions per handover in half of the handovers, with the human factor being the common source of interruption not the monitor alarms or intravenous pumps (Kowitlawakul *et al.*, 2015).

2.7 HANDOVER PRACTICE BETWEEN EMERGENCY DEPARTMENTS AND INTENSIVE CARE UNITS

Several studies have been conducted in first world countries regarding the handover practices of nurses during both ends of shift and inter-unit transfer. To date, few studies have been conducted in third world countries focusing on the handover of patients by nurses as patients transfer from the Emergency Department to the Intensive Care Unit.

McFridge *et al*. (2007) explore the handover processes between nurses in the Emergency Department and those in the ICUs in two acute hospitals within Northern Ireland through

interviews with 12 nurses. The ICU nurses felt the handover began as soon as they received a phone call about the incoming patient, whereas the ED nurses felt the handover began during the physical contact with the ICU nurses. It was clear the ICU nurses believed the critical needs of the patient were more important than the handover, as they focused on connecting patients to monitors and infusion pumps before they received any information. In addition, the ICU nurses were interested in the doctor-to-doctor handover, leaving the ED nurses feeling unnoticed and unappreciated. The handover was unstructured and inconsistent and the content suggested by some respondents were demographic data, both past and current history, management and reactions, haemodynamic variables, Glasgow coma scale, investigations, chest x-ray, input and output, airway management and current treatment.

Zakrison, Rosenbloom, McFarlan, Jovicic, Soklaridis, Allen, Schulman, Namias and Rizoli (2015) conducted a study that included 50 chart audits, six focus groups of 46 ED and ICU nurses and nine trauma doctors, who were team leaders. The study investigated information discrepancies during handover and measures that could be employed to improve information transfer. Chart audits revealed that almost one quarter (24%) of patients' injuries were not communicated during the handover, of which 41% were neurosurgical injuries. The admission notes included 32% new information that was not communicated during handover. There was an overall 48% information discrepancy recorded between ED and ICU, of which 32% of them led to change in management of the patients due to the information discovered in the ICU. Interviews revealed that in each team, emergency physicians regarded each other's handover as disorganised. Nursing themes that emerged also included inter-professional tensions and variability in handover as contributing factors in the delaying of treatment. A checklist organised by both the ICU and ED was proposed as the solution for improvement of handover, although some nurses felt it would mean more paperwork for them.

Matlakala and Botha (2016) explored the ICU unit managers' views regarding the staffing in the Tshwane Metropolitan area in Gauteng, South Africa. Although handover of nurses has been defined as the transfer of accountability and responsibility from one nurse to the other, the study has shown that due to a shortage of nurses, the hospital ICUs had to rely on agencies to provide them with nurses, who showed lack of accountability and responsibility. It could be concluded that handing over patients to such nurses could compromise the safety of patients and continuity of care.

Eygelaar and Stellenberg (2012) conducted a quantitative descriptive study investigating barriers that affect the quality of care in eight rural hospitals in South Africa using a self-administered questionnaire. Three hundred and forty nurses participated, and more than 80% indicated that quality of care was affected by the shortage of staff, inadequate skill, mainly in primary care and trauma, and inadequate supervision.

Matlakala and Botha (2016) revealed that due to shortages of staff, other categories of nurses, such as enrolled nurses and inexperienced nurses, assist in the ICU although Lubbe and Roets (2014) indicated they lack theoretical training and cannot perform certain tasks unsupervised. Given this evidence, it can be concluded that handing over patients to these particular nurses could affect continuity of care since they lack knowledge and their field of experience does not allow them to probe further, hence not being able to identify the things that could have been missed during patient care.

2.8 NURSES' PERCEPTIONS OF HANDOVER

It is of great importance to explore the nurses perception and practice of handover as it varies across specialities, units and even individuals and this is an indication that handover differs across units, with no singular one being suitable for all.

Richter, McAlearney and Pennell (2016) conducted a study to determine whether perceptions of organisational factors that can influence patient safety are positively associated with perceptions of successful patient handoffs, to identify organisational factors that have the greatest influence on perceptions of successful handoffs and to determine whether associations between perceptions of these factors and successful handoffs differ for management and clinical staff. Linear regression analysis revealed that teamwork across the unit had the largest effect on perceived successful handovers, whereas perceived teamwork within units was negatively associated with perceived successful handovers. Managers had a higher perception that organisational factors for safety affect successful handoffs than did the clinical staff. Managers believed learning and continuous improvement had a positive association with perceived successful handover, whereas communication openness had a positive association with a successful handover amongst clinical staff. It must be recognised that inter-unit and within unit handovers differ therefore are perceived differently by

clinicians. Teamwork is very important especially when information crosses specialty borders, as clinicians are from different schools of thought and are prone to differ.

Ammouri, Tailakh, Muliira, Geethakrishnan and Al Kindi (2015) investigated nurses' perception of safety to identify factors that need to be emphasised to maintain a culture of safety. Nurses (n=414) participated in the hospital survey. The two highest (almost 80%) rated items were teamwork within units and organisational and continuous learning, whereas the three lowest rated items (hospital management support, non-punitive and staffing) were scored at approximately 20%. The study revealed that nurses who perceived more supervisors' expectations and feedback about communication errors across hospital units' handovers and transitions had more overall perception of patient safety than those within units.

Manias, Geddes, Watson, Jones and Della (2016) explored the perception of different disciplines regarding clinical handover. Seven hundred and seven health professionals participated in the study, of which 60% were nurses, 22% doctors and the rest were the allied health professionals. All healthcare professionals emphasised the importance of bedside handovers. Role modelling and feedback from the senior staff was regarded as an important factor.

It can be extrapolated from these findings that support and feedback for supervisors and senior staff is important. Senior staff support has been shown to promote teamwork, which promotes shared understanding and information transfer.

2.9 POTENTIAL STRATEGIES TO IMPROVE PATIENT DURING HANDOVER

2.9.1 Standardisation of Handovers

Studies have emphasised the need for a standardised handover as it uses a shared set of handover information (Street *et al.*, 2011; Abraham, Kannampallil, Patel, B., Almoosa & Patel, V., 2012; Agarwal *et al.*, 2012; Payne *et al.*, 2012; Toccafondi *et al.*, 2012; Spooner *et al.*, 2013; Thomas *et al*., 2013 & Drach-Zahavy *et al.*, 2015). Despite this, Anderson *et al.* (2015) conducted an integrated review of 45 articles and revealed that although

standardisation of handover is emphasized, there is no singular tool suitable for all. Consequently, Bruton, Norton, Smyth, Ward and Day (2016*)* emphasise the need for different units to come together and agree on their purpose of communication during handover. Coleman, Redley, Wood, Bucknall & Botti (2015) have shown that although standardisation might help with information transfer, the inter-professional- and specialty-difficult relationships are hindering communication and adoption of tools, hence the need for intervention of leadership and management on this problem.

2.9.2 Education and Training

Healthcare workers in all disciplines need training in handover and other aspects, such as teamwork and communication, as this will encourage interaction between providers and between providers and patients. Mukhopadhyay *et al.* (2015) interviewed 290 nurses and residents involved in the handover of patients admitted to and discharged from medical ICU. Nurses' handovers covered more issues specific to the allied group and reviewed their patients earlier as they had received training compared to the residents who did not (Mukhopadhyay *et al.*, 2015).

Kicken *et al.* (2012) conducted a study to determine whether standardisation and effective training are good interventions for good handover. The participants recommended standardisation and training to improve handover and accountability.

Stoyanov *et al*. (2012) applied the group concept approach to identify, objectively, the shared understanding of a group of experts about handover training interventions. One hundred and five declarative statements about handover training interventions were collected from literature reviews and were given to 21 experts to sort out according to similarity and means of their importance. The literature review revealed the benefits of continuum training from formal training to workplace training.

Rayo, Mount-Campbell, O'Brien, White, Butz, Evans and Patterson (2014) analysed 133 handovers to determine the differences in the incoming clinicians' communication behaviours between clinicians with lower and higher levels of training. ICU trained nurses and attending physicians were considered to have higher level training, whereas registered nurses and resident physicians were considered lower level. It was observed that clinicians

with a higher level of training interrupted the outgoing clinician less frequently (1.0 interjections) and had higher proportions of clarifying and collaborative crosscheck questions compared to those with lower training, who tended to interrupt frequently (3.1 interjections). In addition to this, a study by Petkovsek-Gregonin and Skela- Savic (2015) revealed that nurses with a higher level of education appreciate proper documentation as this facilitates communication between nurses and promotes quality continuity and safety of patients.

Given this evidence, it can be concluded that level of training and educational background of the clinicians positively influences the handover practices. Nurses with a higher level of training caused fewer interruptions, were questioning, sought clarification and covered specific issues, all of which promote information transfer and shared understanding leading to continuity of vital care.

2.9.3 Leadership and Management

'Clinicians and managers need to be aware that providing a good handover requires an understanding of its purpose, leadership, protected time, a systematic approach and a supportive clinical environment' (Jorm, White & Kaneen, 2009).

Croos (2014) emphasised that managers and shift leaders should ensure the agencies and agency staff understand both the clinical and non-clinical expected during their practice, to maintain high quality communication during handover.

2.9.4 Electronic Tools

Several studies have indicated that electronic tools improve handover between nurses and lead to positive benefits in patient safety and quality of care. (Abraham & Reddy, 2010; Brebner, Sandhu, Addison & Kapadia, 2011; Johnson *et al*., 2012; Lin C.H, Chen, Y.C & Lin H.C, 2013; Advani, Stobbs, Killick & Kumar, 2015; Johnson, Sanchez & Zheng, 2016). Despite this, technology should focus on supporting verbal handover and not replacing it, as it allows exploration of more information (Randell, Wilson & Woodward, 2011). In addition, Johnson, Jefferies and Nicholls (2012) correctly indicated that a designed data set that is

flexible and adaptable complements verbal handover and directs nurses to give comprehensive details about the patient.

Johnson *et al*. (2016) used 100-recorded handovers to evaluate the use of a combination of structured content and electronic tool in order to improve the quality of handover during shift-to-shift handovers; this led to improvement in transfer of critical information, reduction in communication errors and consequently, reduction in medication errors. From these findings, it can be concluded that the use of both electronic records and verbal handover arguments each method and produces better outcomes if used together.

In contrast, Lin *et al.* (2013) have shown that electronic handover can lead to inaccurate, missing and incomplete information if excessive pages have to be completed, if the nurses are unfamiliar with the electronic system, if the nurses have different cognition with electronic records, or if the handover is not standardised with no auditing process in place. Ninety percent electronic handover integrity was achieved with adequate training, standardisation and an auditing system.

2.10 MEASUREMENT AND QUALITY OF HANDOVERS

Measurement helps identify gaps in handover practices and provides opportunities to develop necessary measures for improvement of quality care. Anderson *et al.* (2015) conducted an integrated review of tools and issues of handover and revealed that standardisation of handover results in the important issue of auditing clinical handover practices, as this can help with identifying potential areas of improvement and help avoid putting ineffective measures in place.

Handover rating tools have been developed to assess the handover of patients between units and within the unit during the end of shift handover (Manser *et al.*, 2010; Horwitz, Dombroski, Murphy, Farnan, Johnson & Arora 2013; O'Connell, Ockerby & Hawkins 2014).

Horwitz *et al*. (2013) tested the feasibility and validity of the handover evaluation tool to be used at the end of shift. The nurse sending and the nurse receiving the patient, together with the nurse educator valuated the handover process. Six domains were identified as setting,

organisation, communication skills, content, clinical judgement and humanistic qualities and were scored on a 1 to 9 Likert scale. The tool was easy to use and well received, but it cannot be used in this particular study as the evaluation will be used across units and the tool has only been validated for the end of shift handovers.

O'Connell *et al*. (2014) examined the psychometric properties of using the confirmatory and exploratory factor analysis that resulted in the 14-item self-evaluation scale. The tool was also tested in the shift-to-shift handover, making it inappropriate to assess the inter-unit transfer.

Manser *et al.* (2010) however conducted a study aimed at developing a 16-item handover rating tool that could be used as a self-rating tool, or used by external raters across units. Exploratory factor analysis accounted for 49.96 of variance and revealed three factors, which were information transfer, shared understanding and working atmosphere. The tool was developed for use mainly in care transitions and was piloted in three different units, for 126 handovers from paramedics to Emergency Department, anaesthesia care provider to post anaesthesia care provider, and from post anaesthesia care provider to a ward nurse. It is clear that the tool can be used to evaluate handovers where patients are being transferred from one unit to the other.

Manser and Foster (2013) used the handover rating scale to examine team communication during postoperative handover. The relationship between 117 handovers and clinician self-ratings were analysed using correlation analysis and analysis of variance. Higher ratings were related to assessments, whereas less rating was associated with information seeking. Multiple regressions showed that three of the four factors had a good predictive validity for the perceived overall quality of the highest correlation ($\beta=0.46$, $p<0.001$) observed in discussion of patient care information followed by handover organisation ($\beta=0.33$, $p<0.001$) and the last was establishing shared understanding ($\beta=0.28$, $p<0.001$).

Jeffcott, Evans, Cameron, Chin and Ibrahim (2009) identified three key aspects of measurement of safety and handover quality as information transfer, responsibility and accountability, and working environment in relation to policies and practice.

2.11 SUMMARY

This chapter explored the handover practices of nurses as they handover patients from the Emergency Department to the Intensive Care Unit, both locally and internationally. The chapter provided an understanding of handover as a concept, methods of communication during handover as well as the effects of both effective and ineffective handover. Effective handover is attainable if conducted under a good atmosphere, which enhances information transfer and shared understanding. Schramm's Model of Communication guided the study and the model considers nurses' experience influences the way they encode and decode the information received. Verbal bedside handovers was preferred since it allowed clarification of ambiguities from both patient and the nurse giving the handover.

Ineffective handover is the reason for sentinel events, near misses and adverse effects. This compromises quality of care, continuity of care and even safety of patients. Several factors have been identified as barriers of effective handover, such as specialty differences, level of experience, lack of standardised framework, lack of teamwork, lack of education and training.

The strategies that help in the improvement of handover are standardisation of handover, education and training. To ensure the measures employed are effective in improving handover practices, measurement of the quality of handover is vital to identify gaps and prevent putting ineffective measures in place.

The next chapter will discuss research methodology.

CHAPTER THREE

RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

In this chapter, the research methodology was presented. Research method refers to the techniques used to structure a study and to gather and analyse information in a systematic fashion relevant to the research question (Polit & Beck, 2012:11). The techniques included selection of population and sample, data collection, reliability and validity of the instrument used and analysis strategies.

3.2 OBJECTIVES OF THE STUDY

To ensure consistency in the study the objectives are repeated.

- To describe the demographic characteristics in relation to the aspects/items of handover among nurses (handing over and receiving).
- To compare the aspects/items of handover amongst the nurses (handing over and receiving nurses, the novice and the experienced nurses, specialist and non-specialist).
- To investigate the factors associated with quality of handover amongst nurses.

3.3 RESEARCH DESIGN

A descriptive, quantitative, non-experimental, cross sectional survey was used to address the research question. The nurses were asked to describe the handover using a handover rating tool at one point in time. Cross sectional designs are used to examine data at one point in time, collected on one occasion from different participants (Brink *et al*, 2012:101).

3.3.1 Quantitative

Quantitative researchers are systematic, progress logically through steps, use structured instruments to collect information and data is analysed using statistical procedure. The

criterion for assessing the quality of quantitative studies is the degree to which research findings can be generalised to individuals other than those who participated in the study and use mechanisms designed to control the study (Polit & Beck, 2012:11).

In this study, the researcher was systematic and data was collected using a structured Handover Rating Tool developed by Manser *et al. (*2010) and analysed using descriptive and inferential statistics. External validity was enhanced by using representative people, as the sample size was calculated through the assistance of a statistician to ensure it was correct.

3.3.2 Non-experimental

A non-experimental design is relevant where researchers do not intervene by manipulating the independent variable (Polit & Beck, 2012:203). In this particular study, no manipulations, i.e. administration of treatments, were done and there were no control groups, confirming the study was non-experimental.

3.3.3 Descriptive

Descriptive designs provide a picture of situations as they naturally happen (Grove *et al*., 2013:215). The study was descriptive as it was aimed at assessing and describing the handover practices of nurses during transfers from Emergency department to ICU.

3.3.4 Cross-Sectional

The study was cross-sectional design, which examined the groups of subjects in various stages of development trends, patterns and changes simultaneously, with the intent to describe changes in the phenomenon across stages (Grove *et al*., 2013: 220).

3.3.5 Setting

The study was conducted in four adult ICUs and two Emergency Departments at a 1200-bedded tertiary Academic Hospital in Johannesburg, Gauteng. Intensive Care Units include the Trauma, Neurosurgery, General and Coronary Care Units and the casualties include Trauma and Medical casualty. The levels of ICUs are described according to SASA

guidelines (2013). General and Trauma ICUs are described as ‘category three as they admit patients with multiple organ dysfunctions, whereas Coronary Care Unit and Neurosurgical ICU are considered level two ICUs as they admit patients with single organ dysfunction’ (SASA, 2013).

The Neurosurgery ICU is eight bedded, Trauma ICU is nine bedded, General ICU is 12 bedded and the Coronary Care Unit (CCU) six bedded. The nurse-patient ratio is usually one nurse to one patient for those critically ill.

Trauma casualty consists of six resuscitations area, four cubicles mainly for priority two and three patients, Plaster of Paris (POP) room and a stitch room. Medical casualty is divided into the emergency side and the side for stable patients. Medical and Trauma casualty admit patients into the selected four ICUs.

3.4 RESEARCH METHODS

Research method refers to the techniques used to structure a study and to gather and analyse information relevant in a systematic fashion (Polit & Beck, 2012:743). The techniques include selection of population and sample, data collection and analysis strategies.

3.4.1 Population

Population refers to the entire aggregation of cases in which the researcher is interested (Polit & Beck, 2012:249). The target population of this study were all handovers performed between any of the four ICUs (Trauma, Neurosurgery, Coronary, General), with either one of the two casualties (Trauma and Medical Casualty) in a tertiary academic hospital in Johannesburg; Paediatric casualty, Neonatal and Paediatric ICU were excluded in this study. Inclusion criteria included handovers performed by trauma nurses and ICU nurses between Trauma casualty and the four mentioned ICUs and those performed between Medical casualty and the same ICUs.

Preference was given to the registered nurses as they are directly involved in the handing over of the patient and have more knowledge about the process.

An exclusion criterion for the study was all handovers performed by auxiliary and enrolled nurses, as their knowledge and level of training differs from that of registered nurses.

3.4.2 Sample and Sampling

Convenience sampling, involves the choice of readily available participants (Brink *et al*, 2012:140), and was used in this study. This makes convenience sampling the appropriate method since the sample includes all the elements that are in the right place at the right time (Brink *et al*, 2012:140).

To determine the sample size, literature relating to the proposed study was reviewed. In one retrospective study, conducted between January and December 2001, of the 5141 inpatients in the Trauma Unit, 7.8 % (n=400) of the severely injured were admitted to different Intensive Care Units in the proposed setting (Bruce, Schmollgruber, Eales, Gassiep & Doubell, 2003).

This 7.8% was therefore used as the estimate for the expected proportion.
The sample size was calculated using a z-score of 95% coefficient.

$$n = \frac{1.96^2 P(1-P)}{d^2}$$ with precision (0.05).

P= estimated of the expected proportion (prevalence).
d= desired level of absolute precision and is usually 0.05.
If P is 0.078 (7.8%)

$$\text{Then } n = \frac{1.96^2 \times 0.078 (1-0.078)}{0.05^2} = 111.$$

One hundred and eleven handovers was taken as the minimum sample size.

3.4.3 Data Collection

- Data collection process

Once permission was granted to conduct the study in the institution, the researcher visited the units to introduce herself to the respondents and explain the purpose of the study to those who met the criteria and were willing to take part. An information letter (Appendix B)

explaining the study measures were provided. Respondents were provided with consent forms (Appendix C) to read and upon understanding, signed and returned to the researcher.

Each handover was be assessed independently and anonymously by two nurses. The quality rating forms were completed by two raters for each handover and the human factor observers were excluded from the study. The nurse handing over and the one taking responsibility of the patient completed the quality-rating tool independently. Both nurses, handing over (primary nurse) and receiving, will assess the quality of the handover process for each handover involving the emergency or trauma patient.

The rating tools were availed in all units where the study was conducted. Every handover involving an emergency or trauma patient performed by an emergency nurse to an ICU nurse were to be assessed 30 minutes to 1 hour after the patient was stabilised. On completion of the rating tool, the registered nurses' placed it into a sealed data collection box, which could only be accessed by the researcher. Data were collected from mid-week and weekend shifts and from night and day shifts. The researcher collected the questionnaires daily from the respective units and loaded them into a computer statistical programme. The researcher obtained help from the statisticians available in the faculty.

- Instrument

The handover rating tool was developed by Manser *et al*. (2010) at the University of Aberdeen in United Kingdom. The 16-item self-administered questionnaire can be utilised by three raters, the nurses handing over, the nurse taking responsibility and the human factors observer. The tool had 19 items, but three items were excluded from further analyses as one produced a missing item in half of the cases and the other two were excluded as they correlated perfectly and the raters could not differentiate them. The rating tool utilises the four point Likert scale to describe patient handover.

The data collection tool comprised two sections. Section 1 comprised the demographic data developed by the researcher and consisted of eight (8) items. Section 2 was divided into five constructs. Construct 1 (Information transfer) was assessed using items 1 to 7, Construct 2 (shared understanding) was assessed using items 8 to10, construct 3 (working atmosphere) was assessed using items 11 to 13, item 14 assessed the overall handover quality and items

15 and 16 assessed the circumstances of the handover. Demographic data was also included in the tool. Permission to use the tool was obtained.

- Validity and Reliability of Instrument

The tool was piloted in three different settings, which are from paramedic to emergency room staff, anaesthesia care provider to post anaesthesia care unit and from post anaesthesia care unit nurse to ward nurse (Manser *et al*., 2010). The tool was appropriate as it is used to assess the handover conducted between two different settings. Several tools have previously been used to evaluate unit handovers, but were considered inappropriate for this study (O'connell *et al*., 2014 & Horwitz *et al.,* 2013).

Dimensionality and validity of the rating tool were performed. Exploratory factor analysis revealed three factors, which are information transfer, shared understanding and working atmosphere, and accounted for 49.96 of the variance of items. Good predictive validity was obtained in all three factors, as stepwise regression analysis revealed the same relationship between the three factors: information transfer ($\beta=0.59$, $p\leq0.0001$), shared understanding ($\beta=0.28$, $p\leq0.001$) and working atmosphere ($\beta=0.16$, $p\leq0.01$).

Symons, Wong, Manser, Sevdalis, Vincent and Moorthy (2012) used the Handover Quality Rating tool to assess the teamwork skills in shift handover. The overall inter rater reliability was large and statistically significant (Inter Class Correlation= 0.67, $p<0.001$). Inter rater reliability involves having two raters or observers watching an event simultaneously and independently recording data according to the instrument instructions (Polit & Beck, 2012:305). This relates to this study as the two nurses involved were asked to rate the handover using Handover Quality Rating Tool (Appendix A) independently and according to the instrument's instructions.

- Pre-testing

A pre-test was conducted before the commencement of the study. A pre-test is the trial administration of an instrument to identify flaws or assesses time requirements (Polit & Beck, 2012:740). The instrument was considered suitable for the pilot and main study because of its homogeneity and the nature of the study design. The Handover Quality rating

tool (Appendix A) was used on five (n=5) handovers in the selected units for the study and as a result, 10 handover rating tools were completed by the five nurses handing over the patient and five nurses receiving the patient. There were no problems encountered with the instrument during the pilot test, so no modifications were made to the handover rating tool. Data obtained during the pilot study were edited, coded, categorised and filled for statistical analysis but the results obtained in the pilot study were not used in the main study.

3.4.4 Data Analysis

Data were analysed using STATA version 13 and non-parametric statistics. Statistical assistance was sought from a statistician from the Medical Research Council (MRC). The baseline characteristics (respondents' age, gender, hours of work, years of qualification as a registered nurse and as a nurse specialist, years of experience in the unit, the current role in the unit and during handover and the time at which handover was conducted) of the study respondents was described using frequency and percentages for categorical variables, medians and interquartile range for variables with a continuous scale. An overview of all data collected and analysed is presented in **Table 3.1.**

Table 3.1 Demographic data collected to determine baseline characteristics of respondents

Categorical variables	Continuous variables
Gender	Age
Hours of work (full-time, part-time, agency)	Years of qualification as a registered nurse
Current role in the unit	Years of experience in ICU or Trauma Unit
Role during handover	Handover quality rating scores
Time handover was performed	

Comparisons data analysis was used to explore the relationship between two variables (independent and dependent) as presented in **Table 3.2**. The independent variable is manipulated by the researcher to have an effect on the dependent variable and the dependent variable is measured to examine the effect on the independent variable (Grove et al, 2013:145). The variables of interest for further analysis were two independent variables

(handing over and receiving) and two dependent variables: years of experience (<10years and >10 years) and current role (specialist and non-specialist).

Table 3.2 Comparison between respondents in relation to handover quality rating

Independent variable	Dependent variable
Handover given Handing received	Age Gender Hours of work Years of qualification as a registered nurse Years of experience in ICU or Trauma Unit Current role in the unit Role during handover Time handover was performed

In this study, the quality rating form was completed independently by the two nurses, that is the nurse handing over and the nurse taking the responsibility of the patient. The t-test is used to determine whether the differences between the means are significant or caused by chance when data are normally distributed (Brink *et al*, 2012:191). The Shapiro Franscia test was computed to check for normality and it was decided that the median and interquartile would be reported after establishing that data were not normally distributed.

Polit & Beck (2012:387) state that a non-parametric test may be needed when dependent variable is on an ordinal scale, or if the distribution is markedly non-normal. This was done in this particular study as the data was ordinal and the distribution was non-normal, hence a non-parametric analog of an independent group's t-test called Wilcoxon rank-sum test (also known as Mann-Whitney Wilcoxon test or Mann-Whitney U test) was used compare the median scores between the respondents handing over and those receiving (Polit & Beck, 2012:387). Wilcoxon signed-rank test involves taking the difference between paired scores while Wilcoxon rank-sum involves taking the difference in unpaired scores, hence the use of Wilcoxon rank-sum since the scores were unpaired. Wilcoxon rank sum was used to compare the aspects/items and constructs of handover amongst the handing over and receiving respondents in relation to specialisation and years of experience.

Principal components analysis (PCA) was computed using STATA version 13 in order to reduce items into constructs in accordance with the rating tool for handover quality. Principal components analyses (PCA) are statistical techniques designed to examine inter-relationships amongst large numbers of variable to reduce them to a smaller set of variables. It is also used to identify clusters of variables that are most closely linked together (Grove *et al*., 2013:566).

Logistic regression is a multivariate regression procedure that analyses relationships between two or more independent variables and a categorical dependent variable and yields a predictive equation (Polit & Beck, 2012:418). After running a Brant test, to confirm the assumption of proportionality of odds, it was found the data were not proportional, therefore a generalised ordinal logistic model was fitted to investigate the factors association with the quality of handover between two independent groups (handing over and receiving respondents) and dependent variables of interest (specialty and experience). The predictors (handing over and receiving) were continuous, so the odds ratio (OR) were interpreted as: for every unit increase in the odds of the outcome occurring were (OR value) likely to agree to the constructs (information transfer, shared understanding, working atmosphere, overall handover quality and circumstances of handover) than to disagree (Grove *et al*., 2013:576).

3.5 ETHICAL CONSIDERATIONS

It is the responsibility of the researcher to ensure that ethical issues are taken care of. The ethical considerations of this study were in accordance with the Declaration of Helsinki. The University of the Witwatersrand's ethical considerations are in accordance with the Declaration of Helsinki and includes ensuring that the wellbeing of the research subjects take precedence over all interest, hence the researcher made certain the privacy and dignity of research subjects were protected (Grove *et al*, 2013:160). Ethical considerations discussed to abide to the Declaration of Helsinki were informed consent, permission to conduct the study, confidentiality and anonymity.

3.5.1 Informed Consent

Informed consent ensures that participation in the study is voluntary and participants are protected from harm; participants are given the choice to decide to participate in the study, given all the possible and adequate information, which includes the purpose of study,

duration and length of involvement, research procedures and possible dangers (Brink *et al*., 2012:38; de Vos, Strydom, Fouche & Delport, 2011:117).

The participants were provided with the information letter (Appendix B) and given time to read and understand the content. The nurses were given the consent form (Appendix C) to sign to indicate they were willing to participate in the study. Information provided clarified voluntary participation and that no penalty would be imposed in case of withdrawal from study.

3.5.2 Permission to Conduct the Study

Permission to conduct the study was obtained from the University of the Witwatersrand Postgraduate Committee; ethical clearance (Appendix E) was obtained from the University of the Witwatersrand's Human Resource Ethics Committee; permission to conduct the study was obtained from the Chief Executive Officer of Charlotte Maxeke Johannesburg Academic Hospital and the Director of Gauteng Department of Health. Verbal permission to conduct the study was obtained from the nursing services manager and unit managers of both Trauma and Medical Casualties and four ICUs (Trauma ICU, Neurosurgery ICU, Coronary Care Unit, and General ICU).

3.5.3 Anonymity

Anonymity means no one, including the researcher, should be able to identify the subjects (de Vos *et al.*, 2011:120). All participants were assured in writing that information provided would be anonymous; this was done to ensure participants' privacy. No identifying characteristics or names were mentioned in the study and each handover was provided with a number - no names were used.

3.5.4 Confidentiality

Confidentiality is the agreement between persons to limit others' access to private information. Confidentiality implies only the researcher and a few members of staff should be aware of the identity of the participants, and that the staff should have made a commitment

with regard to confidentiality (de Vos *et al.*, 2011: 120). Coded memory sticks and computer codes, only assessed by the researcher and the supervisor, were used.

3.6 VALIDITY AND RELIABILITY OF THE STUDY

Pilot testing was conducted and validity scores were done to ensure feasibility of the study and to detect possible flaws in the instrument used. Face and content validity was ensured by asking five expert local domain expert specialists, both medical and nursing, to review the relevance of the instrument content for the South African context. Data gathering was solely carried out by the researcher. Reliability was maintained by ensuring consistency and accurate recording of data. An appropriate sample size was discussed with a statistician so as to be representative of the study taking into consideration of possible refusal participate. Sample inclusion and exclusion criteria were followed.

3.7 SUMMARY

This chapter outlined a summary of research methods, objectives, research design, setting, population, sampling, data collection, data analysis and ethical considerations. The pilot study was done to identify the flaws of the instrument. Data was collected by a means of a self-administered instrument (Appendix A). Chapter Four will present the results and discussion.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 INTRODUCTION

This chapter describes the analysis of data using descriptive statistical tests and interpretation of findings. Data files were set within the statistical software STATA version 13; data was entered once and verified during the second direct entry. Descriptive statistics and comparative statistics were used to achieve the study objectives. The descriptive tests (frequency, median, inter-quartile range) were used to synthesise the respondents' demographic data and questionnaire schedule. Comparative statistics were employed to describe total questionnaire scores to compare demographic data of the respondents with obtained levels of measurement to test for statistical significance. The statistical tests included Wilcoxon rank-sum test (also known as Mann-Whitney Wilcoxon test or Mann-Whitney U test). Testing was set at 5% level of significance. An ordinal logistic model was fitted to establish the relationship between the handing over and receiving respondents.

4.2 APPROACH TO DATA ANALYSIS

Descriptive statistics were used to present interpretation of the demographic profile of the respondents: age, gender, hours of work, years of experience as a registered nurse and experience in the area of current specialty in years, current practice role, role during handover and the time at which the handover was performed. Frequency distributions were used to provide the overall coherent presentation and description of the data. Percentages in these findings were taken to the nearest one decimal point.

The Shapiro Franscia test was used to determine if the data were normally distributed, and the results of the test showed a non-normally distributed data ($p<0.05$) in all the items. Measures of central tendency (median and inter quartile range) were used to summarise the data. The Wilcoxon rank-sum test was used to evaluate the significance of differences in medians between the selected different categories namely, Trauma and Intensive Care respondents, specialist and non-specialist respondents, the experienced and the novice nurse. The level of statistical testing was set at $p<0.05$.

After running a Brant test to confirm the assumption of proportionality of odds it was found the data was not proportional, therefore a generalised ordinal logistic model was fitted. The p values from the Brant test was less than 0.05 hence the null hypothesis that there is proportionality of odds was rejected. An ordinal logistic model was fitted to establish the relationship between the handing over and receiving respondents with the constructs: information transfer, shared understanding, working atmosphere, overall handover quality and circumstances of the handover.

STATA version 13 was used to compute a factor analysis in order to reduce items into constructs in accordance with the rating tool for handover quality.

4.3 RESULTS AND DISCUSSION OF FINDINGS

4.3.1 Section One: Demographic Profile of the Respondents

This section relates to the demographic profile of the respondents, which comprised eight (8) items. Items include age, gender, hours of work, years of experience as a registered nurse and experience in the area of current specialty in years, current practice role, role during handover and the time at which the handover was performed, which was obtained through the self-administered questionnaire. Results of the demographic profile of the respondents are summarised in **Table 4.1.**

Table 4.1 Demographic profile for nurse respondents for the total sample

Item	Statement	Frequencies	Percentages
Q1	Age		
	20-30 years	56	25.20%
	31-40 years	72	32.40%
	41-50 years	63	28.40%
	More than 51 years	31	14.00%
Q2	Gender		
	Females	166	74.80%
	Males	56	25.2%
Q3	Hours of work		
	Full time	221	99.50%
	Part time	-	-
	Agency	1	0.50%
Q4	Years' experience qualification as registered nurse		
	Less than five (5) years	103	46.40%
	6-10 years	49	22.10%
	11-15 years	18	8.10%
	16-20 years	29	13.10%
	More than 20 years	23	10.40%
Q5	Years of experience in the specialised area		
	Less than five (5) years	114	51.50%
	6-10 years	41	18.50%
	11-15 years	25	11.30%
	16-20 years	27	12.20%
	More than 20 years	15	6.80%
Q6	Current role in the unit		
	ICU trained nurse	79	35.60%
	Trauma and Emergency trained nurse	45	20.30%
	ICU experienced registered nurse	30	13.60%
	Trauma and Emergency experienced registered Nurse	68	30.60%

The majority (57.7%; n=128) of respondents were aged between 21 and 40 years, with a minimal number (14%; n=31) greater than 50 years of age. It can be extrapolated from the findings that the majority of nurses are a younger group of professionals. Findings are presented in **Figure 4.1.**

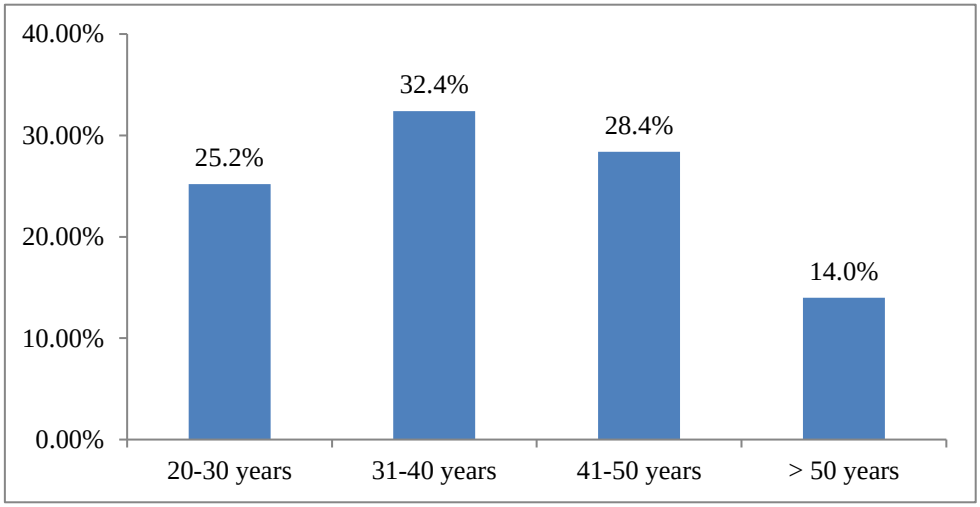

Figure 4.1 Age distribution of nurses' respondents

In this study, almost three quarters (74.80%; n=166) of the sample were females and males accounted for 25.20%. Findings are presented in **Figure 4.2.**

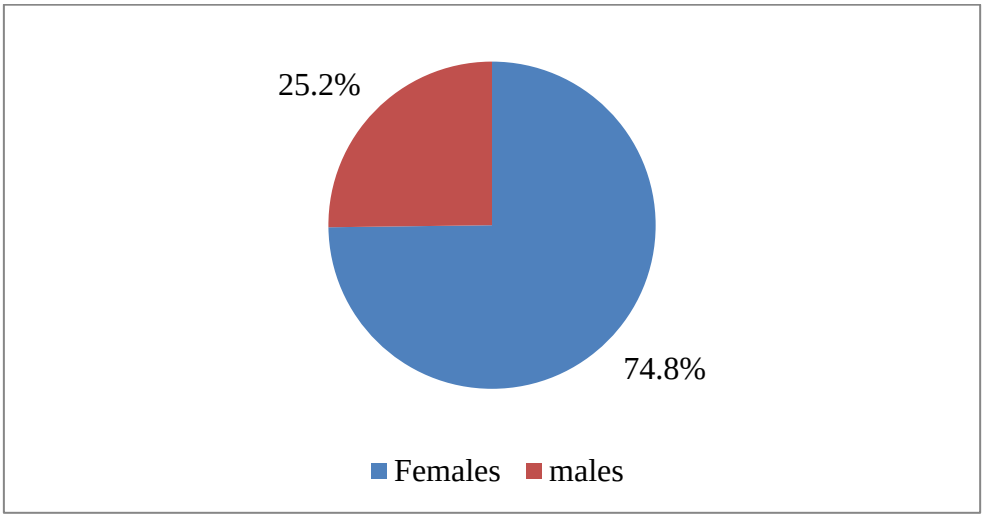

Figure 4.2 Gender of nurse respondents

Almost all the participants were in full time employment, except one who was agency employed. Findings also indicate that the majority (68.50%; n=152) of respondents had less

than 10 years of nursing experience, with the majority (69.80%; n=155) also having less than 10 years working in the specialised areas. Findings are represented in **Figure 4.3.**

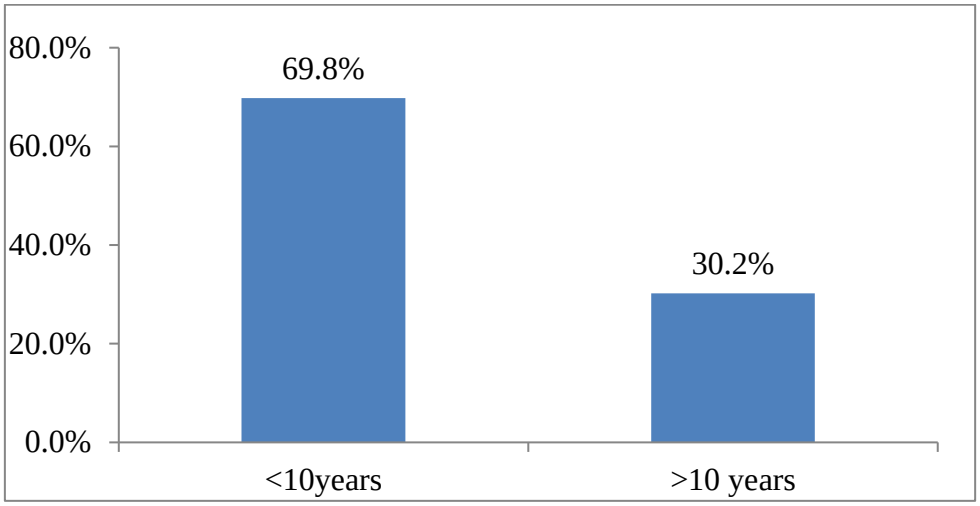

Figure 4.3 Years of experience as a registered nurse and years of experience in the specialised area

The majority of respondents represented were specialist nurses (55.90%; n=124). The results are presented in **Figure 4.4.**

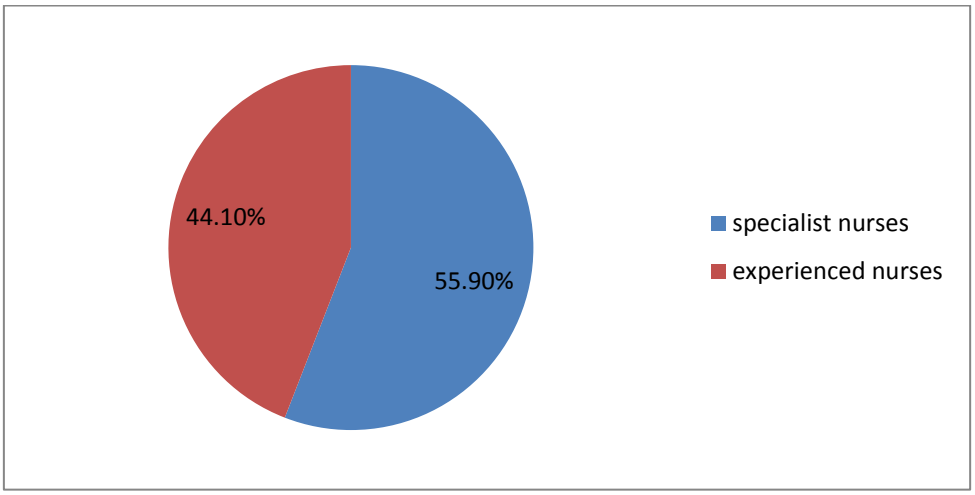

Figure 4.4 Current roles of the respondents (handing over and receiving)

The ICU trained respondents were more than twice the number of the number of ICU experienced respondents. In contrast, the number of Trauma and Emergency experienced

respondents (30.60%; n=68) was higher than the number of Trauma and Emergency trained respondents. Results are presented in **Figure 4.5.**

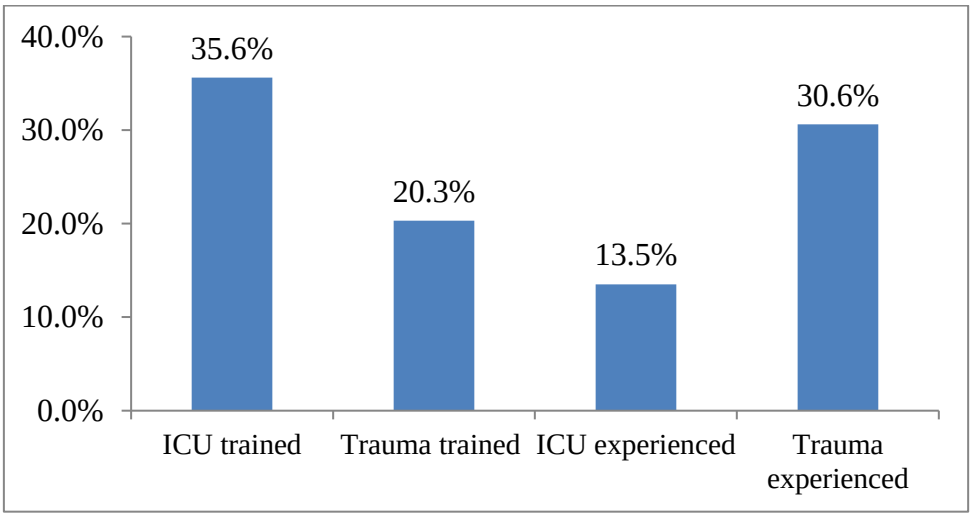

Figure 4.5 The percentage of ICU, Trauma trained, ICU experienced and Trauma experienced respondents

Of the respondents (n=222), trauma nurses (n=111) were handing over patients and ICU nurses (n=111) were receiving patients, with the majority (51.8%; n=115) of the handovers done during the day.

4.3.2 Evaluation of Handover Quality

The evaluation of the handover quality formed Section 2 of the questionnaire, which comprised 16 items. The items were divided into five subsections, namely information transfer (item 1 to 7), shared understanding (item 8 to 10) and working atmosphere (11 to 13), overall handover quality (item 14) and the circumstances of handover (item 15 and 16).

Table 4.2 Evaluation of handover quality respondents

Item	Statement	Agree		Disagree	
		f	%	F	%
	Information transfer				
Q1	Followed logical sequence	178	80.20%	41	19.80%
Q2	Use of available documentation	174	78.40%	48	21.60%
Q3	Not enough time allowed	128	57.70%	94	42.30%
Q4	Information selected and communicated	187	84.20%	35	15.80%
Q5	Priorities for further treatment addressed	179	80.60%	43	19.40%
Q6	Communication of assessment of patient	178	80.20%	44	19.80%
Q7	Documentation complete	181	81.50%	41	18.50%
	Shared understanding				
Q8	Risks and complications discussed	166	74.80%	56	25.20%
Q9	Question and ambiguities resolved	173	77.90%	49	22.10%
Q10	Ensuring handover is complete	182	82.00%	40	18.00%
	Working atmosphere				
Q11	Establishing good contact	191	86.00%	31	14.00%
Q12	There was tension between the team	80	36.00%	142	64.00%
Q13	Patient's experience considered	191	86.00%	31	14.00%
Q14	Overall quality of handover was high	182	82.00%	40	18.00%
	Circumstances of the handover				
Q15	The person handing over under pressure	86	38.70%	136	61.30%
Q16	The person receiving under pressure	71	32.00%	151	68.00%

The first construct, *information transfer,* deals with the technical aspects of handover, with most respondents agreeing that there was information transfer (item 1 to 7) during handover. Of the seven items (item 1 to 7) used to evaluate information transfer, more than three quarters of the respondents were in agreement in six items namely, handover followed logical sequence (item 1: 80.20%;n=178), use of available documents (item 2: 78.40%;n=174) selection and communication of all relevant information (item 4: 84.20%;n=187), addressing priorities of treatment (item 5: 80.60%;n=179), communication of assessment by nurse handing over (item 6: 80.20%;n=178), completion of documentation

(item 7: 81.50%;n=181). In addition, more than half of the respondents agreed that enough time was allowed for handover (item 3: 57.70%; n=94). Findings are presented in **Figure 4.6.**

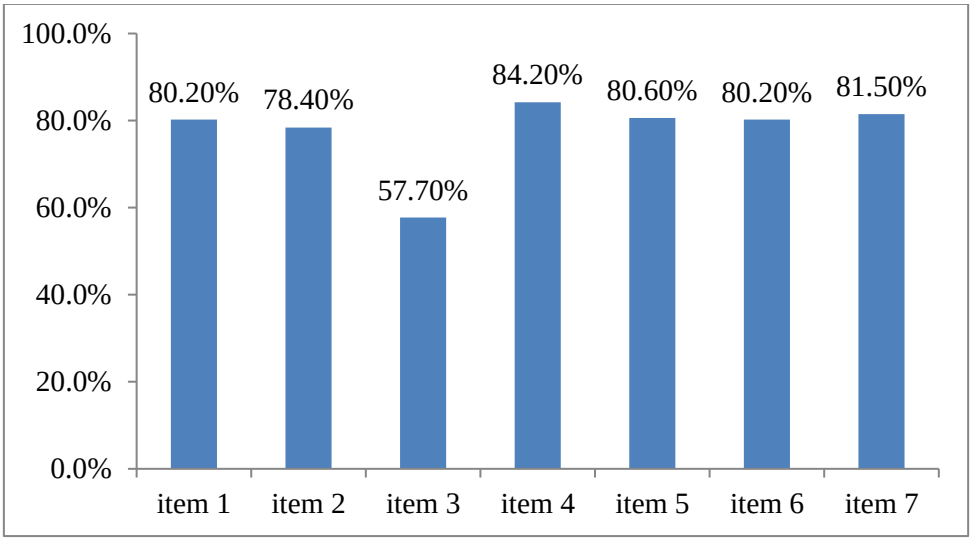

Figure 4.6 Respondents who agreed with items related to information transfer

Almost 20% were disagreed with five items (Q1, Q2, Q4, Q5, Q6, Q7) relating to information transfer. Item 3 (not enough time was allowed for the handover) was the one that most (42.30%; n=94) respondents were in disagreement with. Findings are presented in **Figure 4.7.**

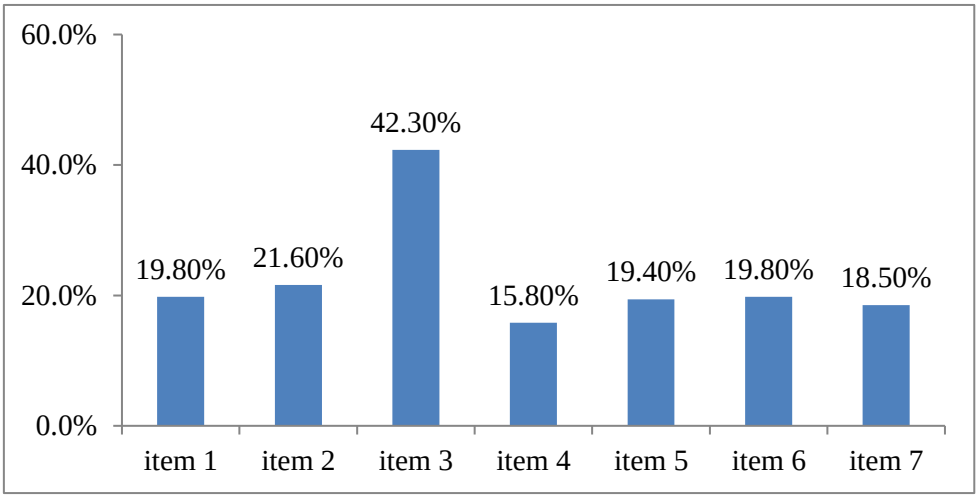

Figure 4.7 Respondents who disagreed with items related to information transfer

Almost three quarters of the respondents agreed there was a shared understanding between the nurses handing over and the nurses receiving patients. Most respondents agreed that the team jointly ensured the handover was complete (item 10: 82.00%; n=182), the majority also agreed that questions and ambiguities were resolved (item 9:77.90%; n=173) and possible risks and complications were discussed (item 7: 74.80%; n=166). Findings are presented in **Figure 4.8**.

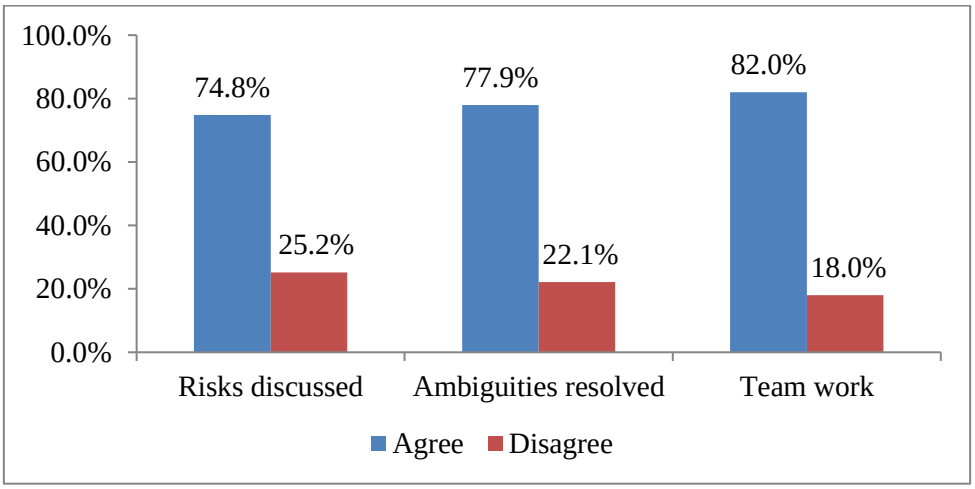

Figure 4.8 Shared understanding among respondents

An overwhelming majority agreed that it was easy to establish good contact and that the patient experience was considered (86.00%; n=191); the majority also agreed there was no tension between the nurses handing over and those receiving (64.00%; n=142). It can be extrapolated from this finding that the respondents agreed there was a good atmosphere during handover. Findings are presented in **Figure 4.9.**

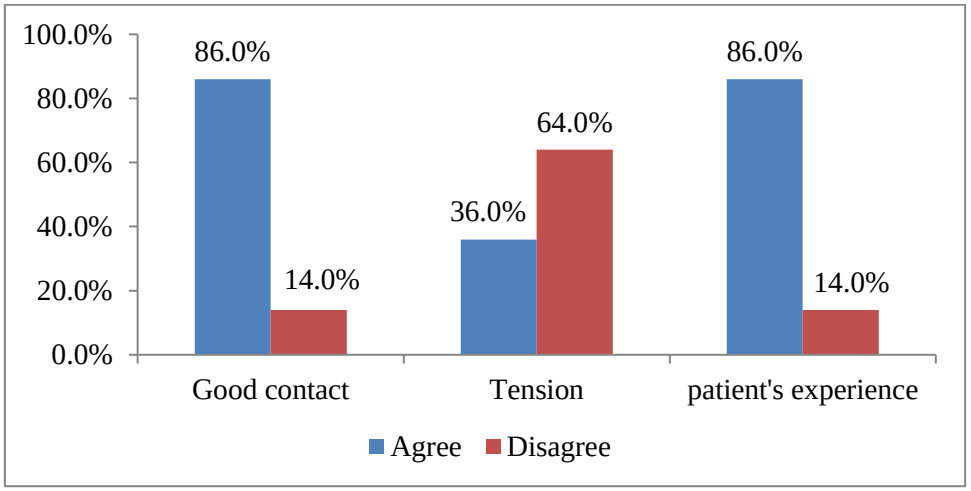

Figure 4.9 Working atmosphere amongst respondents

Generally, an overwhelming majority (82.00%; n=182) agreed that the quality of handover was high (item 14). The results are presented in **Figure 4.9.**

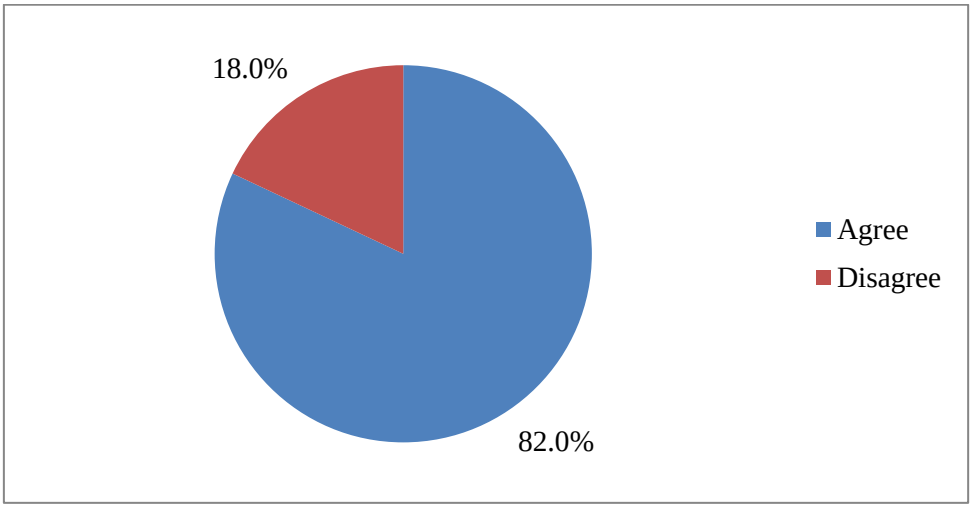

Figure 4.9 Overall rating of quality of handover (item 14)

The majority (61.30%; n=136) disagreed that the nurses handing over were under pressure; the majority (68.00%; n=151) also agreed that the nurses receiving the patients were not under pressure. It can be extrapolated that the handover was conducted under good circumstances.

4.3.3 Differences in the ratings of the handover quality between the Trauma and Intensive Care Nurses

Of interest were construct and item scores for further analysis, to compare results of the categorical variables. To compare the aspects/items of handover among the nurses (handing over and receiving nurses, the novice and the experienced nurses, specialist and non-specialist), central tendency measures were computed. To identify the appropriate central tendency, measures to report a normally test was run-on all the items of handover (Q1 to Q16). From the normally test, it was noted that the data in all items were not normally distributed, hence the central tendency measure used was the median and the inter quartile range. Wilcoxon rank-sum test was used for comparison between the characteristics, as the data was not normally distributed.

Medians and inter quartile range were used to summarise the data. Findings for selected demographic variables, namely years of experience by subcategories (<10 and >10 years) and specialisation (nurse specialist and non-specialist) are discussed in the next section.

The summary of median scores for comparison of evaluation of handover by categories between Trauma nurses (handing) and Intensive Care nurses (receiving) respondents are provided in **Table 4.3.**

Table 4.3 Rating of handover quality scores by categories between Trauma nurses (handing) and Intensive Care nurses (receiving) respondents

Item	Statement	Handing over			Receiving			Wilcoxon Rank Sum Test (p-value)
		n	M	IQR	n	M	IQR	
Q1	Followed logical sequence.	111	4.0	1.0	111	3.0	2.0	0.000*
Q2	Use of available documentation.	111	4.0	1.0	111	3.0	2.0	0.000*
Q3	Not enough time allowed.	111	3.0	2.0	111	3.0	2.0	0.964
Q4	Information selected and communicated.	111	4.0	1.0	111	3.0	2.0	0.000*
Q5	Priorities for further treatment addressed.	111	4.0	1.0	111	3.0	2.0	0.000*
Q6	Communication assessment of patient.	111	4.0	1.0	111	3.0	2.0	0.000*
Q7	Documentation complete.	111	4.0	1.0	111	3.0	2.0	0.000*
Q8	Risks and complications discussed.	111	3.0	1.0	111	3.0	2.0	0.000*
Q9	Question and ambiguities resolved.	111	3.0	1.0	111	3.0	2.0	0.071
Q10	Ensuring handover complete.	111	4.0	1.0	111	3.0	2.0	0.001*
Q11	Establishing good contact.	111	4.0	1.0	111	4.0	1.0	0.026*
Q12	There was a tension between the team.	111	1.0	2.0	111	2.0	2.0	0.424
Q13	Patient's experience considered.	111	3.0	1.0	111	3.0	1.0	0.032*
Q14	Overall quality of handover was high.	111	3.0	1.0	111	3.0	1.0	0.000*
Q15	The person handing over under pressure.	111	1.0	2.0	111	2.0	2.0	0.182
Q16	The person receiving under pressure.	111	1.0	2.0	111	2.0	2.0	0.456

Key= *statistical significance; IQR= inter quartile range; M= median

Table 4.3 presents the scores of the handover rating tool in relation to the role during handover (receiving or handing over). Of these items, Q1, Q2, Q4, Q5, Q6, Q7, Q8, Q10, Q11, Q13 and Q14 tend to be statistically significantly different at the 5% level. No difference was observed in the remaining five items (Q3, Q9, Q12, Q15 and Q16).
Wilcoxon rank-sum test indicated that the self-rated scores for information transfer (item 1 to 7) were more in respondents handing over (Median=4.0) than those receiving the patient (median=3), except for item 3, where ratings of respondents handing over were the same as respondents receiving (Median=3.0). There was significant statistical difference at the 5% level for information transfer (item 1 to 7) between the nurses handing over and those receiving the patients, except for item 3 (p=0.964).

The self-ratings of handover quality, in relation to shared understanding (item 8 to 10), were the same for item 8 and 9 (Median=3.0) but were different for item 10, as the scores for respondents handing over were greater (Median=4.0) than those receiving (Median=3.0). Items 8 and 10 were statistically significantly different ($p<0.05$).

Ratings for quality of handover in relation to working atmosphere (item 11 to 13) were rather high in item 11 and 13 (Median=4.0 and Median=3.0 respectively) for both the ratings from the respondents handing over and those receiving patients. Comparison was made to item 12, where the ratings were low - ratings for respondents handing over were lower (median=1) than those receiving (Median=2.0). Item 11 and 13 were statistically significantly different ($p<0.05$) and no statistical significance was observed in item 12 (p=0.424).

The overall ratings of quality of handover were rather high (Median= 3.0) for both handing over and receiving respondents. There was significant statistical difference (p=0.000) in overall ratings of quality of handover.

On circumstances of handover (item 15 to 16), the self-rated scores were greater (Median=2.0) for respondents receiving compared to those handing over (Median=1.0). There was no statistical difference at the 5% level observed in item 15 and 16 (p=0.183 and p=0.456 respectively).

Table 4.4 Median scores for ratings of quality of handover by categories between Trauma nurses (handing) and Intensive Care nurse (receiving) respondents in relation to specialty

Item	Statement	Specialist							Non-specialist						
		Handing			Receiving			Wilcoxon test (p-value)	Handing			Receiving			Wilcoxon test (p-value)
		n	M	IQR	n	M	IQR		N	M	IQR	n	M	IQR	
Q1	Followed logical sequence.	41	4.0	1.0	83	3.0	2.0	0.003*	70	4.0	1.0	28	3	2.0	0.007*
Q2	Use of available documentation.	41	4.0	1.0	83	3.0	2.0	0.002*	70	4.0	1.0	28	3	2.0	0.002*
Q3	Not enough time allowed.	41	2.0	2.0	83	2.0	2.0	0.962	70	2.0	2.0	28	2.0	2.0	0.814
Q4	Information selected and communicated.	41	4.0	1.0	83	3.0	2.0	0.002*	70	2.0	2.0	28	2.0	2.0	0.017*
Q5	Priorities for further treatment addressed.	41	4.0	1.0	83	3.0	2.0	0.000*	70	4.0	1.0	28	3.0	2.0	0.000*
Q6	Communication assessment of patient.	41	4.0	-	83	3.0	2.0	0.000*	70	4.0	1.0	28	3.0	2.0	0.007*
Q7	Documentation complete.	41	4.0	-	83	3.0	2.0	0.000*	70	4.0	1.0	28	3.0	1.5	0.023*
Q8	Risks and complications discussed.	41	4.0	1.0	83	3.0	2.0	0.000*	70	3.0	1.0	28	3.0	2.0	0.000*
Q9	Question and ambiguities resolved.	41	3.0	1.0	83	3.0	2.0	0.000*	70	3.0	1.0	28	3.0	1.0	0.683
Q10	Ensuring handover complete.	41	4.0	1.0	83	3.0	2.0	0.038*	70	4.0	1.0	28	3.0	2.0	0.019*
Q11	Establishing good contact.	41	4.0	1.0	83	4.0	1.0	0.415	70	4.0	1.0	28	3.0	1.0	0.013*
Q12	There was tension between the team.	41	1.0	2.0	83	1.0	2.0	0.256	70	2.0	2.0	28	2.0	3.0	0.169
Q13	Patient's experience considered.	41	4.0	1.0	83	3.0	2.0	0.036*	70	3.0	1.0	28	3.0	1.0	0.372
Q14	Overall quality of handover was high.	41	3.0	1.0	83	3.0	1.0	0.000*	70	3.0	1.0	28	3.0	-	0.003*
Q15	The person handing over under pressure.	41	1	2	83	2	2	0.007*	70	2	2	28	2	2	0.676
Q16	The person receiving under pressure.	41	1	1	83	1	2	0.075	70	2	2	28	2.5	2	0.293

Key= *=statistical significance IQR= inter quartile range; M= median

Table 4.4 presented the median and inter-quartile range scores by non-specialist and specialist nurses. Overall, of the 16 items on the rating scale, **12 items were statistically significantly different amongst handover by specialist nurses, compared to 10 out of 16 between the non-specialist nurses.**

Ratings of specialist respondents, in relation to information transfer (item Q1 to Q7), who were handing over were greater (median=4) than those receiving (median=3) except in item Q3, where the response of specialist nurses respondents for both handing over and receiving was similar (median=3). All items that evaluate information transfer (item Q1 to Q7) were statistically significantly different ($p<0.05$) amongst specialist nurses except for item Q3, where no statistical difference ($p=0.962$) was observed. The scores obtained in ratings between specialist respondents in relation to information transfer were similar to results obtained in non-specialist respondents. There was still no statistical difference ($p=0.814$) observed on item Q3.

Ratings of the handover quality in item Q8 and Q10 were rather high on handing over specialist nurses (median=4) compared to receiving specialist nurses (median=3). Nurses handing over agreed (median=4) more than receiving nurses (median=3) that possible risks and complications were discussed, and that the team jointly ensured that the handover was complete. Item Q9 indicated that the self-rated score was the same for both the handing over and receiving respondents (Median=3). Despite this, all the items that were evaluated shared understanding (item Q8 to Q10) amongst the specialist respondents were statistically significantly different ($p<0.05$).

Unlike the ratings in the specialist respondents, non-specialist ratings had two (2) items that were significant ($p<0.05$), except for item Q9 where no statistical difference was observed ($p=0.683$). A Mann Whitney test indicated the self-rated score was greater (Median=4.0) amongst non-specialist handing over respondents on item 8 and 10 compared to non-specialist receiver ratings (Median=3.0), hence there was statistical difference observed ($p<0.05$).

Items that evaluate working atmosphere (item Q11 to Q13) had at one item that was statistically significant each in each category (specialist nurses and non-specialist nurses). Interestingly, items that were not statistically significant were not the same for both

categories; item Q13 was statistically significantly different for specialist nurses, whereas item Q11 was statistically significantly different for non-specialist nurses ($p<0.05$).

Receiving specialist respondents agreed (Median=4.0) with the respondents handing over (Median=4.0) that it was easy to establish good eye contact during handover (item Q11). Both the specialists handing over and receiving specialists disagreed (Median=1.0) there was tension during handover (item Q12). Hence, there was no statistical difference observed in item Q11 and Q12 in relation to working atmosphere between specialist respondents. Higher ratings of respondents handing over was high (Median=4.0) compared to the receiver ratings (Median=3.0) in item Q13. It can be extrapolated from the findings that the respondents handing over agreed that patient experience was carefully considered during handover compared to receiving respondents. Hence there was significant statistical difference observed in item Q13 ($p=0.036$) compared to item Q11 and Q12.

The overall ratings of handover quality were the same (Median=3.0) for both non-specialist and specialist nurses and there was significant statistical difference observed in item Q14 for both groups.

Items Q15 and Q16 dealt with circumstances of handover. Ratings for items Q15 were higher (Median=1.0) in specialist respondents handing over compared to receiving specialists (Median=2.0). The specialist handing over was more in disagreement that the person handing over was under pressure compared to the specialist respondent receiving, hence, there was statistical significance observed in item Q15. There was no statistical significance (0.075) in item Q16 for specialist respondents and no statistically significance ($p>0.05$) observed for non-specialist nurses in relation to items Q15 and Q16.

Table 4.5 Rating of quality of handover by categories between Trauma nurses (handing) and Intensive Care nurses (receiving) respondents in relation to years of experience

Item	Statement	< 10 years of experience							>10 years of experience						
		Handing			Receiving			Wilcoxon test (p-value)	Handing			Receiving			Wilcoxon test (p-value)
		n	M	IQR	n	M	IQR		N	M	IQR	n	M	IQR	
Q1	Followed logical sequence.	82	3.5	1.0	73	3.0	2.0	0.005*	29	4.0	1.0	38	3.0	3.0	0.002*
Q2	Use of available documentation.	82	4.0	1.0	73	3.0	2.0	0.000*	29	4.0	1.0	38	3.0	2.0	0.003*
Q3	Not enough time allowed.	82	2.0	2.0	73	2.0	2.0	0.428	29	3	3	38	2.0	2.0	0.218
Q4	Information selected and communicated.	82	4.0	1.0	73	3.0	2.0	0.001*	29	4.0	1.0	38	3.0	3.0	0.005*
Q5	Priorities for treatment addressed.	82	4.0	1.0	73	3.0	2.0	0.000*	29	4.0	1.0	38	2.5	2.0	0.001*
Q6	Communication assessment of patient.	82	4.0	1.0	73	3.0	2.0	0.000*	29	4.0	1.0	38	3.0	2.0	0.000*
Q7	Documentation complete.	82	4.0	1.0	73	3.0	1.0	0.000*	29	4.0	-	38	3.0	2.0	0.001*
Q8	Risks and complications discussed.	82	3.0	1.0	73	3.0	2.0	0.014*	29	4.0	1.0	38	2.0	1.0	0.000*
Q9	Question and ambiguities resolved.	82	3.0	1.0	73	3.0	2.0	0.806	29	4.0	1.0	38	3.0	2.0	0.006*
Q10	Ensuring handover complete.	82	4.0	1.0	73	3.0	2.0	0.001*	29	3	1	38	3.0	1.0	0.282
Q11	Establishing good contact.	82	4.0	1.0	73	3.0	1.0	0.010*	29	4.0	1.0	38	4.0	1.0	0.905
Q12	There was a tension between the team.	82	1.0	2.0	73	2.0	2.0	0.102	29	3	2	38	1.0	2.0	0.309
Q13	Patient's experience considered.	82	3.0	1.0	73	3.0	2.0	0.175	29	3	1	38	3.0	2.0	0.086
Q14	Overall quality of handover was high.	82	3.0	1.0	73	3.0	1.0	0.000*	29	3	1	38	3.0	1.0	0.001*
Q15	The person handing over under pressure.	82	1.0	2.0	73	2.0	2.0	0.085	29	3	2	38	2.0	2.0	0.709
Q16	The person receiving under pressure.	82	1.0	1.0	73	2.0	2.0	0.077	29	3	2	38	1.0	1.0	0.226

Key= *=statistical significance IQR= inter quartile range; M= median

Table 4.5 presented the ratings of quality of handover in relation to years of experience (less than 10 years and greater than 10 years) by categories between Trauma nurses (handing) and Intensive Care nurse (receiving) respondents.

The items for specialist nurses, items Q1, Q2, Q4, Q5, Q6, Q7, Q8, Q10, Q11, and Q14 (10 items) were statistically significantly different, whereas for non-specialist nurses items Q1, Q2, Q4, Q5, Q6, Q7, Q8, Q9 and Q14 (9 items) were statistically significantly different. No differences were observed in six items (Q3, Q9, Q12, Q13, Q15 and Q16) for specialist nurses and seven items for non-specialist nurses (item Q3, Q10, Q11, Q12, Q13, Q15 and Q16).

4.3.4 Factor Analysis of Handover Items by Categories

Table 4.6 Rotated factors of the handover items

Category	Item	Statement	Factor 1	Factor 2	Factor 3
Information transfer	Q1	Followed logical sequence.	0.771	-	-
	Q2	Use of available documentation.	0.751	-	0.149
	Q3	Not enough time allowed.	0.048	0.159	0.234
	Q4	Information selected and communicated.	0.842	-	-
	Q5	Priorities for further treatment addressed.	0.783	0.165	-
	Q6	Communication assessment of patient.	0.812	0.163	-
	Q7	Documentation complete.	0.670	0.149	-
Shared understanding	Q8	Risks and complications discussed.	0.699	-	-
	Q9	Question and ambiguities resolved.	0.669	-	-
	Q10	Ensuring handover complete.	0.669	-	-
Working atmosphere	Q11	Establishing good contact.	0.591	-	-
	Q12	There was tension between the team.	-	0.238	-
	Q13	Patient's experience considered.	0.515	0.133	-
Handover quality	Q14	Overall quality of handover was high.	-	-	-
Circumstances of handover	Q15	The person handing over under pressure.	0.735	-	-
	Q16	The person receiving under pressure.	0.735	-	-

Factor analysis was computed to reduce items into constructs, in accordance with the rating tool for handover quality, and findings are presented in **Table 4.6.** Upon iteration of factor loadings it was found that for information transfer (item Q1 to Q7), item 4 contributed more (p=0.842) to the outcome (item Q1 to Q7), whereas item 3 had the least (p=0.048) contribution.

It was found that items Q8, Q9 and Q10 (p=0.669, p=0.669 and p=0.669), respectively, contributed equally to the outcomes of shared understanding. Similarly, item Q15 and Q16 contributed equally (p=0.735 equally) to the outcomes of circumstances of handover.

Table 4.7 Median values and IQR for ratings of handover quality and the three factors between Trauma nurses (handing) and Intensive Care nurse (receiving) respondents.

Factors	Handover			Receiving			Wilcoxon rank sum p-value
	n	M	IQR	n	M	IQR	
Information transfer	111	3.0	2.0	111	2.0	2.0	0.000*
Shared understanding	111	3.0	1.0	111	2.0	2.0	0.001*
Working atmosphere	111	3.0	1.0	111	2.0	2.0	0.012*
Overall handover quality	111	3.0	1.0	111	3.0	1.0	0.000*
Circumstances of handover	111	1.0	2.0	111	3.0	2.0	0.146

Key= *statistical significance; IQR= inter quartile range; M= median

The results presented in **Table 4.7** were in terms of median scores and inter quartile range for comparison of evaluation of handover by categories between Trauma nurse (handing) and Intensive Care nurse (receiving) respondents' in relation to the factors of handover quality. Most factors were significantly statistically different ($p<0.05$) except for circumstances of handover, where statistical difference was not observed.

There was significant statistical difference (p=0.000) for information transfer between the respondents handing over and those receiving the patient, the ratings of handover were lower for receiving respondents (Median=2.0) compared to those who were handing over (Median=3.0). With regard to information transfer, the nurses handing over partially agreed that there was information transfer compared to nurses receiving, who partially disagreed.

There was also significant statistical difference (p=0.001) in the shared understanding between the handing over and receiving respondents; respondents' handing over ratings were higher (Median=3.0) than those receiving (Median=2.0). Similar to information transfer, receiving respondents partially disagreed that there was shared understanding compared to respondents handing over who partially agreed.

Significant statistical difference (p=0.011) was observed for working atmosphere between respondents handing over and those receiving the patient; those handing over had a higher rating (Median=3.0) compared those respondents receiving patient (Median=2.0).

Overall handover quality also tended to be statistically significantly different (p=0.0000), whereas no statistical difference was observed for circumstances of handover (p=0.1456).

Table 4.8 Median values and IQR for ratings of handover quality between categories in relation to years of experience (<10 years of experience and >10 years of experience)

Construct	< 10 years of experience							>10 years of experience						
	Handing			Receiving			Wilcoxon test (p-value)	Handing			Receiving			Wilcoxon test (p-value)
	n	M	IQR	N	M	IQR		n	M	IQR	n	M	IQR	
Information technology	82	3.0	2.0	73	2.0	2.0	0.000*	29	3.0	2.0	38	1	2.0	0.000*
Shared understanding	82	3.0	1.0	73	2.0	2.0	0.136	29	3.0	2.0	38	1	2.0	0.001*
Working atmosphere	82	3.0	1.0	73	2.0	2.0	0.033*	29	2.0	3.0	38	2.0	2.0	0.363
Overall atmosphere	82	3.0	1.0	73	3.0	1.0	0.000*	29	3.0	1.0	38	3.0	1.0	0.001*
Circumstances of handover	82	1.0	2.0	73	3.0	2.0	0.042*	29	3.0	2.0	38	3.0	2.0	0.589

Key= *statistical significance; IQR= inter quartile range; M= median

Table 4.8 presents ratings of handover quality between categories in relation to years of experience (<10 years of experience and >10 years of experience). Ratings of handover quality amongst respondents with less than 10 years of experience of all the factors were statistically significantly different ($p<0.05$) except for shared understanding, where statistical significance was not observed ($p=0.1359$). In comparison, the ratings for respondents with more than 10 years of experience were statistically significant ($p<0.05$), except for working atmosphere ($p=0.363$) and circumstances of handover ($p=0.589$).

Ratings of handover quality in relation to information transfer were higher (Median=3) amongst handing respondents with less than 10 years of experience compared to those receiving (Median=2.0). As a result, handover respondents agreed there was information transfer compared to receiving respondents who disagreed. Handing over respondents' who had more than 10 years of experience, agreed (Median=3.0) to information transfer compared to receiving respondents who disagreed (Median=1.0). There was significant statistical difference ($p=0.000$) between the respondents with less than 10 years of experience and those with more than 10 years ($p=0.000$).

Self-rated scores were higher (Median=3.0) with respondents handing over compared to the receiving respondents (Median=2.0) amongst respondents with less than 10 years of experience, in relation to shared understanding. Despite this, there was no statistical significance observed ($p=0.136$), on the contrary, there was significant statistical significance ($p=0.006$) observed amongst respondents with more than 10 years of experience in relation to shared understanding.

Handing over respondents with less than 10 years of experience agreed (Median=3.0) that there was a good working atmosphere during handover compared to those who were receiving (Median=2.0). There was significant statistical difference ($p=0.033$) observed compared to respondents with more than 10 years of experience, where no statistical difference was observed ($p=0.362$).

The overall ratings of handover quality was high (Median=3.0) in the respondents handing over from both groups, compared to the groups that were receiving (Median=1.0). Significant statistical difference was observed from both groups ($p<0.05$).

Ratings of quality of handover by respondents with less than 10 years of experience were rather high (Median=3.0) compared to those receiving (Median=1.0), in relation to circumstances of handover; there was statistical significance (p=0.042) compared to ratings of respondents with greater than 10 years of experience (p=0.589).

Table 4.9 Median values and IQR for ratings of factors handover quality between categories in relation to specialty

Construct	Specialist							Non specialist						
	Handing			Receiving			Wilcoxon test (p-value)	Handing			Receiving			Wilcoxon test (p-value)
	n	M	IQR	n	M	IQR		n	M	IQR	n	M	IQR	
Information technology	41	3.0	2.0	83	2.0	2.0	0.000*	70	3	2.0	28	2.0	2.0	0.000*
Shared understanding	41	3.0	2.0	83	2.0	2.0	0.005*	70	3	1.0	28	2.0	2.5	0.001*
Working atmosphere	41	3.0	2.0	83	2.0	3.0	0.051	70	2.0	1.0	28	2.0	2.0	0.363
Overall atmosphere	41	3.0	1.0	83	3.0	1.0	0.000*	70	3	1.0	28	3.0	-	0.001*
Circumstances of handover	41	1.0	2.0	83	3.0	2.0	0.005*	70	3	2.0	28	3.0	1.5	0.589

Key= *=statistical significance; IQR= inter quartile range; M= median

Table 4.9 presented the Median values and IQR for ratings of factors handover quality between categories in relation to specialty. Of the three factors of the handover quality, two were statistically significant between the categories (handing over and receiving) of specialist nurses, whilst one was statistically significant amongst non-specialist nurses.

Ratings of handover quality were higher (Median=3.0) for handing over specialist respondents compared to receiving specialist respondents (Median=2.0) in all three factors of quality of handover. Despite this, two factors were significantly statistically different, information transfer (p=0.000) and shared understanding (p=0.005). There was no statistical significance (p=0.051) observed between the respondents handing over and those receiving in relation to working atmosphere.

As for the ratings of quality of handover amongst the non-specialist respondents, there was statistical significance in one factor, information transfer (p=0.003). There was no statistical significance observed in the other two factors, shared understanding (p=0.251) and working atmosphere (p=0.052).

There was significant statistical difference in the overall rating of the quality of handover by both the specialist respondents (p=0.000) and non-specialist respondents (p=0.003). There was significant statistical difference (p=0.005) observed in relation to circumstances of handover between specialist respondents handing over and those receiving, whereas there was no statistical difference observed between the non-specialists (p=0.481) in relation to circumstances of handover.

Table 4.10 Univariate and multivariate analysis of factors of handover quality between categories in relation to information transfer

Information transfer	Univariate				Multivariate			
	OR	SE	p-value	CI	OR	SE	p-value	CI
Base: receiving/agree • Handover	3.41	0.96	0.000*	1.964-5.914	4.02	1.26	0.000*	2.169-7.435
Base: specialist/agree • non specialist	1.16	0.31	0.589	0.681-1.697	0.64	0.20	0.159	0.340-1.194
Base:<10years experience • >10 years	0.74	0.22	0.307	0.417-1.317	0.76	0.24	0.385	0.413-1.407

Key= *statistical significance; OR=odds ratio; SE=standard error; CI=confidence interval

An ordinal logistic model was fitted to establish the relationship between the handing over, receiving respondents and information transfer. After running a Brant test to confirm the assumption of proportionality of odds, it was found that the data was not proportional, hence a generalised ordinal logistic model was fitted.

Table 4.10 presented the univariate and multivariate analysis of factors of handover quality between categories in relation to information transfer. There was statistical significance (p=0.000) in that respondents handing over are 3.41 times more likely to agree to information transfer than disagree compared to the receiving respondents. When adjusted with other constructs (shared understanding, working atmosphere, overall handover quality and circumstances of handover), there was still significant statistical significance (p=0.000) that the respondents handing over were more likely to agree (4.02 times) to information transfer than to disagree compared to the receiving respondents.

There was no statistical significance (p=0.589) in non-specialist respondents being 1.16 more likely to agree to information transfer than disagree compared to specialist respondents. There was also no statistical significance (p=0.159) when adjustment was done with other subscales.

There was no statistical difference (p=0.307) in the respondents with more than 10 years of experience (0.74) being more likely to agree with information transfer than disagree compared

to the respondents with less than 10 years of experience. Adjustment was made with other factors and still there was no statistical difference (p=0.385) observed.

Table 4.11 Univariate and multivariate analysis of factors of handover quality between categories in relation to shared understanding

Shared understanding	Univariate				Multivariate			
	OR	SE	p-value	CI	OR	SE	p-value	CI
Base: receiving/agree • Handover	2.08	0.57	0.007*	1.216-3.155	1.93	0.57	0.025*	1.084-3.441
Base: specialist/agree • non specialist	1.57	0.43	0.100	0.918-2.167	1.24	0.37	0.456	0.688-2.225
Base:<10 years' experience • >10 years	0.97	0.28	0.910	0.545-1.718	1.07	0.32	0.818	0.592-1.947

Key= *=statistical significance; OR=odds ratio; SE=standard error; CI=confidence interval

An ordinal logistic model was fitted to establish the relationship between the handing over and receiving respondents with shared understanding since data was not proportional. The table presented univariate and multivariate analysis of factors of handover quality between categories in relation to shared understanding. The respondents handing over were 2.08 times more likely to agree that there was shared understanding than disagree compared with the receiving respondents, hence there was statistical significance (p=0.007).

Adjustment was done with other subscales (shared understanding and working atmosphere) and there was still significant statistical significance (p= 0.025) and the respondents handing over were 1.93 times more likely to agree to information transfer than to disagree in comparison to the receiving respondents.

No statistical difference was observed in relationship in terms of experience (p=0.28) and specialty (p=0.100) to shared understanding. Adjustment with other variables and did not have any effect as no statistical significance was observed after adjustment.

Table 4.12 Univariate and multivariate analysis of factors of handover quality between categories in relation to working atmosphere.

Working atmosphere	Uni-variate				Multi-variate			
	OR	SE	p-value	CI	OR	SE	p-value	CI
Base: receiving/agree Handover	2.07	0.56	0.008*	1.214-3.538	2.41	0.73	0.004*	1.332-4.357
Base: specialist/agree • non specialist	0.96	0.26	0.880	0.565-1.631	0.64	0.20	0.147	0.349-1.669
Base:<10years experience • >10 years	0.70	0.21	0.220	0.392-1.242	0.69	0.21	0.224	0.380-1.254

Key= *statistical significance; OR=odds ratio; SE=standard error; CI=confidence interval

An ordinal logistic model was fitted to establish the relationship between the handing over and receiving respondents with working atmosphere since data was not proportional. **Table 4.12** presented univariate and multivariate analysis of factors of handover quality between categories (receiving and handing over) in relation to working atmosphere. There was statistical difference (p=0.008) in that the respondents handing over were 2.07 times more likely to agree to good working atmosphere than disagree compared to receiving respondents. There was still statistical difference (0.004) when adjustment was done with other subscale, the handing over respondents were 2.41 times more likely to agree to good working atmosphere than to disagree compared to receiving respondents.

There was no statistical significance (p=0.880) that non-specialist respondents were 0.96 times more likely to agree to good working atmosphere than disagree compared to specialist respondents. There was also no statistical significance (0.147) when adjustment was done with other subscales. There was no statistical difference (p=0.220) that the respondents with more than 10 years of experience were 0.70 times more likely to agree to good working atmosphere than to disagree compared to the respondents with more than 10 years of experience. No statistical difference (0.224) was observed when adjustment was done with other subscales.

Table 4.13 Univariate and multivariate analysis of factors of handover quality between categories in relation to overall handover quality

Overall Handover quality	Univariate				Multivariate			
	OR	SE	p-value	CI	OR	SE	p-value	CI
Base: receiving/agree • Handover	7.73	3.61	0.000*	3.091-19.319	7.11	3.57	0.000*	2.711-18.666
Base: specialist/agree • Non-specialist	2.41	0.93	0.022*	1.138-5.124	1.16	0.50	0.730	0.499-2.695
Base:<10years experience • >10 years	0.51	0.18	0.064	0.253-1.039	0.58	0.22	0.156	0.270-1.234

Key= *=statistical significance; OR=odds ratio; SE=standard error; CI=confidence interval

An ordinal logistic model was fitted to establish the relationship between the handing over and receiving respondents with overall handover quality since data was not proportional. **Table 4.13** presented univariate and multivariate analysis of factors of handover quality between categories (receiving and handing over) in relation to overall handover quality. There was statistical difference (p=0.000) in that the respondents handing over were 7.73 times more likely to agree to overall quality of handover than to disagree compared to receiving respondents. There was still statistical difference (0.000) when adjustment was done with other subscales; the respondents handing over were 7.11 times more likely to agree to good overall quality of handover than to disagree compared to receiving respondents.

There was statistical difference (0.022) in that the non-specialist respondents were 2.41 times more likely to agree to overall quality of handover than disagree compared to the specialist respondents. There was no still statistical difference (0.730) observed when adjusted with other subscales. There was no statistical difference (0.064) in the nurses with more than 10 years of experience being 0.51 times more likely to agree to overall quality of handover than to disagree compared to those with less than 10 years of experience.

Table 4.14 Univariate and multivariate analysis of factors of handover quality between categories in relation to circumstances of handover

Circumstances of handover	Univariate				Multivariate			
	OR	SE	p-value	CI	OR	SE	p-value	CI
Base: receiving/agree • Handover	0.65	0.17	0.108	0.381-1.100	0.48	0.15	0.016*	0.262-0.869
Base: specialist/agree • non specialist	1.59	0.43	0.088	0.933-2.471	0.64	0.20	0.008*	1.244-4.238
Base:<10years' experience • >10 years	1.34	0.39	0.320	0.754-2.378	0.76	0.24	0.206	0.809-2.673

Key= *=statistical significance; OR=odds ratio; SE=standard error; CI=confidence interval

An ordinal logistic model was fitted to establish the relationship between the handing over and receiving respondents with circumstances of handover since data was not proportional. **Table 4.14** presented the univariate and multivariate analysis of factors of handover quality between categories in relation to circumstances of handover. There was no statistical difference (0.108) in that the respondents handing over were 0.65 times more likely to agree to circumstances of handover than disagree compared to receiving respondents. When adjusted with other factors there was statistical difference (0.016) in the respondents handing over being 0.48 times more likely to agree to circumstances of handover than to disagree compared to receiving respondents.

There was no statistical difference (0.088) in the non-specialist respondents who were 1.59 times more likely to agree to circumstances of handover than to disagree compared to specialist respondents; when adjustment was done with other subscales there was statistical significance (0.008) in that the non-specialists handing over were 0.64 times more likely to agree to circumstances of handover than to disagree compared to specialist respondents.

There was no statistical difference (0.088) in the respondents' handing over being 1.34 times more likely to agree to circumstances of handover than disagree compared to the receiving respondents; there was still no statistical difference (0.206) observed when adjustment was done with other factors.

4.4 DISCUSSION OF RESULTS

The purpose of the study was to assess the quality of handover practices between nurses in the Emergency Departments and Intensive Care Units, which enabled identification of the strengths and weaknesses of the handover practice currently in place in one academic hospital in Johannesburg, in order to make recommendations towards the development of a standardised framework for handover of patients.

The *first objective* was to describe the demographic characteristics in relation to the aspects/items of handover among nurses (handing over and receiving).

The distribution of the sample revealed 74.8% (n=166) females and 25.2% (n=56) males. The study done in South Africa by Nel *et al.* (2011), revealed that 10.2% (n=10) of respondents were males, whereas in this study there were more than double the males (25.6%; n=56) showing an increase of males in the profession.

The majority (55.9% n=124) of respondents were specialist nurses, whilst 44.1% (n=98) were not. Of the specialist nurses (n=124), most (67%; n=83) were ICU trained compared to 33 % (n=41) who were Trauma trained. This shows the ICU specialist nurses numbers are increasing, as a study done in South Africa by Scribante and Bhagwanjee (2008) showed that the ICU nurses only represented 25.6% (n=1490) compared to 74.8% (n=83) of the total sample (100%: n=111) of the receiving respondents. The majority (68.5%; n=152) of nurses had less than 10 years (<10) experience as professional nurses, whereas only 31.5% (70) had more than 10 years (>10) nursing experience. Similarly, most nurses (70.7%; n=157) had less than 10 years (<10) Trauma or ICU nursing experience whereas 29.3% (n=65) had more than 10 years (>10) in the current specialty. Scribante and Bhagwanjee (2007) had 71.5% (n=2806) of respondents with almost the same experience compared to 70.7 % (n=157) in this study. The distribution of the sample is similar to the previously published studies by Fero, Witsberger, Wesmiller, Zullo and Hoffman (2009), Cicolini, Simonetti, Comparcini, Labeau, Blot, Pelusi and Di Giovanni (2014) and Cork (2014).

In this study, section two of the questionnaire was divided into five constructs namely, information transfer, shared understanding, working atmosphere, overall handover quality and

circumstances of handover. The first construct is **information transfer**, which comprises seven (7) items.

Factor analysis was computed using STATA version 13 in order to reduce items into constructs in accordance with the rating tool for handover quality. The item that contributed more (0.842) to the rating of handover quality was **item 4** (all relevant information was selected and communicated) and the item that contributed less (0.048) to the rating of handover quality was **item 3** (not enough time was allowed for handover). Similarly, the same **item 4** (all relevant information was selected and communicated) was found to have contributed more (0.71) to the rating of quality of handover in the study conducted in United Kingdom (Manser *et al.*, 2010). In contrast, the one that had the least (less than 0.3) contribution was **item 5** (priorities for further treatment were addressed). This is contrasted by another study done in United Kingdom by Manser *et al.* (2013), where the item that contributed more (0.15) to the rating of handover quality were related to assessment and the item that contributed less (-0.23) was information seeking.

The *second objective* was to compare the aspects/items of handover among the nurses (handing over and receiving nurses, >10 years experienced and more than 10 years experienced, ICU and trauma trained versus ICU and trauma experienced).

Information transfer (Item 1-7)

In relation to role (handing over or receiving), in this study there was statistical difference ($p=0.0000$) between the receiving and handing over respondents medians, showing that those who were handing over answered three more than those who were receiving, who answered two, in relation to information transfer. The difference in the medians may be due to the fact there is no standardisation of handover in the study setting. The results are comparable to the results of the study conducted by McFetridge *et al.* (2007) in the United Kingdom to explore the communication between the ED and ICU nurses, which proved the reason the handover lacked consistency and structure was due to the fact there was no standardised framework to guide the study. The study conducted in Texas, United States of America, by Abraham, Kannampallil, Almoosa, Patel B & Patel V (2014) revealed that the use of a standardised tool led to fewer ($F1.80=45.66$; $p<0.000$) communication breakdowns and a greater ($t40=4.56$; $p<0.001$) number of communication events between the handing and receiving nurses. Overall,

the study revealed that standardisation led to the ability to organise and comprehend patient information.

The differences in agreement between ED and ICU respondents with **item 2** related to the continuous use of available records being statistically significant (p=0.000) in this study. The ratings of quality of handover in relation to **item 2** were more (Median=4) in the respondents handing over than those receiving (Median=3). The results of the study are consistent with the trends of similar study conducted in Italy by Toccafondi *et al* (2012), where the use of accessible records reported by the recipient units was lower than that reported by the sender units ($t19=-2.711$; $p<0.05$). Conversely, Frankel *et al*. (2012) conducted a study in the United States of America indicating that information transferred during handover comes from the documents that are only accessible to the nurses handing over, as both the sending and the receiving nurses cannot hold the file simultaneously, creating potential for errors in information transmission since the receiving clinician could not check whether the handover was accurate and complete.

The differences in agreement with items related to information transfer were statistically significant ($p<0.05$) between respondents handing over and receiving in six (6) items (Q1, Q2, Q4, Q5, Q6, Q7), except one (item 3) whereby no statistical difference was observed ($p=0.9641$). There was significant statistical difference (Q1, Q2, Q4, Q5, and Q6) between the handing over and receiving respondents' medians showing those who were handing over answered four compared to those who were receiving, who answered three. The results are comparable to the previously published literature reviews (Calleja *et al*., 2010; Kessler, Scott, Siedsma, Jordan, Beach & Coletti., 2014) on best practices of information transfer, which revealed that concerned issues that influence information transfer are structure, missing content and documentation.

There was significant statistical difference ($p=0.000$) in the medians of respondents handing over (Median=4) and those receiving (Median=3) in relation to **item 4** (all relevant information was selected and communicated). The results share similarities with the study conducted in Italy by Toccafondi *et al.* (2012), whereby the sender units rated the overall relevance of the information provided higher than the recipient units ($t19=2.138$; $p<0.05$).

In relation to years of experience, in this study, there is a difference in agreement between the respondents in terms of years of experience. In relation to **item 4,** (all relevant information was selected and communicated), there was statistical difference (p=0.001) between the medians of the respondents with less than 10 years' experience as the respondents handing over had a higher (Median=4) rating than the respondents receiving (Median=3). The results were almost similar to those with more than 10 years' experience, as there was still significant statistical difference (p=0.005) between the two categories. The study is contradictory to the study conducted in the United Kingdom by Mcfetridge *et al.* (2007), where experienced ED nurses had a greater ability in prioritising the information that should be provided during handover than the less experienced respondents.

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With regard to specialty, the differences in agreement in the item related to completion of documentation (**item 7**) in both specialist and non-specialist nurses were both statistically significant ($p<0.05$) in this study, despite a greater significance (p=0.000) noted in specialist nurses compared to non-specialists nurses (p=0.023). The results are comparable to the study conducted in Europe by Petkovsek-Gregorin and Skela-Savic (2015), whereby nurses with the higher education attributed documentation greater significance than the nurses with a lower education achievement. Petkovsek-Gregorin and Skela-Savic (2015) showed there was no statistical significance in correlation between the level experience and perception of documentation and this is contrasted with this study as there was statistical difference ($p<0.05$) between the less and more experienced respondents.

In this study, the second construct in the rating tool for handover quality is **shared understanding.**

In relation to role (handing over or receiving), there was significant statistical difference (p=0.0000) in **item 8** (possible risks and complications were discussed) between the nurses handing over (median=3) and those receiving (median=3). The results of the study conducted by Toccafondi *et al.* (2012) in Italy are comparable to this study as the sender unit reported there was a significant higher amount ($r19=4.395$; $p<0.0001$) of information transfer on predictable changes, warning signs and what to monitor in the file compared to the recipient unit.

With regard to experience, in **item 9** (questions and ambiguities resolved through active inquiry by the person taking responsibility of the patient) there was statistical difference (0.006) in the medians of respondents who had more than 10 years' experience (median=4) in comparison to those who were receiving (Median=3). There was no statistical difference (0.806) observed in those with less than 10 years' experience. The results are comparable to the study conducted by Mcfetridge *et al.* (2007) in the United Kingdom, which revealed that new nurses to the speciality did not ask more questions as they did not know the information that had been missed. This was similar to the results of this study, as there was statistical difference (p=0.006). The study conducted by Lee *et al*. (2014) revealed a significantly higher (Kruskal-Wallis p=0.002) information transfer amongst the more experienced nurses who were able to express concern about information compared to those who did not express concern.

There was statistical difference ($p<0.05$) observed amongst the specialist respondents handing over and those receiving in relation to **item 7** (documentation was complete) and **item 9** (questions and ambiguities were resolved). The results share similarities with a study conducted by Braaf, Rixon, Williams, Liew and Manias (2015) in Australia, whereby there was a lack of communication about the details of medications between nurses in different specialities during patient handovers across and within units, including Emergency Departments and Intensive Care. Minimum questioning on clarification of some ambiguities about incomplete medications was also observed, indicating that shared understandings were not achieved.

With regard to experience, Ammouri *et al.* (2014) conducted a study in Oman to explore the nurses' perception about the patient safety culture including communication openness, care transition and handovers and teamwork across units. The results revealed that the nurses who had more experience ($\beta=0.293$; $p<0.01$) and were working in a teaching hospital ($\beta=0.403$; $p<0.05$) had more perception of patient safety culture compared to those with less experience. The results are comparable to this study as there was statistical difference (0.006) observed in relation to shared understanding amongst respondents with more than 10 years' experience compared to those with less than 10 years' experience, where statically no difference was observed (p=0.136).

In this study, the third construct in the rating tool for handover quality is **working atmosphere.**

In relation to role (handing over or receiving), the majority (64%; n=142) agreed there was no tension during handover and the results are similar to those conducted in Oman by Ammouri *et al.* (2014), where 68.1% (n=282) indicated there was good cooperation between the nurses handing over, while those receiving 65% (n=269) added that it was easy to work with each other.

There was statistical difference (p<0.026) in **item 11** (it was easy to establish contact at the beginning of handover). The results share similarity with a study by Frankel *et al.* (2012) in the United States of America, which revealed that verbal and visual attention on the artefact (notes) happened infrequently during handover, even though it allows the handing over and receiving nurses to compare and contrast the aural and visual information and detect whether there is shared understanding

The *third objective* was to investigate the factors associated with quality of handover among nurses.

In relation to role (handing over or receiving), the uni-variate model also revealed statistical significance (p=0.000) in that the respondents handing over were 3.41 times more likely to agree to information transfer than to disagree when compared with receiving respondents. These results are comparable to the results of the study conducted by Benham-Hutchins and Effken (2010) in an urban hospital in the United States, which revealed that 82% of the sending ED providers were satisfied with the information they were providing and 54% of the admitting unit providers were satisfied with the clinical information they obtained during patient handover. The results share a similarity with the study conducted by Rabol *et al*. (2011) in Denmark hospitals, where there was an 86% (n=35 reports) loss of information during patient transfer or at signoff.

In relation to role (handing over or receiving), on univariate analysis, the respondents handing over in this study were significantly (p=0.008) associated with working atmosphere compared to the respondents receiving, and those handing over were 2.07 times more likely to agree to working atmosphere than disagree, compared with the respondents receiving. On multivariate analysis, the respondents handing over had 2.41 times increased odds of the ratings in relation to working atmosphere (there was tension between the team during handover) in comparison with the respondents receiving. The results are similar to the qualitative study

performed in the United Kingdom by Sujan *et al*. (2015), which revealed that time related performance targets led to inappropriate transfers of patients, which in turn lead to lack of trust between the clinicians in different departments during the handover. The ED clinicians expressed frustrations with other departments stating they lacked willingness to collaborate, leading to tension between the departments.

The results also share similarities with the study conducted by Zakrison *et al.* (2015), where the tension in nurses was brought about by nurses in the ED feeling they were judged by the ICU nurses for incomplete resuscitations, patients coming with bloody sheets, mixed intravenous lines, whilst ICU nurses, on the other hand, felt the incomplete resuscitations affected continuity of care as they did not know what had to be done for ongoing resuscitation.

With regard to **circumstances of handover**, there was no significance, noted on the univariate analysis. Multivariate analysis showed some statistical significance (p=0.016) in that the respondents handing over were 0.48 times more likely to agree with circumstances of handover than disagree compared to respondents receiving. The results show a similarity to the study conducted by Abraham and Reddy (2010) in North-eastern United States of America, where the ED nurses were under pressure as they had to achieve patient flow (rapid handovers) in order to accommodate the influx of new patients, but this was not the case with the Neuroscience Department as they had no influx of new patients.

The univariate ordinal model also showed there was no statistical difference (p=0.088), but when adjustment was done with other constructs, significant statistical difference (0.008) showed that the non-specialist respondents were 0.64 times more likely to agree to circumstances of handover than disagree, in comparison with specialist respondents.

In specialty, there was no statistical difference (p=0.100) in non-specialist respondents being more likely (OR=1.57) to agree to shared understanding compared to the specialist respondents. When adjustment was done with other constructs, there was still no statistical difference (p=0.456) that non-specialist respondents were 1.24 times more likely to agree to shared understanding compared to specialist respondents. The results are contradictory to the previous study conducted by Rayo *et al*. (2014) in the United States of America, as the study revealed association with higher levels of learning being proportional to iterative questioning; there was significant statistical difference (p<0.001) as the nurses and physicians with the

higher level of training were found to interject 1.0 times less than the nurses and physicians with 3.1 times interjections per minute.

4.5 SUMMARY

This chapter discussed the descriptive and comparative statistics that were used to describe and analyse the data collected, and presented the data and interpretation of the findings. The following chapter will discuss the limitations of the study, summary of the research findings, the conclusion and recommendations.

CHAPTER FIVE

SUMMARY OF THE STUDY, MAIN FINDINGS, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

5.1 INTRODUCTION

As the concluding chapter of this research report, this chapter will present a summary of the study, a discussion of the main findings, the limitations experienced in conducting this study as well as recommendations for clinical practice, nursing education and further research.

5.2 SUMMARY OF THE STUDY

5.2.1 Purpose of the Study

The purpose of this study was to assess the quality of handover practices between nurses in the Emergency Departments and Intensive Care Units in an urban academic hospital in Johannesburg. To be determined was whether the technical aspects of handover, including a correct, complete transmission of information, shared understanding and a good atmosphere, are critical for the quality of handover as patients are transferred from the Emergency Department to the Intensive Care Unit.

5.2.2 Objectives of the Study

The objectives set to meet the purpose of the study were:

- To describe the demographic characteristics in relation to the aspects/items of handover amongst nurses (handing over and receiving).
- To compare the aspects/items of handover amongst the nurses (handing over and receiving nurses, the novice and the experienced nurses, specialist and non-specialist).
- To investigate the factors associated with quality of handover amongst nurses.

5.2.3 Methodology

Ethical clearance (Appendix E) was obtained from the University of the Witwatersrand's Human Research Ethics Committee.

In this study, the target population were all handovers performed between one of the four adult Intensive Care Units (Trauma ICU, Neurosurgery ICU, Coronary Care unit, General ICU) and one of the two casualties (Trauma Casualty and Medical Casualty) in a tertiary academic hospital in Johannesburg. The handover rating tool was developed by Manser *et al*. (2010) at the University of Aberdeen, in the United Kingdom.

To assess the feasibility of the study a pilot test was conducted prior to commencement of the main study. The Handover Quality rating tool (Appendix A) was used on five (n=5) handovers in the selected units for the study; as a result, 10 handover rating tools were completed by the five nurses handing over the patient and five nurses receiving the patient.

To meet the study objectives, a descriptive, quantitative design was used. Data from the questionnaires was recorded onto Microsoft Excel and then transferred to Statistical Package of Social Sciences (SPSS) for screening and cleaning. Nominal scaled variables, frequencies and percentages were displayed in numbers (section one). Interval scaled variables (section two) were reported in median and inter quartile ranges. Factor analysis was computed using STATA version 13 in order to reduce items into constructs in accordance with the rating tool for handover quality. Subgroups were identified and further analysed and significance of differences in the ratings between different categories were evaluated using Wilcoxon rank sum. An ordinal logistic model was fitted to establish the relationship between the handing over and receiving respondents and information transfer.

5.3 SUMMARY OF MAIN RESEARCH FINDINGS

Of the total sample (n=222), the distribution revealed a majority of females (74.8%; n=166) and less males (25.2%; n=56), more (57.6%) younger adults at less than 40 years old, the majority (69.8%; n=155) had less than ten years working in the specialised area and 55.9% (n=124) were nurse specialists.

With regard to the ratings of **the quality of handover**, the medians for overall ratings of 75% (n=12) items were rather high (3 and 4) showing that the respondents were satisfied with the current handover practices. The highest rated, with medians of 4, were items 7 (Documentation was complete), 10 (The team jointly ensured that the handover as complete) and 11 (It was easy to establish good contact at the beginning of the handover). Two items with the medians of 2 were items 3 (Not enough time was allowed for the handover) and 12 (There was tension between the team during handover). The lowest rated (Median=1) was item 16.

In relation to **Information transfer** (items 11 to 13)**,** upon iteration of factor loadings it was found that item 4 contributed more (0.84) than item 3, which had the least (0.0481) contribution to the outcome of information transfer. It is evident that both the respondents handing over and respondents receiving agreed (median=3) that there was enough time allowed for handover (item 3) hence less contribution to the outcome of information transfer. Although Schramm's circular model of communication implies that communication is a circular process and that both the handing over and receiving respondents are both decoders and encoders, there was a disagreement in terms of information communicated hence item 4 contributing more to the outcome of information transfer. Wilcoxon rank-sum test indicated statistical difference (p=0.000) that the self-rated scores for item 4 (all relevant information was selected and communicated) were more in respondents handing over (Median=4.0) than those receiving the patient (median=3). It is clear that the respondents did not encode the message and provide enough feedback to clear ambiguities and make the information understandable to each other's field of experience. Handover is meant to allow a two-way communication that gives both parties the opportunity to create a shared awareness and seek clarification as they were from different fields of experience.

There was statistical difference (p=0.000) in the medians of the handing over (Median=3) and those receiving (Median =2) and in the medians of the respondents with less than 10 years' experience handing over (Median =3) compared to those receiving (Median=2).

There was statistical difference (p=0.003) in respondents with more than 10 years' experience noted in the medians between handing over (Median= 3) compared to receiving (Median=1) in relation to information transfer. It is clear that there was defective encoding and decoding. The field of experience influencing the way the message was understood was experience. The

nurses handing over agree that the information was transferred whereas the one receiving disagree.

Significant statistical difference ($p<0.05$) was observed between the specialists and non-specialists' respondents handing over, and similarly for both groups the medians for the respondents handing over and receiving were the same (Median=3).

The univariate and multivariate model showed a statistical difference ($p=0.000$); the univariate model showed that the respondents handing over were 3.41 times more likely to agree to information transfer than to disagree compared with the receiving respondents. When adjustment was done with other constructs (shared understanding, working atmosphere, overall quality and circumstances of handover), the multivariate model showed an increase in likelihood (4.02 times) in the respondents handing over to agree with information transfer than to disagree. Univariate and multivariate model showed no statistical difference at the significance set at 5% in relating information transfer to specialty and experience.

In regard to **shared understanding** it is evident that there was disagreement between the respondents. There was also significant statistical difference ($p=0.001$) in the shared understanding between the handing over and receiving respondents; respondents' handing over ratings were higher (Median=3.0) than those receiving (Median=2.0).

In relation to **shared understanding**, items 8 to 10 (0.6691, 0.6694 and 0.6690 respectively) contributed equally to the outcomes of shared understanding upon iteration of factor loadings. Schramm's circular model of communication (1954) appreciates that the field of experience such as work experience and educational background influences the way the message is understood. Hence there is statistical difference observed ($p=0.001$) that respondents handing over with more than 10 years of experience agreed (median=3) to shared understanding in comparison to the respondents receiving with more than 10 years of experience who disagreed (median=1). There was significant statistical difference ($p=0.0000$) between the respondents with less than 10 years of experience and those with more than 10 years ($p=0.0003$).

There was statistical difference ($p<0.05$) noted in both specialists and non-specialists respondents in relation to shared understanding. Ratings of handover quality were higher (Median=3.0) for handing over specialist respondents compared to receiving specialist

respondents (Median=2.0). Schramm's circular model of communication (1954) states that if the parties involved in communication do not share some common understanding then it is not possible for the communication to occur. ED specialist nurses and ICU nurses are from a different filed of experience. Schramm's communication model appreciates the fact that communication is two-way which allows the receiving nurse to provide feedback on the information provided. It is clear that there was a disagreement on the issue of feedback since there was statistical difference (p=0.000) that respondents receiving disagreed (Median=1) that questions and ambiguities were resolved in comparison to the respondents handing who agreed (Median=3).

The univariate model showed a statistical difference (p=0.007), illustrating that the respondents handing over were 2.08 times more likely to agree to shared understanding than to disagree compared to the receiving respondents. When adjustment was done with other constructs (information transfer, working atmosphere, overall quality and circumstances of handover), the multivariate model showed a significant statistical significance (p=0.025) that the respondents handing over were 1.93 times more likely to agree with shared understanding than to disagree. Univariate and multivariate model showed no statistical difference, with the significance set at 5%, in relating shared understanding to specialty and experience.

With regard to **working atmosphere** (item 8-10), upon iteration of factor loadings, it was found item 11 contributed more (0.5901) than item 12, which had the least (0.2375) contribution to the outcome of working atmosphere. There was statistical difference (p=0.0106) between the respondents handing over (Median=3) and those receiving (Median=3). There was significant statistical difference (0.0326) noted between the respondents with less than ten years handing over and those receiving and there was no significant statistical difference observed between the respondents with more than 10 years' experience. No significant statistical difference was observed in relation to specialty. Univariate ordinal model illustrated significant statistical difference (p=0.008) in the respondents handing over, being 2.07 times more likely to agree to good working atmosphere than to disagree compared to the receiving respondents. When adjusted with other constructs, there was still significant statistical significance (0.004) that the respondents handing over were 2.41 times more likely to agree to good working atmosphere than to disagree compared to those receiving. Univariate and multivariate model showed no statistical difference, with the significance set at 5%, relating to shared understanding to specialty and experience.

With regard to **overall handover quality,** significant statistical difference (p=0.000) was observed between the respondents handing over and receiving in relation to overall handover quality. Significant statistical difference was also observed (p=0.0000) in the medians between more experienced (>10 years) handing over and those receiving in relation to the overall quality of handover. Similarity in results was observed in the less experienced (<10 years) respondents, as there was significant statistical difference observed between the handing over and receiving respondents. With regard to specialty, there was a similarity in results as there was statistical significance difference (p<0.05) in the medians observed in both the non-specialist and specialist handovers; no significant statistical difference was observed in relation to specialty. Univariate ordinal model showed there was significant statistical difference (p=0.0000) in that the respondents handing over were 7.73 times more likely to agree to overall handover quality than to disagree compared to the receiving respondents. When adjusted with other constructs, there was still significant statistical significance (0.0000) that the respondents handing over were 7.11 times more likely to agree to overall handover quality than to disagree compared to those who were receiving. There was significant statistical significance in that non-specialist respondents were 2.41 times more likely to agree to overall quality of handover than to disagree compared with the specialists' respondents. When adjusted with other constructs, multivariate ordinal model showed no statistical significance between the specialist and non-specialist respondents in relation to handover. Univariate and multivariate ordinal model showed no statistical level set at 5% level in relation to years of experience.

With regard to **circumstances of handover**, items 15 and 16 contributed equally (0.7354 equally) to the outcomes. There was statistical difference (p=0.0415) observed between the less experienced (<10years) respondents handing over and those receiving. Significant statistical significance was also observed (p=0.0050) between the specialist respondents handing over and those receiving in relation to circumstances of handover. Multivariate model showed a significant statistical difference (0.016) that the respondents handing over were 0.48 times more likely to agree to circumstances of handover than disagree compared to the receiving respondents when adjusted with other constructs. Multivariate model also showed significant statistical difference (0.008) that the non-specialist respondents were 0.64 times more likely to agree to circumstances of handover compared to specialist respondents when adjustment was done with other factors.

5.4 CONCLUSION

The study is based on Schramm's Circular Model of Communication. The model emphasises the importance of feedback and allows the source to adjust the message if not properly received. The model makes it clear that if the parties do not have a shared understanding it is impossible for communication to occur. The shared field of experience between the receiving nurses and the nurses handing over include meanings, beliefs, values and experiences.

The purpose of the study was to assess the quality of handover practices between nurses in the Emergency Departments and Intensive Care Units, which enabled identification of the strengths and weaknesses of the handover practice that is currently in place.

The first objective was to describe the demographic characteristics in relation to the aspects of handover.

The second objective was the use of Wilcoxon rank sum to test the difference in the measure of central tendency (medians) among nurses (handing over and receiving, non-experienced and experienced, specialist and non-specialist).

The results of this study indicated that there was statistical difference ($p<0.05$) between the medians of respondents handing over as their ratings were higher (median=3) than those of the receiving respondents (median=2), indicating the respondents handing over agreed that they were providing adequate information; there was shared understanding and good working atmosphere as compared to receiving nurses. It is clear that the sender (handing over respondents) encoded the message influenced by the field of experience. The receiver disagreed that there was information transfer, shared understanding and working atmosphere as they decode the message to be understandable to his field of their experience.

With regard to level of experience, there was statistical difference ($p<0.05$) observed between the medians of both the highly experienced (> 10 years) and less experienced respondents handing over and less experienced receiving in relation to information transfer. There was also statistical difference ($p=0.0006$) between the medians of the more experienced (>10 years) handing over (median=3) and those receiving (median=1) in relation to shared understanding. Conversely, in relation to working atmosphere, statistical difference ($p=0.0326$) was noted

between less experienced handing over (median =3) and those receiving (median=2). This is due to the fact there is no standardised handover framework in place, hence everyone provides whatever information they feel is important.

There was statistical difference ($p<0.05$) between the medians of both specialist and non-specialist handing over (median=3) and those receiving (median=2) in relation to information transfer and shared understanding.

The third objective of the study was to investigate the factors associated with the quality of handover amongst nurses using generalised ordinal logistic regression. There was statistical difference ($p<0.05$) in that the respondents handing over were more likely to agree with information transfer (3.41 times), shared understanding (2.08 times), working atmosphere (2.07 times) and overall rating of handover quality (7.73 times) compared to those receiving.

Statistical difference ($p=0.022$) was observed, whereby the non-specialist nurses handing over were 2.41 more likely to agree to the overall quality of handover compared to the specialist nurses. When adjustment was done with other constructs, statistical difference ($p=0.008$) was observed, as non-specialist nurses were less likely (OR=0.64) to agree with circumstances of handover compared to specialist nurses.

The level of education influences the type of information provided during handover, hence the need for clinicians of different specialities and experience to meet and decide on the process that will be suitable for both parties.

Effective handover is vital for the safety of patients and continuity of essential care. A good quality handover also promotes information transfer, shared understanding and establishment of a good working atmosphere (Manser *et al*, 2010). It is evident in this particular study that educational background and level of experience influences handover practices and this is supported by several studies (Kicken *et al.*, 2012; Stoyanov *et al*., 2012; Rayo *et al*., 2014; Mukhopadhyay *et al.*, 2015; Petkovsek-Gregonin & Skela- Savic 2015).

Results from this study support evidence in literature on handover, however the studies conducted in this area in South Africa have been limited. Considering South Africa's uniqueness in terms of language, qualification and experiences that constitute the units (trauma

and ICU units), these settings have become unique areas in the South African healthcare setting, hence indicating a need for further research.

5.5 LIMITATIONS OF THE STUDY

The researcher acknowledges that there were limitations in conducting this study.

The handover ratings were rather high, the mean of three quarters (n=12) of the 16 item rating tool was above three. This may be due to the fact the respondents were not subjected to any training in relation to the rating scale, but also because the perceptions of the respondents towards the quality of handover are rather high. A human factor would have been of great benefit to justify the ratings. Horwitz (2012) has shown that the external observers gave fewer scores than peer evaluators.

The study was conducted in one tertiary academic hospital. The setting included four adult ICUs and two Emergency Departments providing evidence that the results could be generalised to different ICUs in the hospital, excluding paediatric ICUs. However, external validity would require an inclusion of a variety of Emergency Departments and ICUs across multiple hospitals.

There is potential dependency of the data, as the individual respondents completed more than one rating tool so were studied multiple times, especially in the Emergency Departments as two (2), compared to four (4) ICUs, were used in the study.

5.6 RECOMMENDATIONS OF THE STUDY

The findings of the study were used to make recommendations for clinical nursing practice, nursing education and future research.

5.6.1 Clinical Nursing Practice

Wilcoxon rank sum indicated statistical difference (p=0.0000) in the median of the respondents handing over (Median =3) and those receiving (Median=2) in relation to information transfer

during handover. This indicates there was a disagreement in relation to information transfer, therefore a structured handover would be necessary to ensure that all the relevant information is communicated (Abraham *et al*, 2012; Agarwal *et al*, 2012; Drach-Zahavy *et al*, 2015; Toccafondi *et al*, 2012; Spooner *et al*, 2013; Payne *et al*, 2012; Thomas et al, 2013; Street *et al*, 2011).

A disagreement in information transfer between these two parties is an indication that a shared understanding was not achieved. This is also evident in the results of this study, as there was statistical difference (0.0010) in the medians of the responding handover (Median=3) and receiving (Median=2). To achieve shared understanding it would be necessary for ED and ICU nurses to have an agreement on the content of the structured handover framework as different specialists have different expectations (Toccafondi *et al*., 2012).

5.6.2 Nursing Education

It is an expectation that new nurses give a clear and effective handover although they are not taught on how to perform a handover systematically, nor are they evaluated on it (Lee *et al*., 2016). There is significant statistical difference observed in more than half (60%) of the items used to evaluate handover between the nurses handing over and those receiving the patients, hence the implication for nursing education that handover training be included in both the basic and post basic training courses offered in South Africa. Each healthcare organisation should promote ongoing handover training of all healthcare providers within their institutions.

5.6.3 Further Research

Handovers are highly rated in this study. A replication of the study is needed which includes the recording of handovers and a human factor observer. This will allow comparisons of the self-rating and the ratings from the human factor observer.

A replication of this study is needed using multiple institutions so that the study can be generalised to other institutions and give a more realistic perspective to the South African context. Geographic regions of the respondents should also be included so that comparisons can be drawn.

Replication of the study is needed using an expert panel to analyse and agree on key concepts to be included in the tool. This will help in developing a handover guideline and testing its relevance to the setting of interest.

A qualitative research will be of great value to investigate barriers affecting handover and possible strategies to improve the handover practices amongst nurses.

5.7 CONCLUSION

The aim of the study to assess the quality of handover practices between nurses in the Emergency Departments and Intensive Care Units has been met. The results of the study will inform the ICU and trauma nurses, nursing managers and even the policy makers of the expectations of the ICU and trauma nurses in regard to handover practices. Schramm's Circular Model of Communication states that the field of experience influences the way the message is sent and understood. As a result it is important to have both the ED and ICU nurses to come together while developing the guidelines as their field of experience such educational background, the speciality, length of experience in the unit differs.

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APPENDIX A

QUALITY OF HANDOVER ASSESSMENTS BY REGISTERED NURSES ON TRANSFER OF PATIENTS FROM EMERGENCY DEPARTMENTS TO INTENSIVE.

DATA COLLECTION INSTRUMENT

This questionnaire will take you about 10 to 15 minutes to complete. The questionnaire is divided into two sections, with instructions to help you throughout the questionnaire. Your participation in this study is very important, as any issues identified from your questionnaire will be addressed. Your participation in this study is much appreciated.

SECTION 1 code number ☐

1. What is your age?

20-30 years	
31-40 years	
41-50 years	
51-60 years	
>60 years	

2. What is your gender?

Male	Female

3. What are your hours of work?

Full time	Part time	Agency

4. How many years have you been qualified as a registered nurse?

<1 year	

1-5 years	
6-10 years	
11-15 years	
16-20 years	
>20 years	

5. How many years of Intensive Care or Trauma nursing experience do you have?

<1 year	
1-5 years	
6-10 years	
11-15 years	
16-20 years	
>20 years	

6. What is your current role in the unit?

ICU trained nurse	Trauma and Emergency trained	ICU experienced registered nurse	Trauma and Emergency experienced registered nurse	Shift leader	Unit manager

7. What is your role during handover?

The nurse taking receiving the patient	The nurse handing over the patient

8. What time was the handover performed?

Day	Night

SECTION 2: ITEMS OF THE RATING TOOL FOR HANDOFF QUALITY

	Items per category **Handover characteristics**	Agree	Partially agree	Partially disagree	Disagree
	Information transfer				
1	Handover followed a logical sequence.	4	3	2	1
2	The person handing over the patient continuously used the available documentation (anaesthesia record, patient's chart, etc.) to structure the handover.	4	3	2	1
3	Not enough time was allowed for the hand-over.	4	3	2	1
4	All relevant information was selected and communicated.	4	3	2	1
5	Priorities for further treatment were addressed.	4	3	2	1
6	The person handing over the patient clearly communicated his/her assessment of the patient.	4	3	2	1
7	Documentation was complete	4	3	2	1
	Shared Understanding				
8	Possible risks and complications were discussed.	4	3	2	1
9	Question and ambiguities were resolved (active inquiry by the person taking on the responsibility of the patient).	4	3	2	1
10	The team jointly ensured that the handover was complete.	4	3	2	1
	Working atmosphere				

11	It was easy to establish good contact at the beginning of the handover.	4	3	2	1
12	There was tension between the team during handover.	4	3	2	1
13	The patient's experience was considered carefully during handover (respect).	4	3	2	1
14	**Handover quality** Overall, the quality of this handover was very high.	4	3	2	1
	Circumstances of the handover				
15	The person handing over the patient was under time pressure.	4	3	2	1
16	The person taking on the responsibility of the patient was under time pressure.	4	3	2	1

APPENDIX B

QUALITY OF HANDOVER ASSESSMENTS BY REGISTERED NURSES AS PATIENTS ON TRANSFER OF PATEINTS FROM EMERGENCY DEPARTMENTS TO INTENSIVE CARE UNITS.

Dear Colleague,

My name is Tebogo Mamalelala and I am currently registered as a postgraduate at the University of Witwatersrand for the Master of Nursing Science (Trauma and Emergency Nursing) in the Department of nursing. You are invited to participate in the research to determine the effectiveness of handover practices for registered nurses as patients are transferred from the Emergency Department to the Intensive Care Unit, with the aim of describing the opinions of nurses about the handover practices between nurses in the respective units. Both the nurse handing over the patient (primary nurse) and the nurse receiving the patient will be assessing the quality of the handover process for each handover involving an emergency or trauma patient. Every handover involving emergency or trauma patients performed by an Emergency nurse to ICU nurse will be assessed 30 minutes to 1 hour after the patient has been stabilised.

Ineffective communication between people of different specialties has been described as a contributing factor to errors, procedural mistakes, near misses or even incidents. It is of importance to conduct research that will describe the current practices, which will enable identification of the strengths and weaknesses of the handover practice currently in place.

Participation in this study is voluntary and you may choose to participate or withdraw from the study at any time. Your name or any personal information will not be included in the study results to ensure confidentiality. Should you consent to be part of the study participants, please complete and sign the consent form (Appendix C) then return to me in the enclosed addressed envelope.

I appreciate you will not derive any benefit from participation in this study. The information that you provide, however, will assist in identifying the strength and weaknesses of handover and help in the development of standardised handover procedures. I am still waiting for the approval of the study and its procedures from the committees of the University of the Witwatersrand, Gauteng Department of Health and Charlotte Maxeke Johannesburg Academic hospital.

Thank you for your time. In case of queries or any other information regarding the study, please contact me at the Department of Nursing education - my cell phone number is 0766370477 and my email address is tebsmamalelala@yahoo.com.

Yours faithfully,

Tebogo Mamalelala

APPENDIX C

QUALITY OF HANDOVER ASSESSMENTS BY REGISTERED NURSES ON TRANSFER OF PATIENTS FROM EMERGENCY DEPARTMENTS TO INTENSIVE CARE UNITS.

CONSENT FORM

I _____ (name) give permission to participate in the study.

I have read and understood the content of the information sheet and been given the opportunity to ask for clarification on some questions I might be having regarding the consent and inclusion in the study.

_____ _____

Date Signature

APPENDIX D

HOSPITAL PERMISSION LETTER

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL

Enquiries:
Ms. G. Ngwenya
Office of the Nursing Director
Tell: (011): 488-4558
Fax: (011): 488-3786
05 September 2016

Ms. Tebogo Mamalelala
Department of Nursing Education
Faculty of Health Sciences
University of Witwatersrand

Dear. Tebogo Mamalelala

RE: "Assessment of Handover by Registered Nurses as Patients are Transferred from Emergency Departments to Intensive Care Units"

Permission is granted for you to conduct the above recruitment activities as described in your request provided:

1. Charlotte Maxeke Johannesburg Academic hospital will not in anyway incur or inherit costs as a result of the said study.
2. Your study shall not disrupt services at the study sites.
3. Strict confidentiality shall be observed at all times.
4. Informed consent shall be solicited from patients participating in your study.
5.

Please liaise with the Head of Department and Unit Manager or Sister in Charge to agree on the dates and time that would suit all parties.

Kindly forward this office with the results of your study on completion of the research.

Supported / ~~not supported~~
Ms. M.M Pule
Nursing Director
Date: 2016/09/05

Approved / not approved
Ms. G. Bogoshi
Chief Executive Officer
9.9.2016

APPENDIX E

ETHICAL CLEARANCE CERTIFICATE

R14/49 Ms Tebogo Mamalelala

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M160553

NAME: (Principal Investigator)	Ms Tebogo Mamalelala
DEPARTMENT:	Nursing Education Charlotte Maxeke Johannesburg Academic Hospital
PROJECT TITLE:	Assessment of Handover by Registered Nurses as Patients are Transferred form Emergency Departments to Intensive Care Units
DATE CONSIDERED:	27/05/2016
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Mrs M. Botes and Dr S. Schmollgruber
APPROVED BY:	Professor P. Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	07/07/2016

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 May and will therefore be due in the month of May each year.

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX F

Scan Post-graduate approval letter here

APPENDIX G

PERMISSION TO USE INSTRUMENT

From: Tebogo Mamalelala <tebsmamalelala@yahoo.com>
Date: 05 February 2016 at 11:35:17 AM SAST
To: <Tanja.Manser@ukb.uni-bonn.de>
Subject: PERMISSION TO USE THE TOOL
Reply-To: Tebogo Mamalelala <tebsmamalelala@yahoo.com>

Dear Dr Manser

This serves as a request to use your handoff rating tool as I conduct my research titled " THE EVALUATION OF THE HANDOVER PRACTICES FOR PATIENTS TRANSFERRED FROM THE EMERGENCY DEPARTMENT TO THE INTENSIVE CARE UNIT.' The purpose of the study is to describe nurses' handover practices as patients are transferred from the Emergency Department to the Intensive Care Unit, in an Academic Hospital in the City of Johannesburg in South Africa.

I am a registered nurse currently pursuing my Masters in Nursing, specialising in Trauma and Emergency at the University of the Witwatersrand in South Africa. I am appealing to you to allow me to use your handover tool. I would also like to know if I am allowed to make some adjustments in the tool to fit my study.

Thank you in advance.

Yours faithfully,
Tebogo Mamalelala

Antwort: Fwd: PERMISSION TO USE THE TOOL
From: "Tanja.Manser@ukb.uni-bonn.de" Tanja.Manser@ukb.uni-bonn.de
Sent: Saturday, February 6, 2016 12:07 PM
To: "Tebogo Mamalelala" <tebsmamalelala@yahoo.com>

Hi

I am happy for you to use the tool and to make any necessary modifications. I would however ask you to cite our work as the basis for your adapted tool.

Kind regards, Tanja
Prof. Dr. Tanja Manser
Direktorin
Institut für Patientensicherheit

Tel.: +49 (0)228 287 13782

Mobil: +49 (0)151 44048475
Fax: +49 (0)228 73-8305

E-Mail: tanja.manser@ukb.uni-bonn.deBüro:
Universitätsklinikum Bonn, Sigmund-Freud-Straße 25, Gebäude 5 (Augenklinik), 2. OG, Raum 372
Postanschrift: Institut für Patientensicherheit, Stiftsplatz 12, 53111 Bonn www.ifpsbonn.de
www.ukb.uni-bonn.de

APPENDIX H

Gill Smithies

Proofreading & Language Editing Services

59, Lewis Drive, Amanzimtoti, 4126, Kwazulu Natal

Cell: 071 352 5410 Email: moramist@vodamail.co.za

Work Certificate

To	Dr Shelley Schmollgruber
Address	Wits Dept of Nursing Education
Date	12/12/2016
Subject	MSc: Forward and Chapters 1 to 5 – ASSESSMENT OF HANDOVER BY REGISTERED NURSES AS PATIENTS ARE TRANSFERRED FROM EMERGENCY DEPARTMENTS TO INTENSIVE CARE UNITS, by T Mamalelala.
Ref	SS/GS/16

I, Gill Smithies, certify that I have proofed and language edited,

the Forward and Chapters 1 to 5 by Tebogo Mamalelala: Assessment of handover by registered nurses as patients are transferred from Emergency Departments to Intensive Care Units

to the standard as required by Wits Dept. of Nursing Education.

Gill Smithies

12/12/2016