OPTIMISING NURSING HANDOVER IN THE INTENSIVE CARE UNIT BY MANAGING DISTRACTERS

CHALET ALET VAN DER MERWE

1430244

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DECLARATION

I Chalet Alet van der Merwe declare that this Dissertation is my own, unaided work. It is being submitted for the Degree of Masters of Science in Nursing at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

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(Signature of candidate)

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ABSTRACT

Background: Distracters in any form will cause a break in the train of thought diverting nurses' attention away from the handover and vital information regarding the patients care may be lost. It prolongs the handover time and delays treatment in the already vulnerable critically ill patient. Identification of the type and frequency of distracters are therefore vital. It does not only create a bigger awareness among nursing staff, but enables them to come up with new ideas and strategies on limiting the amount of distracters that places patients and the continuity of safe patient care at risk.

Objective: The purpose of the study was to optimise the nursing handover in the intensive care unit (ICU) by identifying and managing distracters which may interfere with the handover process. It aimed to implement and manage new handover strategies in an attempt to reduce the type and frequency of distracters during bedside handover in the Intensive Care Units (ICUs). This could optimise the handover practice, thus enabling nurses to deliver safe patient handover from one shift to another and reduce the amount of distracters during handovers.

Method: A mixed method design was used. Observational, descriptive and participatory phases were included. The study followed three sequential phases. Use was made of a before and after study intervention model. Observed data was gathered by means of a structured observation checklist during phase one. Phase two a qualitative phase followed phase one. Qualitative data was collected through collaboration with a focus group of experts. Categories that emerged from phase one, were presented to the focus group. Experts in this focus group collaborated on the findings /categories and developed ideas on strategies they thought they would be able to implement and manage in their units to limit the amount of distracters during the handover period. Phase three, the final phase followed the same structured observation as phase one once the new handover strategies had been implemented for a period of two months.

Setting: The study was conducted in the Intensive Care Units (ICUs) of five hospitals in the private sector. Four hospitals are situated in Gauteng and one hospital is situated in Mpumalanga. This included 94 ICU beds with an average of 90% occupancy over the last three months. Both day and night shift handovers were included in the study.

Results: Four main distracters were identified. Results from phase one showed that during observation of the handovers a large number of distracters 76 occurred. Social conversation among nurses interrupting the handover was the most common distracter (48.7%) followed by monitor alarms, IV alarms and Doctors rounds. A great amount of time was being spent on distracters during the handover period in the various ICU areas. The overall mean value for time spent on distracters was (M=82.3) seconds during phase one. Phase two a qualitative phase included a group of experts with qualifications in critical care nursing science. The distracters identified in phase one were put forward for discussion to the group of experts in phase two.

The experts from phase two collaborated on strategies and collectively came to an agreement on the type of strategies they thought they would be able to implement in their units to enable them to limit the amount of distracters. The strategies agreed upon were implemented over a period of two months, where after the researcher returned to re-evaluate whether strategies implemented brought about a change in limiting the amount of distracters during the handover period.

A total of 76 handovers were observed in phase three after the new handover strategies had been implemented. The same four distracters from phase one were once again identified as the main distracters during the handover period. This occurred in spite of implementation of the new handover strategies. There was however a significant decrease in the incidence of these distracters.

Conclusion: Distracters are unavoidable in the ICU environment. Nurses should become more aware of their role in limiting distracters during the handover period. Knowledge sharing among nurses can close this gap in the development of appropriate strategies in order to limit distracters that would compromise the continuity of safe patient care. It is hoped that findings from this study could be used by others in the development of strategies in limiting the amount of distracters during the handover period, thereby improving patient safety.

Keywords: Distracters, frequency, handover, patient safety

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ABBREVIATIONS

ANOVA	Analysis of variance
AACCN	American Association of Critical Care Nursing
ICU	Intensive Care Unit
SBAR	Situation, Background, Assessment and Recommendations
ISBAR	Introduction, Situation, Background, Assessment and Recommendations
ISOBAR	Identification, Situation and Status, Observation, Background and History Assessment and Actions, Responsibilities and Risk Management

CHAPTER ONE

OVERVIEW OF THE STUDY

1.0 INTRODUCTION

This dissertation intends to explore the distracters that are present in intensive care units (ICUs) during handover from one shift to another. It also seeks to optimise the process of handover by making recommendations based on the results of the data obtained**.**

This chapter gives the overview of the study. It describes the background of this study, its purpose, the problem statement, research questions which sought to be addressed and objectives guiding the study. The researcher has also provided a brief overview of the methodology employed including the design, data collection methods, the population sample and sampling procedures and the data collection tool. The ethical considerations as well as validity and reliability of the study have also been briefly described.

- What is the meaning and aim of handover?

Handover is defined as the "transfer of professional responsibilities and accountability for some or all aspects of care for a patient, or groups of patients, to another person or professional group on a temporary or permanent basis aiming at informational relational and management continuity in patient care" (Manser, 2013:194). The point of handover should be to transfer key information regarding the patient from one nurse to another thus ensuring continuity of safe patient care.

In doing so the nurse accepts accountability for her actions which in turn will improve the quality of patient care, patient satisfaction, and patient safety.

- Handover rituals and the forces affecting patient safety

Handover takes place numerous times a day in the hospital setting from one shift to another. The skill of handover is not formally taught in nursing programs (Kerr *et al*., 2011 and Manser and Foster, 2011) yet it is expected from nurses to deliver accurate and appropriate information regarding their patients care. Handover may be influenced by its location such as a general ward or the ICU. The patient's condition, agency staff, the nurses' experience and knowledge are all contributing factors that may influence the bedside handover (Tucker and Fox, 2014).

During handover there is an exchange and transfer of information regarding the patients care form the outgoing nurse to the oncoming nurse. Transfer of information during handover should be current and appropriate to the patient's diagnosis as this may have a direct impact on the planned care to be delivered to the patient for the next twelve hours (Davies and Priestly, 2006; McFetridge *et al*., 2007).

Currently bedside handover in some general wards takes place outside the patient's room. These general wards may consist of 30 beds. Bed spaces are divided into single rooms, two bedded rooms and four bedded rooms. Nurses gather in a group outside the patient's room and the handover is given. This group of nurses may consist of eight to ten nurses and they would walk in a group from one room to another listening to the handover outside the patient's room until the handover had been completed for all patients.

This can potentially impact negatively on the continuity of safe patient care as the nurses do not verbally engage with the patients. In large groups nurses may interrupt each other and important information regarding the patient's care may be lost. The nurses do not see the patient and therefore have to rely on the verbal handover for accuracy and pertinence to the patient's condition.

- Safe patient handover and the continuity of safe patient care

Tucker and Fox, (2014) are of the opinion that there are certain criteria to be followed during bedside handover. Greeting the patients and addressing him/her by name is preferred by the patient. Engage in conversation with the patient regarding his/her needs if possible. Identify the patient. Check that the patient's wrist band matches with the patient's chart thereby ensuring patient safety. In ICU it is of particular importance as most patients are unable to speak for themselves. Visually assess the patient's physical condition. Look at the patient's assessment chart for completeness and whether it was signed by a registered nurse. This includes vital data, medication and care of the patient.

- Current handover practice in ICU

Handover in the ICUs are currently done at the bedside of the patient. In the context to this study handover takes place every twelve hours in the ICU. The ICUs have an open floor plan and beds are divided by screens to ensure patient privacy. Two styles of handover are recently used. Firstly bedside handover takes place between two nurses facing each other at the patient's bedside. Alternatively some ICUs prefer group handover done by the shift leader accompanied by a group of nurses at the bedside of each patient until the handover had been completed for all patients. There are various advantages to bedside handover. Patients are clearly identified and it would enable the nurse to observe the patients physical condition

immediately. It would also give the nurse the opportunity to check the patient's vital data, intravenous lines, medication, and invasive devices such as ventilators and alarm settings for its appropriateness to the patient's condition. The nurse would be able to assess the patient's chart for the care that was given during the last twelve hours. This may include changes in the patient's conditions any outstanding care and any new orders regarding care of the patient.

1.1 BACKGROUND OF THE STUDY

Patients in ICUs are vulnerable when it comes to safe patient handover. Handover of a patient from one shift to another could impact directly on how that patient is cared for during the next twelve hours. Ineffective handover practices caused by distracters may lead to poor communication that could result in incorrect nursing care delivered from the oncoming nursing team. Best practices, policies and procedures have been developed to aid nurses in limiting the risk of errors and adverse events related to handover. Yet these events reoccur frequently placing these vulnerable patients' safety and continuity of care at risk (Kowitlawakul *et al*., 2015; Spooner *et al*., 2015).

In the intensive care environment, handover is a time when changes in life support and doses of life maintaining drugs are discussed between nurses thus ensuring continuity of safe patient care. Many patients in the ICU have life-threatening diseases and often require invasive measures such as life sustaining drugs and mechanical ventilation enabling the patient to breath. Therefore key information discussed during the handover in the ICU should include an overview of the patient's vital data from the last twelve hours.

This includes any changes in parameters and vital data of the patient as well as the intervention taken such as changes made in the doses of drugs and the patient's response. Patients may require invasive devices such as mechanical ventilation to help them breath.

The patient's response to the treatment delivered by the device should be assessed and handed over. This includes invasive lines and drains that pose a high risk for the development of infections. During this time any change to the patient's treatment regime that may include medication, diagnostic tests, doctors' orders and any outstanding care are discussed.

Poor communication during handover may lead to the omission of important information placing the patient at a higher risk for development of complications such as hospital acquired infections thus increasing the patient's length of stay and financial cost. Effective communication is essential in the transfer of information to ensure continuity of safe patient care. This is particularly important in the intensive care setting. In brief the nurse accepts accountability for her actions which in turn should improve the quality of patient care, patient satisfaction, and patient safety.

Worldwide there is a greater awareness of distracters during bedside handover practice. These distracters may lead to adverse patient events compromising patient safety. The (WHO) World Health Organization refers to patient safety as the prevention of errors that can lead to harm, compromising healthcare. An article review by Gunther (2015:2) for the European Society of Intensive Care Medicine suggested that "clinical handovers are an integrated part of the ICU life, allowing the transfer of information and responsibility from the outgoing caregivers to oncoming team."

Effective handovers are a key tool for providing continuity of care and ensure patients' safety. Yet this exchange takes place in an interrupted driven and time pressured environment, with all the risks of such interruptions: break in thought, difficulties to maintain concentration and loss of vital information. These distracters may lead to failure in communication during bedside handover which in turn jeopardises patient safety (Kowitlawakul *et al*., 2015).

Distracters occur when there is a break in attention leading to failure in completing the task at hand. This results in suspension of the initial task. It is however expected that the task will be resumed once the distracter had been resolved (Spooner *et al*., 2015).

Nursing staff are pressed for time in these highly specialised environments. The complex nature of the critical care environment lends itself to nurses working at a faster pace. Therefore many nursing actions need to be prioritised resulting in nursing staff distracting each other during handover because something needs to be done urgently (Kowitlawakul *et. al*., 2015).

Distracters may lead to ineffective handover. Omission of key information places patient safety at risk and can potentially relate to the clinical deterioration in the critically ill patient (Kapadia and Addison, 2012).

Halm, (2013) identified nurses, doctors, patients' families and phone calls as distracters during handover. Halm, (2013) is of the opinion that nurses would interrupt each other to attend to tasks they see as important to their patients' needs. Doctors and family members distract the handover process when they request information during handover. The distraction could potentially divert the nurses' attention away from the handover and vital information may get lost, compromising patient safety and continuity of care.

Distracters are seen as a break in concentration that could interrupt the completion of a task (Spooner *et al*., 2015). In this study distracters are seen as any behaviour listed on the structured observation checklist that may lead to a break of attention making it difficult for nursing staff members to maintain concentration which may result in the loss of information.

Currie, (2002) identified background noises as distracters. Manser and Foster, (2011) strongly suggested that environmental noises such as telephone calls and monitor alarms are frequent distracters. In the context of this study the patients in the ICUs have telephones next to their beds that have a specifically assigned number and families can call at any time.

Two telephones are at the nurses' station. These telephones may ring at random times at the bedside of the patient and will keep on ringing until the nurse caring for the patient answers the phone call during which the nurse is called away from the bedside interrupting the handover.

This could cause a break in concentration and the possibility remains that the nurse may not remember what was said during the handover. Monitor alarms, intravenous and invasive devices alarms are set according to the patient's physical condition and diagnosis. These devices will keep on alarming until the nurse physically attends to it and reassesses the patient. It may distract the nurse as she has to interrupt the handover to attend to the alarms.

In the South African context with multilingual members of staff, language might be seen as an additional distracter. In South Africa there are eleven official languages however, English is considered as an international language and is predominately used in business. Thus the official language use in the hospital is English. Nurses for whom English is not their first language often find it difficult to express themselves, causing disruptions and break down in verbal communication. They will often translate words back to their mother tongue in order to make meaning of the words. Translating back to English may change the meaning of the words. This creates problems because for some words in the "English language" especially in medicine there is no substitute word in the African language. This may result in a break down

in clarification of the words, thus omitting important information needed in providing continuity in safe patient care and the handover may be disrupted.

Frequent distracters during handover may lead to the omission of vital information. It could have a direct impact on recognising clinical changes in the already compromised critically ill patient. This will not only affect the nurses' clinical judgment, but it could place the patient at particular risk for the development of adverse events compromising patient safety and quality of care (Spooner *et al*., 2015).

Limiting the amount of distracters could decrease handover time. Various safe patient handover practices have been suggested in limiting the amount of distracters during the handover period. A study conducted by the Institute for Safe Medication Practices, (2012) found the following steps useful:

- Staff education, as it creates a bigger awareness among members of staff.
- Timing of necessary interruptions, as it could help to avoid distracters during complex tasks.
- The use of checklists could improve the safety of patients when used as a point of reference when distracted and lastly minimising the frequency of invalid alarms and social conversation next to the bedside of the patient.

Spooner *et al.,* (2015) found that the education and empowerment of members of staff as well as checking of alarms prior the handover period may have a positive impact in reducing distracters. The British Medical Association, (2004) and Kalisch and Aebersold, (2010) are of the opinion that creating an awareness through education, the use of checklist, checking of alarms and limiting social conversation to designated areas may decrease distracters. The

British Medical Association, (2004); Institute for Safe Medication Practices, (2012); Kalisch and Aebersold, (2010) and Spooner *et al*., (2015) had similar advice in steps to be taken to reduce distracters. They all agreed that it would be beneficial to the patient in that the safety of patients could be protected thereby ensuring the continuity of safe patient care. Although distracters could never be completely avoided in the ICU environment, these steps have the potential to minimise the amount of distracters. These interventions could have a positive effect on maintaining the continuity of safe patient care during the handover period.

Bedside handover must be meaningful and should form the basis on which the next shift will plan the nursing care. This emphasises the need for investigating the type and frequency of distracters to equip nursing staff with the necessary knowledge and skills to enable them to deliver appropriate handovers.

1.2 PROBLEM STATEMENT

Literature confirms that patient safety in the ICU is compromised due to errors caused by distracters during bedside handover. These errors may be multifactorial and are diverse. They include interruptions by a variety of team members as well as environmental distracters which include telephone calls, attending to alarms and medical devices. Language diversity may also play a role. A breach in patient safety increases the length of stay and could place the patient at a higher risk for development of complications. Thus the need to optimise the handover practice by managing distracters and improving patient safety is urgent.

1.3 PURPOSE

The purpose of this study was to optimise the nursing handover in the ICU by identifying and managing distracters which may interfere with the handover process. This study aimed to

identify the nature and frequency of distracters during bedside handover in the ICUs in an attempt to optimise the handover practice and thus enable the nurse to deliver the transfer of patients care from one shift to another with risk free handovers that will result in safe patient care.

1.4 RESEARCH QUESTIONS

The researcher sought to answer the following questions:

- What are the distracters affecting the ICU handover and the frequency of these?
- How can these distracters be managed?
- Does the implementation of the management strategy reduce the nature and frequency of distracters?

1.5 RESEARCH OBJECTIVES

The following objectives were set to meet the research questions:

- To identify the type and frequency of distracters during nursing handover.
- To implement changes in handover practice as agreed upon by the participants of the focus group from the intensive care units after collaboration with colleagues and the researcher.
- To evaluate the effect of the implemented changes on the nursing handover.

This was added in individual sets for each phase.

1.6 SIGNIFICANCES

The significance of the study is that the findings could be used to improve patient safety by limiting the amount of distracters with the possibility of shortening handover time. Identifying the distracters may allow nurses to put measures in place to decrease the amount

of distractions that currently interfere with the handover. It is important to investigate the type and frequency of distracters during bedside handover in the ICU, so that handover practices can be improved and thus enable nurses to deliver appropriate handover that will result in safe patient care.

1.7 DEFINITIONS AND TERMS

The operational definitions consistently used in this study are as follows:

Patient safety is the prevention of harm. The (WHO) World Health Organization, (2013) refers to patient safety as the prevention of errors that can lead to harm compromising health care. In this study the safety of patients are assessed by using a structured observation checklist during observation to identify the frequency of distracters during bedside handover that could possible compromise patient safety.

Intensive Care Unit is a dedicated area in a hospital that provides specialised care. It uses advanced technology in providing care to patients. In the intensive care unit nurses work at a fast pace as the environment is ever-changing (Urden, Stacy and Lough, 2014). Nurses working in the intensive care unit require specialised skills as patients need continuous and close monitoring (Kowitlawakul *et al*., 2015). In this study the ICU disciplines included cardiac surgical ICU, neuro surgical ICU, general ICU and transplantation. These are highly specialised in managing critically ill patients.

Critically ill patient critically ill patients are defined by the American Association of Critical-Care Nurses (AACCN) as "those patients who are at high risk for actual or potential life-threatening health problems" (Urden *et al*., 2014:1). These patients are vulnerable and are often mechanically ventilated. In this study the critically ill patients are all adult patients in the eight selected ICUs.

Face to face handover is done when two nurse facing each other at the patient's bedside attend to handover.

Group handover is done by a shift leader at the bedside of each patient, attended by a group of nurses, until handover for all patients has been completed.

Oncoming nurse refers to the nurse who will come on duty to start a new shift.

Outgoing nurse refers to the nurse who is at the end of his/her shift of the day.

1.8 METHODOLOGICAL ASSUMPTIONS

Methodological assumptions reflect the researcher's belief about the nature of the research process. It is influenced by the nature of the research topic and problem as well as the interest of the researcher in the particular field. Polit and Beck, (2017) include the following as paradigms:

- Positivism
- Constructivism
- Advocacy/ participatory
- Pragmatism

This study was based on positivism and constructivism. Various researchers classify approaches to nursing research (Burns and Grove, 2009; Creswell, 2014; Polit and Beck, 2017). These are usually quantitative and qualitative. Creswell, (2014) included a third approach, quantitative, qualitative and mixed methods.

A mixed method approach was employed since the aim was to extract the data using a complex approach in order to cover all possibilities in managing distracters. Mixed methods entail using both quantitative and qualitative approaches in an attempt to enhance data collection putting meaning to this data and create a platform for implementation. The qualitative approach will bring the depth of understanding to the facts collected by the quantitative approach**.**

The research approach followed three sequential phases. Phase one, a quantitative phase made use of structured observation. During this phase the researcher made use of a structured observation checklist collecting quantifiable information that gave a visual representation of the research problem.

Phase two followed a qualitative approach. It made use of a focus group. The focus group consisted of nine selected experts in the field of intensive care nursing. A representative from each hospital was invited to participating in this study. They included unit managers, clinical facilitators and shift leaders. These representatives were purposively selected as they are all in leadership positions enabling them to bring about changes in reducing distracters that could possible place the safety of patients at risk.

Distracters that emerged from observation in phase one were introduced to the group of experts, then open-ended questions were posed. These experts collaborated on the distracters to make meaning of them and shared their experiences in order to establish strategies to manage the distracters. Collectively phase one and phase two built on each other's strengths and gave a more in-depth understanding of the research. The group of experts came to a common agreement on the date for implementation of these strategies.

Phase three, a quantitative phase, followed the same approach as phase one. Evaluation was done on the handovers once implementation of the chosen strategy had been implemented and use was made of structured observation. The same structured observation checklist from phase one was used in phase three. The new handover strategies were agreed upon by the experts in the focus group in phase two. The aim of phase three was to evaluate whether the new handover strategies agreed upon in phase two added value in managing distracters during handover.

This research was guided by two distinct paradigms, positivism and constructivism. Positivism depends on quantifiable observation that results in statistical analysis (Creswell, 2014) whereas constructivism depends on the views of the participants and acknowledges their own experiences.

The first paradigm used was positivism. Positivism can be explained as a philosophical stance that emphasises that knowledge should be gained through observable and measurable facts. This is also referred to as empiricism. Positivists do not rely on subjective experiences. In this sense, positivism can be viewed as an epistemological stance in which sensory information counts as true knowledge.

A positivist paradigm in research is guided towards understanding the cause of the underlying phenomenon (Polit and Beck, 2017). This paradigm was applied in phase one and phase three of this study. Empirical evidence was gathered by following an established plan by using a structured observation checklist and all senses. The obtained information was quantitative in nature. It made use of statistical and numerical information thus it gave a "picture" of the research problem.

Constructivism is a paradigm that believes that there is no single truth. It is often referred to as the naturalistic paradigm. It is not fixed. It emphasises the complexity of humans in creating and shaping their own experiences in that the truth is a composite of human experience as it is lived. It yields rich in-depth information from real-life experiences (Polit and Beck, 2017). Information is usually gathered through small groups of participants. This applied to phase two a qualitative phase that made use of a focus group. The focus group consisted of experts from each hospital that were invited to participate in this study.

After establishing categories and reflecting on their own experiences the experts were able to deconstruct the old ideas and reconstruct new ideas to establish strategies to manage and decrease distracters during handover.

Positivism and constructivism assumptions can be compared as follows: **(see Table 1.1)**

Table 1.1 A comparison between positivist and constructivist paradigms according to Polit and Beck (2017)

POSITIVIST PARADIGM ASSUMPTION	CONSTRUCTIVIST PARADIGM ASSUMPTION
Reality exits in a real world, through real experiences.	Subjective experienced reality, multiple and constructed by individuals.
The researcher does not influence the study. The researcher remains independent from those being studied.	An interactive process. The researcher interacts with those being researched in constructing new ideas.
Evidence is objective and quantifiable.	Evidence is subjective and qualitative.
Specified design.	Flexible design.

Content is controlled.	Context-bound.
Researcher is not part of process.	Researcher is part of the process.
Large sample.	Small sample.
Statistical analysis.	Qualitative analysis.
Source generalization.	Source in-depth understanding.

1.9 OVERVIEW OF RESEARCH METHODS

This overview of the research method identified the type of design selected and introduced the methods used. In this research use was made of a mixed method approach in an attempt to identify and manage distracters which occur during handover in the ICU. The details will be set out in chapter three.

1.9.1 Research design

The data was gathered through a mixed method design with sequential observational, descriptive and participatory phases. A before and after study also known as a pre-test post-test design (Polit and Beck, 2017; Creswell, 2014) was employed in this study.

Mixed methods imply the collection and analysis of quantitative and qualitative data. It links quantitative data with qualitative data by building on each other's strengths to give a better in-depth understanding of the data whereas one method stands alone.

Quantitative and qualitative data were collected. The quantitative data from phase one and three which is numeric in nature was analysed using descriptive and comparative statistical measures. Qualitative data from phase two was descriptive in nature and data were analysed by means of content analysis. Data gathered showed that distracters during patient handover

may increase the handover time. The assumption was that the findings could be used to improve patient safety and possibly shorten handover time. Identifying the distracters would allow nurses to put measures in place to decrease or prevent the amount of distractions that occurred with patient handover.

1.9.2 Research Methods

Setting

The study was conducted in eight ICUs of five private sector hospitals in Gauteng and Mpumalanga. Four hospitals are situated in Gauteng and one hospital is situated in Mpumalanga. The ICU disciplines included cardiac surgical ICU, neuro surgical ICU, general ICU and transplantation. This totalled 94 ICU beds with an average of 90% occupancy over the last three months.

Unit of study

A population can be described a set of individuals with specific characteristic that will be used in a study (De Vos, 2002). According to Brink (2006:206) a population is defined as "a complete set of persons or objects that possesses some common characteristics that is of interest to the researcher".

In this study the term ‘unit of study’ was substituted for the population and included 94 ICU beds in eight ICUs from five hospitals in the private sector.

Sample and sampling

Brink van der Walt and van Rensburg, (2012) as well as Polit and Beck, (2017) stated that sampling is the action taken when selecting a portion of the population that will represent the

population in a study. Therefore sampling can be described as a part of the population in a study. For this study the researcher chose simple random sampling.

The sample was calculated by means of Raosoft calculation, with an error margin of 5% and a confidence level of 95%. The sample required was (n=76) observations for phase one and phase three of this study. Every third bed in all ICUs was selected by the researcher until a sample of (n=76) were reached. Observation took place from Monday to Friday. Handovers from day to night and night to day staff were observed.

Data collection

Permission to undertake the study was obtained from the relevant authorities. The researcher invited the participants to an information session informing them about the study. The researcher chose a mixed method design that made use of structured observations and a focus group discussion in collecting information. Data collection was done in three sequential phases.

Phase one and three were quantitative and applied structured observations. A structured observation checklist developed by Spooner *et al*., (2015) was used to establish specific distracters that occurred during handover in each of the eight ICUs in the five private sector hospitals. Both day to night and night to day handovers were observed.

Instrument

An existing structured observation checklist was used (Appendix J). This is a checklist developed by Spooner *et al*., (2015). Permission for use was obtained from the author of the checklist (Appendix I). The instrument (Appendix J) covers the source of distracters such as conversational and procedural interruptions as well as the reason and duration of each

interruption measured in minutes. These checklists were numbered by the researcher for analysis purposes for phase one and three.

Phase two included a focus group of experts from each hospital. The four most common distracters were shared with the focus group as the starting point for the discussion of how to manage distracters. The focus group discussion was recorded and transcribed then analysed using Hsieh and Shannon's, (2005) content analysis. The identified distracters formed the core of the discussion in phase two. The group of experts collectively agreed on two possible options for easy implementation. Representatives included in this phase were all trained in critical care nursing and consisted of clinical facilitators, unit managers and shift leaders. A collective agreement on the date of implementation of these strategies was reached.

Phase three evaluated the new handover procedure using structured observation once implementation of the agreed strategy had occurred. The same structured observation checklists from phase one were used in phase three. Observation was done from Monday to Friday until the sample size was reached. Day to night and night to day handovers were observed. A total (n=76) handovers were observed during phase one and another (n=76) in phase three.

1.10 DATA ANALYSIS

Data analysis is a scientific and systematic way of organising, categorising, ordering, manipulating, interpreting, summarising, reporting and describing collected data into a meaningful structural form for an easy discussion and understanding of the research data (Brink *et al*., 2012).

Sequential, observational, descriptive and participatory statistics were used to analyse the results of the study, with statistical software, SAS JMP 13.0 used for analysis purposes. Statistical assistance was obtained from a biomedical statistician.

Transcribed verbatim data in phase two were analysed using Hsieh and Shannon's, (2005) content analysis in order to extract categories which met the objectives of the study. Emerging categories were grouped into sub-categories and categories.

1.11 RESEARCH RIGOR

Validity and Reliability are closely related. Validity can be described as the degree to which an instrument measures what it is supposed to measure and reliability implies consistency in the use of an instrument in obtaining similar results each time it is used (Polit and Beck, 2017). Measures used to ensure validity and reliability of this study made sure that the findings were unbiased, accurate and represented the target population. For this study an existing structured observation checklist was used. This tool was developed and used by a well-known researcher and the resulting work was published. The researcher was the only person collecting data to ensure consistency of the findings. Raosoft calculation was used to establish the sample size. A statistician was consulted regarding further data analysis for the quantitative phase. The proposal was presented to a panel of researchers.

Phase 2 of the study was subjected to trustworthiness. Trustworthiness refers to the establishment of validity and reliability of qualitative research. Polit and Beck (2017:747) define trustworthiness as "the degree of confidence the researchers have in their qualitative research." Trustworthiness is a means of judging soundness of a qualitative research as identified by Lincoln and Guba (Polit & Beck, 2017). Lincoln and Guba's model include four

cardinal approaches. These include credibility, confirmability, transferability and dependability.

Credibility was ascertained by being attentive in observation, through combining recorded data and the transcribed data from the focus group that ensured saturation of key categories under discussion.

Confirmability was established through rich quotes obtained from the focus group in response to distracters and reflected the voice of the participants and not the researcher's perspective. Conversation with the participants were confirmed and amended as necessary.

Transferability was ensured using thick description of data saturation from verbatim transcripts. Meanings obtained through conversation with participants have provided a detailed account of their experiences.

Lastly, it may be difficult to ascertain dependability because the study is limited to a small number of hospitals in one private sector hospital group. This study followed similar studies conducted by well published authors.

In this study trustworthiness of phase two was ascertained by purposively selecting participants with unique characteristics. Characteristics that made them unique were that they all had a post graduate qualification in critical care nursing science and were therefore seen as experts in the field of critical care. Their expertise would enable the researcher to extract their knowledge and judgement as it will come through in the focus group. The study was done in accordance with the procedures and protocols of the Universities Human Research Ethics Committee (Medical).

1.12 ETHICAL CONSIDERATIONS

Before conducting the study, approval was obtained from a number of committees. Permission to undertake the study was sought from the Human Research Ethics Committee (Medical) (Appendix A) and Postgraduate Committee of the relevant University.

Written permission to use the observational checklist was sought from the author of the instrument and permission was granted through e-mail response (Appendix I).

Nursing participants in the ICU were given an information letter that explained the purpose and the procedure of the study (Appendix F). Consent was obtained from participants (Appendix G).

Consent to participate in a recorded focus group (Appendix H) was only obtained from participants on the day of the focus group.

A formal letter requesting permission to conduct the study at the various hospitals was submitted (Appendix B and Appendix C) as well as the ethics committee of the private hospital group and consent was obtained (Appendix D and Appendix E).

Confidentiality and anonymity was maintained throughout the period of the study. Numbers were assigned to participants and hospitals therefore no names could be linked to participants or participating hospitals, and is only known by the research team even after publication. All electronic data collected was saved and password protected. Written documents were locked away and only the supervisor and researcher had access to the key.

1.13 OUTLINE OF THE DISSERTATION

Chapter layout of the thesis is as follows:

Chapter One:	Overview of the study
Chapter Two:	Literature review
Chapter Three:	Research methods
Chapter Four:	Findings
Chapter Five:	Discussion, limitations, recommendations and conclusions.

1.14 SUMMARY

The chapter has provided an outline of this study. The problem statement, purpose of the study, research objectives and the significance of this study has been described. The operational terms have been defined and a brief overview was given of the research methodology, validity and reliability of this study and the ethical procedures adhered to during the course of this study.

The following chapters will provide a review of the literature, the methodologies, data analysis, the description and interpretation of research findings. The final chapter will state limitations of the study, summary of the study findings, conclusions and recommendations for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The previous chapter has provided an overview of the study, its background, the purpose, objectives and significance. The research questions, problem statement and researchers methodological assumptions were also discussed. It defined the operational terms frequently used in this study and provided the overview of methods employed in this study and the ethical considerations applicable. This chapter provides the summary on the available information about the subject studied in this research.

2.2 SEARCH METHOD

The sources of literature reviewed included searching of various databases including Google Scholar, Science Direct, Elsevier, British Medical Journal, Scopus, Cinahl, Medscape, Pubmed and Researchgate databases. Printed text books, e-books and electronic media reports were also searched.

Keywords: Handoffs, handover, distracters, interruption, patient safety

2.3 HISTORICAL OVERVIEW OF INTENSIVE CARE UNITS

The Online Medical Dictionary for Health Professions and Nursing © Farlex, (2012) describes a critical care unit as "a hospital facility for provision of intensive nursing and medical care of critically ill patients, characterised by high quality and quantity of continuous nursing and medical supervision and by use of sophisticated monitoring and resuscitative equipment; may be organised for the care of specific patient groups" (Retrieved July 13, 2016 from http://www.medical-dictionary.thefreedictionary.com/nursing.)

The evolution of critical care can be traced back to the "mother" of nursing, Florence Nightingale. Even though knowledge with regards to critical care was unknown during the 1800's, it was during the Crimean War in the 1850's that Florence Nightingale first recognised the need for closer monitoring of seriously injured soldiers and demanded that they should be placed nearer to the nursing station. This action lead to a drop of two percent in the mortality rate of seriously injured soldiers and placed focus on the importance of a separate area of care for critically ill patients (Vincent, 2013).

Dr Walter Edward Dandy (1886 – 1946) has been described by literature as a pioneer in critical care. It is documented that he established the first three bedded unit in the world for more critically ill postoperative neurological patients at the John Hopkins Hospital in Baltimore MD USA in 1923 using specially trained nurses to monitor and care for patients (Vincent, 2013). However it was in the early 1950's during several polio epidemic outbreaks in Copenhagen, Denmark that critical care units came to exist when hundreds of patients experienced respiratory failure (Kelly *et al*., 2014). Patients had to be triaged based on the severity of their illness. Physicians and nurses realised that these patients survival depended upon specialised care, hence the need for specialised units.

Literature confirms that during this period of polio outbreaks, the first ICU in the world was established in the observation room at Kommunehospitalet in Copenhagen on 21 December 1953 by the Danish anaesthetist Dr Bjorn Isben (Berthelsen and Cronqvist, 2003).

In 1958 Dr Max Harry Weil and R Herbert Shubin opened a four bed ward in LA County – USA Medical Centre Los Angeles CA, USA for the treatment of critically ill patients. This lead to a worldwide phenomenon where critical care units established at a fast pace in countries form Europe, USA, Australia and most recently as critical care is still considered a

"young" form of medicine, China established its first critical care unit in 1982 (Vincent, 2013).

Dr Christiaan Neethling Barnard (1922-2001) was one of the pioneers in the development of Intensive Care Units in South Africa.

Figure 2.1 Dr Christiaan Neethling Barnard (1922-2001)
Source: Heart of Cape Town https://en.wikipedia.org/wiki/Heart_of_Cape_Town_Museum

It was during his studies at the University of Minnesota (1956 – 1958) that he developed an interest in intensive care. Upon his return in 1958 he established the first ICU at the Groote Schuur Hospital in Cape Town, South Africa (Netcare Christiaan Barnard Hospital memorial exhibition guide, 2016).

In the early 1960's, various units opened. Their sole purpose was to focus on specific specialities such as cardiothoracic surgery and pulmonology. In October 1970 the first multidisciplinary ICU opened at the Addington Hospital in Durban and so began the birth of critical care in South Africa (Scribante, Schmollgruber and Nel, 2004).

2.4 STRUCTURE OF HEALTH SYSTEM

The South African health structure consists of two parallels, a large public healthcare and a smaller yet fast growing private healthcare sector. According to De Beer, Brysiewicz, Bhengu, (2011); Jobson, (2015) and Mathivha, (2002) there are 376 public hospitals, 143 in urban areas and 233 in rural areas funded by the state whereas the private sector has 238 hospitals countrywide, 188 in urban areas and 50 in rural areas.

More recent data presented by Richards, (2016) at the Joint Per-operative Cardiothoracic Congress revealed that, in South Africa by 2016 the number of public healthcare hospital beds are 54 529, with a total of 1 783 ICU beds in public healthcare facilities. The amount of beds are representative of 379 public healthcare facilities. In total 93 (25%) of the public healthcare facilities have an ICU or high care whereas 288 (75%) have no ICU or high care.

The number of private healthcare facility beds accounts for 24 760 and includes a total of 2 385 ICU beds representative of 216 private healthcare facilities. Private healthcare facilities with an ICU or high care accounts for 40 (60%) whereas 216 (84%) don't have these facilities.

Both the public and private healthcare facilities have limited ICU beds and these units are classified according to levels from I to level IV. A study done by De Beer *et al*.,(2011) and Mathivha, (2002) confirms that level I units can be found in the public sector and are known as tertiary referral hospitals affiliated with universities also known as academic ICUs. Level I units are technology driven and have sophisticated equipment enabling these units to treat a wide spectrum of life-threatening diseases. Twenty four hours seven days a week care are provided in these level I units by dedicated teams that consist of a medical officer, resident, specialist and nurses. The nurse to patient ratio is 1:1 for more critically ill patients, but in

some units it may vary on a ratio of 1:2 based on the availability of staff members and are mostly managed as closed units.

Level II – IV units are located in the private sector. According to De Beer *et al*., (2011) and Mathivha, (2002) level II units specialise in neurology and coronary care, level III units provide limited invasive care and are found in community hospitals whereas level IV units are high dependency units. These ICUs do not have a dedicated twenty four hour medical team as seen in the public sector but are staffed with non-intensivists. In most ICUs the nurse to patient ration is 1:1 or 2:1 in some units. Units are seen as open and inputs from intensivists are limited in the private sector.

2.5 STAFF SCHEDULLING AND ROSTERING

Daily routines may differ from ICUs according to their speciality. Staff scheduling and rostering should be insightfully planned according to the nursing care to be delivered to patients and unit needs. The complex nature of the ICU environment requires patients to be constantly monitored minute by minute. It therefore requires careful planning and scheduling of knowledgeable members of staff to meet those needs to ensure the continuity of safe patient care.

The ICU environment is task and procedure driven. Individual members of staff are therefore scheduled over twelve hour periods including day and night staff and specific time lines are allocated for delivering of nursing tasks ensuring patient safety and continuity of care. These nursing tasks in the ICUs are followed religiously to provide the best possible care.

In the context of this study **Table 2.1** indicates the scheduling of nursing tasks per 12 hourly shifts developed by two unit mangers in 2016 and has been implemented as best practice in ensuring the continuity of safe patient care. The schedules are at the bedside of each patient and executions of tasks are documented on the nursing records of each patient.

Table 2.1 Patient care schedule used by units in this study in daily routine care

PATIENT CARE SCHEDULE				
Patient identified	12hourly	07:00 19:00	ID Band	Legible
Monitor Alarm Checked	*			Subject to patient condition
Infusions Checked	12hourly	07:00 19:00		Yellow / Green stickers
Insertion site checked ➢ Peripheral ➢ CVP ➢ A-Line ➢ Quinton – Line Dressings intact	1hourly			Check insertion site for: ➢ Redness ➢ Swelling ➢ Pain Please ensure CHG dressing are dated and placed correctly
Transducers Zeroed	*			*Subject to patient condition
Pressure bag Checked	12hourly	7:00 19:00	300mmHg	NO Heparin *
Bag valve Mask Available	12hourly	7:00 19:00		Check that in working condition
Ventilator Alarms Checked • Check ET tube position (cm) • Check ET tube cuff pressure • ET Tube securement (harness)	12hourly	7:00 19:00		
High/Low Pressure Suction Checked	12hourly	7:00 19:00		Check that unit is in working order and attachment are available
Eye Care	6hourly	10:00 16:00 22:00 04:00		Sterile water Dura Tears

Teeth Brushed	12hourly	16:00 04:00	Toothpaste	
Chlorhexidine Mouth Rinse	12hourly	10:00 22:00	Mouth tray	Dilute Chlorhexidine Change Mouth trays 12 hourly
Mouth Moisturized	2hourly			Sterile Water / Lip Moisturizer
Patient Washed	24hourly	04:00		Use Daily wipes
Beard Shaved	24hourly	04:00		
Skin Care/Pressure Care Done	3hourly	06:00 09:00 12:00 15:00 18:00 21:00 24:00 03:00		As per PRESSURE CARE CLOCK Update skin lesion form
Body Position Changed	3hourly	06:00 09:00 12:00 15:00 18:00 21:00 24:00 03:00		As per PRESSURE CARE CLOCK Update skin lesion form
Hair Washed	*	PRN / 3rd Day		
Tracheostomy Care Done	6hourly	09:00 15:00 21:00 03:00	Wound tray	Allevyn Trach Cavalon spray
Wound Care Done	09:00	Per Dr's Request – Visibly soiled	Wound tray	
Catheter Care	6 hourly	09:00 15:00 21:00 03:00	Wound tray	Sab Saline / Sterile water
Catheter Fixation Checked	6 hourly	09:00 15:00 21:00 03:00	Grip-lock	Catheter fix dressing
SpO2 Probe Position Changed	6 hourly	06:00 12:00 18:00 24:00		
Restraint Safety Check	6 hourly	06:00 12:00 18:00 24:00		Check that it is prescribed (24 hourly) by Dr
Patient Safety/ Rights Attended To	12hourly	07:00 19:00		Mention / Recorded in Nursing documentation

Compiled by: UM M Norris/C Olivier 2016. For Review: 2019

2.6 HANDOVER

Handover is a complex high risk activity and is often overlooked for the essential role it plays in the continuity of safe patient care. The aim of handover should be to communicate relevant information regarding the patients care from one nurse to another that will provide for consistency in safe patient care. Effective communications transfers accountability and responsibility from the outgoing to the oncoming nurse which in turn will lead to the continuity of safe patient care (de Lange, van Eeden, Heyns, 2017; Scovell, 2010; Spooner *et al*., 2015).

2.6.1 Handover - Looking Back

Literature has described handover as a "nursing ritual", an honoured tradition that can be traced back to the early eighteen hundreds (McFetridge *et al.,* 2007; Nikstaitis, 2016; Scovell, 2010).

Historically handover was done at the nurses' station or an office away from the patient's bedside. Nurses gathered in large groups and the handover was done face to face. These large groups posed various problems as nurses could easily be distracted through conversation. A major pitfall of this type of handover was that the nurse could not see the patient therefore it can be said that an accurate representation of the patient's physical condition was not possible (Nikstaitis, 2016).

In the late 1800's Florence Nightingale advocated the importance of bedside handover. Drawing from her own experience she soon realised that bedside handover gives nurses the advantage of seeing the patient. In doing so, the nurse will be able to assess the physical condition of the patient, which in turn will give the nurse a more accurate and true reflection

of the patient's condition during the handover period. It also gives nurses the advantage of involving the patient in decision making regarding his/her care. This brought about a change in the way we implement bedside handover today.

Handover in many general wards takes place outside the patient's rooms. Nurses would gather outside the patients' rooms in groups to attend the handover. This can potentially place the safety and continuity of the patients care at risk as the nurses attending the handover would not be able to visually engage with the patient. The nurse therefore has to rely on the verbal content of the handover.

In recent years there has been a greater move towards bedside handover. Radell, Wilson and Woodward, (2011) as well as Scovell, (2010) are all of the opinion that there are major benefits to the advantage of bedside handover. Not only does it give the nurse the opportunity to involve the patient in his/her care, but it also gives the nurse the opportunity to assess the clinical condition of the patient, thus promoting continuity of safe patient care.

2.6.2 Types of Handover and Their Purpose

Four main types of handover have been identified:

- Verbal reports
- Recorded
- Bedside handover
- Written reports

(Hughes, 2008; Miller, 1998; O'Connell and Penney, 2001)

Verbal reports

These are the most traditional type of handover. According to Miller, (1998) handover is done verbally supported by documents. Patient's charts are used to complement the handover and the handover takes place during shift change, face to face between two individuals. It has been estimated that at least 30 minutes should be spent in order to deliver a good verbal report during handover. One negative aspect of verbal reports is that it can lead to repetition from nursing notes.

Recorded reports

Handover is recorded on a tape and played at the change of shift to the oncoming staff members (Miller, 1998). Only the oncoming staff members will be present, therefore it is debated that it allows for more time to be spent with patients and tapes could be played back by staff member at a later stage if more information is required. A major disadvantage of this type of report is the lack of opportunity to be able to ask questions and clarification of content.

Bedside reports

Handover is done at the bedside of the patient. It gives the nurse the opportunity to see the patient and evaluate the record at the same time. The patient can be identified at the bedside, his/her clinical condition assessed complementary to the bedside report as it will give a clearer and more accurate "picture" of the patient's clinical condition. This will encourage the continuity of safe patient care.

Bedside reports also allows for collaboration between the patient, family and staff members regarding care given. Disadvantages to bedside reports may include patient confidentiality as other patients or family members may listen to the report given.

Patients may feel excluded due to the use of medical terminology not understanding what has been said regarding their care. In the ICU the critically ill patient may be sedated and mechanically ventilated excluding them from participating in decision making regarding his/her care (Miller, 1998).

Written reports

According to Miller, (1998) patient's charts, care plans, computers and even whiteboards may be used for written reports. A major advantage of written reports is that they are kept up to date for the oncoming staff members to read saving time. However we should recognise that written reports alone may affect the patient in a negative way in that it leaves no room for asking questions and clarification on the report.

O'Connell and Penny, (2001) have identified strengths and limitations of three types of handovers as listed in **Table 2.2.**

Table 2.2 Strengths and limitations of three types of handover

Strengths and Limitations of three types of handover		
Type of handover	**Strengths**	**Limitations**
Verbal office-based handovers.	• Collective narrative (fewer gaps in information). • Opportunity for staff to debrief. • Opportunity to clarify information (learning opportunity, especially for new staff).	• More story-like (prone to being subjective and judgmental). • Time-consuming. • Some information is superfluous. • Some nurses disengage, especially when information is subjective.
Tape-recorded handovers.	• Does not require shift overlap.	• Information can be out of date.

	• Less time consuming. • More factual. • Some nurses like this matter of pact approach.	• Difficulty to clarify information. • Cannot check patient and / or documentation. • No teaching opportunity. • Acts as a filter: some nurses are cautious about tape-recording information. • Some information is not handed over and is not processed formally or informally.
Face to Face bedside handovers.	• Involves the patient (individualised care). • Charts and medications can be checked. • Errors can be remedied. • Patients can be assessed and information clarified during handover.	• Public forum – difficult to discuss personal patient issues. • Confidential information is sometimes revealed. • Time consuming • Nurses are prone to being interrupted by ward issues. • Some patients like to chat.

(Source: O'Connell and Penney 2001:17)

Hughes, (2008) investigated the four styles of handover during the changes of shift from nurse to nurse and came to the following conclusions and recommendations listed in **Table 2.3**.

Table 2.3 Strengths, weaknesses and recommendations on four handover styles

Type of report	Strengths	Weakness	Recommendations for reducing errors and improving patient safety
Verbal report	• Face to face contact. • Allows time for questions and clarification. • In-service training opportunities may present itself.	• Verbal report may not correlate with patients current condition. • Verbal handover may be time consuming and vital information lost as nurses get bored.	• Supplement verbal handover with patient documents. • Greet patients with handover to assess status. • Make use of standardised procedures as a guideline during handover to ensure vital data is not lost.
Bedside report.	• Face to face contact. • Allow time for questions and clarifications. • Correction of errors. • Collaboration with patient regarding his/her care.	• Patient confidentiality at risk. • Medical terminology may confuse patients and lead to anxiety.	• Be conscious to maintain patient confidentiality. • Implementation of protocol and standardised procedures, facilitate the transfer of essential and accurate information. • Where possible encourage patient to participate in

			decision making regarding his/her care.
Recorded reports.	• More time can be spent with patients. • Les time consuming. • Reports can be played back when needed.	• Audio may not be clear. • Inability to ask questions for clarification on report. • Recorded report may not be current to patients condition.	• Create opportunities to ask questions and clarify information. • Patient's rounds are advisable to correlate condition with report. • Make use of standardised procedures as a guideline during handover to ensure vital data is not lost.
Written report	• Up to date written reports ready for oncoming staff to read.	• Not all documents may be up to date. • Lack opportunity for questions and clarification if information is not documented.	• Supplement with verbal report. • Create opportunities to ask questions. • Make use of standardised procedures as a guideline during handover to ensure vital data is not lost.

(Source: Hughes, 2008 Patient safety and quality)

Research confirms that the four handover styles should not be seen or used in isolation but rather supplementing each other to ensure that the handover is of a high quality, accurate and clear ensuring patients' safety and continuity of patient care.

2.7 CRITICAL CARE UNIT - ENVIRONMENTAL DISTRACTERS

During the early developmental days of ICUs, the environment was often described as isolated, cold, sterile and rather frightening. Staff wore protective clothing such as gowns, masks and sometimes it was expected from family members to do so as well, accelerating fear and anxiety. Visiting hours were controlled in a highly restricted manner limiting family interaction with the patient (Vincent, 2013).

ICU is a highly specialised technology driven environment where minute to minute decision making takes place. Opening the ICU doors, one of the first noticeable physical features are the artificial lights. Monitors are attached to patients blinking continuously as well as alarms sounding from monitors, ventilators and infusion pumps. In the majority of ICUs patients beds are still next to each other. Privacy is limited which in turn elevate fear and anxiety in patients as they can hear everything happening to the patient in the next bed. Interruptions are frequent affecting rest and sleep (Fontaine, Briggs and Pope-Smith, 2001).

Many authors have confirmed that noise from equipment such as monitor alarms, ventilators, infusion pumps, telephones, televisions and nurses conversations are some of the most disruptive sounds in the ICU. Authors such as (Currie, 2002; Fontaine *et al*., 2001; Halm, 2013; Manser and Foster, 2011 and Vincent, 2013) all described how environmental noise can distract and be very intimidating towards visiting family members, staff and patients and should be seen as an environmental hazard. However it is also important for us to recognise that although many ICU patients are sedated they may still be able to hear.

According to Fontaine *et al.,* (2001) noise levels are measured in decibels using a logarithmic scale. An increase in ten decibels and sound seems twice as loud. In a previous study conducted in an ICU noise levels consistently elevated as high as 80 decibels. The heighten activity of audio-visual stimulation has a profound impact on staff members. This overstimulation of the sympathetic nervous system produces feelings of anxiety and fear, subconsciously affecting memory in nurses and patients compromising the continuity of safe patient care which in turn may increase morbidity in the patient (Wenham and Pittard, 2009).

A study conducted by Iyendo, Uwajeh and Ikenna, (2016) confirms that environmental distracters such as noise should be seen as stressors affecting staff members by increasing agitation, anxiety and altering memory which in turn leads to feelings of increased work pressure, physical and psychological exhaustion and ultimately burnout syndrome among staff. They reported that various researchers have suggested that noise can have a profound effect on the recognition and administration of prescribed drugs due to background noises and ringing telephones distracting staff members and that these areas should be quiet with minimal interruptions.

Considering all the above mentioned factors regarding the ICU environment it could seem as if it is an inhumane and uncompassionate environment, not only for the patient but family members and staff. But we have come a long way.

In recent years there has also been a move towards focussing on the patients and their families in the hope of making it a more compassionate and non-threatening environment. Beds are spaced more widely apart providing some form of privacy however there is still a lot of room for improvement in creating individual rooms to ensure a more therapeutic environment for healing to take place.

Although many policies are still in place, regulation of visiting times are now less controlled and even unrestricted in some ICUs allowing more contact with family members making it a more friendly and welcoming environment thereby reducing stress and fear (Fontaine *et al*., 2001; Manser, 2013; Vincent, 2013).

Currently a lot has changed in the ICU environment. Various hospitals have now implemented policies for interruption of artificial light as this complements the normal physiological needs of the patient in the critical care environment aiding them in distinguishing between day and night. Manufactures of electronic equipment such as monitors, ventilators and infusion pumps are much more aware of the effect of noise on patients in the ICUs and are continuously trying to develop new equipment that will reduce auditory stimulation. Nursing staff have also become more aware and more recently "quiet times" have been implemented in hospitals at certain times.

2.7.1 Distracters

Spooner *et al*., (2015) described distracters as a break in an activity. Distracters prevent the registered nurse form completing a task, diverting attention away from task completion (Potter *et al*., 2005). A distracter is an event that may be initiated by another person or equipment (Kalisch and Aebersold, 2010).

Distracters may lead to poor communication and misinterpretation of what was said during the bedside handover which in turn jeopardises patient safety and the continuity of safe patient care (Kowitlawakul *et al*., 2015).

Halm, (2013) is of the opinion that nurses would interrupt each other to assist them in the care of their patients' needs. Halm, (2013) also found that doctors requesting information during

handover as well as family members requesting information regarding the patient interrupted the process of handover diverting the nurses' attention away from the handover thus compromising patients' safety and care.

Currie, (2002); Manser, (2013); Manser and Foster, (2011) and Morrison *et al*., (2001) strongly suggested that environmental noises such as phone calls, during which nurses are called away from the bedside interrupted handover. Monitor alarms being attended to as well as performing tasks such as attaching monitors and intravenous devices during handover cause distractions.

Mobile devices such as smart phones are an essential part of everyday life and communication. With connectivity readily available and free WiFi available to all hospital staff, staff members may be tempted to use their smart devices at the bedside of the patient for personal and social use to keep up with friends and family. This can be a major distracter in attention placing patients' safety at risk leading to adverse events.

In a multilingual society like South African with its eleven official languages, language may be seen as an additional distracter. English as a second language is spoken by the majority of South Africans. Although English is the official language used in these hospitals the African languages do not provide for the explanation of words in medical terminology. This has the potential of creating gaps in effective communication. In order to make meaning of these words nurses may translate these words back to their mother tongue. This could change the meaning of the words resulting in misinterpretation and confusion. Therefore the handover may be disrupted.

Frequent distracters during handover may compromise patients' safety. It can lead to delays in initial recognition of changes in the patient's clinical status, resulting in poor judgement regarding the patient's care placing their safety at risk (Spooner *et al*., 2015).

Bedside handover must be meaningful and should form the basis on which the next shift will plan the nursing care for the day, therefore distracters should be limited as it may jeopardise patients' safety.

2.7.2 Impact of Distracters on Patient Safety

Distracters in the clinical environment are unavoidable. The ICU environment has been described as a high paced interruptive environment where minute by minute decision making is required to deliver safe patient care. Research has shown that distracters have a negative impact on the cognitive memory and increases the risk of adverse events and medication errors (Westbrook *et al.,* 2010).

Distracters lead to failure in effective communication Kowitlawakul *et al*., (2015) from the oncoming to the outgoing nurse during handover with vital information getting lost regarding the patients care. Potter *et al.*, (2005) are of the opinion that distracters may prolong the time spent on the handover, leading to cognitive fatigue on the receiving staff member's part. In the ICU environmental distracters may have a direct impact on the cognitive work of the brain, diverting attention away from the task at hand. Cognitive focus is lost with failure to complete nursing tasks and care to the patient placing the patient's health and safety at risk by increasing the risk of medication errors and adverse events.

Monterio, Avelar and Pedreira, (2015); Potter *et al*., (2005); Spooner *et al*., *(*2015) and Westbrook *et al.,* (2010) are all in agreement that distracters lead to cognitive failure. It stops

completion of nursing care critical information gets lost due to poor communication delaying patients' treatment, and misinterpretation of information can be life-threatening to patients' health as treatment may be repeated or omitted. Potter *et al*., (2005) also reported that distracters lead to errors and omission in safe patient care.

According to Monterio *et al*., (2015) distracters are the main cause leading to errors in the delivery of safe patient care. It places the safety of patients at risk and may lead to wasting of healthcare resource. Research states that 88.9% to 90% of distracters have a negative impact on patient safety as it delays patient care due to cognitive failure , thereby increasing the risk for medication errors (Colligan and Bass, 2012; McGillis Hall, Pedersen, Fairley, 2010; Timietto *et al*., 2012)

2.7.3 Impact of Distracters on Task Completion and Memory

Distracters impede on memory by preventing the successful completion of nursing tasks or repeating of tasks. It affects decision making. A study on social interruption and the loss of productivity conducted by CubeSmart, Inc. © (2002) found that during distractions it takes a person 20 minutes to get back to their original level of concentration before the distraction occurred and if the task was complex more concentration and time will be lost.

Studies conducted by Monterio *et al*., (2015); Potter *et a*l., (2015) and Westbrook *et al*., (2010) found that this time lost during distractions generate feelings of anxiety, frustration, increased stress levels and demotivation among staff members. Staff members experience feelings of an increased workload and feel pressed for time in order to make up for time lost. Research found that in an effort to make up for lost time staff would tend to change their work rhythm by working faster (Mark, Gudith and Klocke, 2008; Westbrook *et al*., 2010).

Mark *et al*., (2008) and Westbrook *et al*., (2010) found that even though staff worked faster to compensate for the time lost they wrote less and worked with less accuracy to the cost of the patient's safety and their own as they experience a higher workload due to time constraints. On the other hand it can even lengthen the period of time spent on task completion as staff members need to re-orientate themselves back to the task at hand heightening feelings of stress and anxiety.

It is evident by research that distracters play a key role in the delivery of safe patient care. Although a certain amount of distracters may be tolerable it is essential for us to understand the complex nature of the ICU environment to enable us to manage distracters thereby ensuring continuity of safe patient care.

2.8 IMPACT OF HANDOVER ON PATIENT SAFETY

An article review by Gunther (2015:2) for the European Society of Intensive Care Medicine suggested that "clinical handovers are an integrated part of the ICU life, allowing the transfer of information and responsibility from the outgoing caregivers to oncoming team". Effective handovers are a key tool for providing continuity of care and add to patients' safety.

Effective communication is essential in delivering safe patient care, (Cohen, Hilligos and Kajdacsy-Bella Amaral, 2012). A breakdown in communication may compromise patient safety and quality of nursing care delivered. Handover affects the quality of nursing care whilst ineffective handover may compromise the safety of patients by leading to mistakes (Currie, 2002).

Kapadia and Addison, (2012) are of the opinion that poor handover my lead to the omission of vital information leading to errors such as delayed diagnosis, medication errors, an increase

in invasive testing placing the patient at risk for development of hospital acquired infections leading to an increase in the length of stay and medical costs.

According to Gardiner, Marshall and Gillespie, (2015) errors during handover have been found to contribute to 70% of medical errors compromising patient safety resulting in physical and psychological injury and even death. Many authors (Gardiner *et al.*, 2015; Halm, 2013; Kerr *et al*., 2011; Manser, 2013 and Randell *et al*., 2011) agreed that poor communication during handover is the most common cause of medical errors putting patients' safety at risk.

Handover is seen as a critical part of patient care and it is of particular significance in the critically ill patient that needs rapid accurate and appropriate treatment, therefore the aim of handover being effective communication, delivering high quality information enabling safe quality patient care.

Poor communication during handover will affect the delivery of safe patient care with consequences to the patient on short and long term. Short term consequences include poor and delayed diagnosis, loss of vital information putting the safety of patients at risk for life-threatening events and incorrect treatment (Gardiner *et al*., 2015).

The (WHO) World Health Organisation, (2013) has listed communication during patient handover as one of its High $5^{'s}$ actions on improving patient safety and is of the opinion that the lack of proper education may be a major pitfall compromising patient safety during handover. Common pitfalls identified during handover that may put the safety of patients at risk were listed by the Royal College of Physicians in a study on Safe handover: safe patient appendix IV, (2004). They include the lack of concentration by teams during handover where

connecting the patient to monitors and equipment seems more important and valuable therefore information gets lost in the process.

Unclear role clarification and responsibilities during handover leads to the omission of vital information when staff members assume that other team members will take on the responsibility to give an update on the patient's condition. This places the patient at risk for adverse events. Lack of accurate updated written records places patients' safety at risk. Staff members have to spend more time searching for information regarding the patient. This places the patient at risk for receiving the incorrect treatment and can be life-threating and fatal.

The British Medical Association and National Patient Safety Agency, (2004) are of the opinion that a good handover can be beneficial to the patient's safety as there will be less discontinuation and inconsistency in care. Repetition will be less, placing patients' morbidity and mortality at risk. The significance of a good handover is often undervalued. "Clinical handover is a procedure that is potentially perilous for patient care" (New South Wales Health – Implementation Toolkit – Standard Key Principles for Clinical handover 2009:5).

2.9 COMMUNICATION TOOLS FOR SAFE HANDOVER

Many researchers advise the use of standardised protocol as a guideline to ensure safe and effective handover. According to Buckley, (2007); Hunter New England Health, (2009); Kowitlawakul *et al*., (2015); Manser and Foster, (2011) and New South Wales Health, (2009) these guidelines to handover will provide the oncoming nurse with pertinent information regarding the patient's care and will ultimately result in patient safety and continuity of safe patient care.

Currie, (2002) suggested the use of the mnemonic "CUBAN" as a guideline. In addition the 5 P's rule gives structure to rely on information during handover improving the handover process:

- **C** – confidential, ensure patient confidentiality.
- **U** – uninterrupted, handover by limiting distracters.
- **B** – brief, limit unnecessary information by keeping it relevant to the patient's clinical condition.
- **A** – accurate, information should be correct, clear and documents up to date.
- **N** – named nurse, the handover should be done by nurse who care for the patient in the last 12 hours, to ensure continuity of safe patient care.
- P1 - patient identification, doctor, diagnosis, relevant past medical and surgical history.
- P2 - admission date, reason, post - op date.
- P3 - present restrictions, co morbidities.
- P4 - planned care, needs and problems.
- P5 - plan of care for the next shift.

The most widely used guidelines in healthcare are used as a communication tool to ensure patient safety during handover. They, use the following mnemonics:

SBAR (Situation, Background, Assessment and Recommendations)

ISBAR (Introduction, Situation, Background, Assessment and Recommendations)

ISOBAR (Identification, Situation and Status, Observation, Background and History Assessment and Actions, Responsibilities and Risk Management)

ISBAR is the most commonly used in healthcare for handover (Buckley, 2007; Hunter New England Health, 2009; New South Wales Health, 2009). ISBAR originated in the military and aviation industry. It was first used as SBAR by the United States Navy nuclear submarines and soon after followed by the airline industry.

In 2002 it was introduced at the Kaiser Permanente Hospital in Colorado after it was adapted for healthcare by Michael Leonard, MD in collaboration with Doug Bonacum and Suzanne Graham, PhD, RN (Hunter New England Health, 2009; Kimberely and Jordan, 2009; New South Wales Health, 2009).

During handover SBAR was used as a communication tool to convey information regarding the patient as follows:

S- situation, what is the current problem.

B- background, relevant history, examination, leading up to situation.

A- assessment, of most recent vital data and changes in clinical condition.

R- recommendations, what should happen and actions to be implemented.

SBAR was adopted by health care worldwide by adding the "I" resulting in ISBAR. The "I" is for introduction (Hunter New England Health, 2009 and New South Wales Health, 2009). It not only enables nurses to introduce and identify themselves to patients, but also gives nurses the opportunity to identify patients.

It promotes the safety of patients as set out in the Health Professions Council of South African Health, National Patients' Rights Charter, (2008:2) "every person has a right to know the person that is providing health care and therefore must be attended to by only clearly identified health care providers".

Many healthcare facilities adapted ISBAR for use as a best care guideline communication tool during handover. Strengths identified by Hunter New England Health, (2009) for the use of ISBAR as a communication tool for safe patient handover include:

- It is easy to use.
- Information is current and clear.
- It organises information in a structured, complete and chronological format.
- Focuses on the problem.
- Ensures effective communication among staff members.
- Allows room for making recommendations regarding the patients' care to be delivered.

ISBAR is widely used in healthcare during handover from nurse to nurse and doctor to nurse. It is also used at the change of shift during bedside handover, patient discharge, inter and external hospital transfers and in emergency situations when time is limited and this is of particular significance in the ICU (Buckley, 2007; Hunter New England Health, 2009; Kowitlawakul, *et al*., 2015; Manser and Foster, 2011; New South Wales Health, 2009).

ISBAR consists of five elements and information is relayed in the following manner by using the mnemonic.

I - introduction, introduce yourself, your role, identify patient by name, hospital number, bed number arm band.

S – situation, what happened to the patient leading up to the situation. Highlight specific vital data, what is happening at the moment.

B – background, relevant history, examination, leading up to situation, any management done.

A – assessment, what do you belief is the problem, recent vital data and changes in clinical condition.

R – recommendation, what should happen and actions to be implemented to correct the situation.

The OSSIE Guide to Clinical Handover Improvement – Australian Commission on Safety and Quality in Health Care, (2010) recommend the use of the mnemonic ISOBAR as a communication tool for safe patient handover in the following way.

I - identification , identify yourself to patient and your role, identify patient by name hospital number, bed number arm band.

S – situation and status, what happened to the patient leading up to the situation. Highlight specific vital data, what is happening at the moment. Care requirements.

O – observation, oncoming nurse can assess the patients at the bedside, this include vital data, patients chart, equipment, and the patient physical condition.

B – background and history, relevant history, examination, leading up to situation, management done to date and result.

A – assessment and action, understanding the patient's condition, action to be taken accountabilities for actions and communication to senior in charge.

R – recommendation and risk management, plans to be implemented to limit risk to patient, acceptance of responsibilities and clarify and read back of information.

Research has proven that the use of standardised guidelines during handover (SBAR, ISBAR and ISOBAR) as a tool for safe patient handover will assist in the transfer of pertinent information regarding patients in areas of time constrains such as the ICU. It not only improves communication among oncoming and outgoing shifts but also organise the information clearly, understandable and focus on the problem at hand. Therefore it will reduce the risk of adverse event and mistakes, increasing patient safety by promoting continuity of safe patient care.

2.10 SUMMARY

Nursing handover still remains one of the most important tasks nurses will perform each day. Handover requires structure and preparation. It should be organised factually and accurately. Bedside handover between nurses facing each other is still recommended as one of the best methods during handover as it gives the nurse the opportunity to assess the patient and allow room for clarification. Poor communication and distracters during handover may lead to adverse events placing patients' safety and continuity of care at risk. Various communication tools have been developed throughout the years to assist nurses with safe patient handover yet a lot of distracters still divert nurses' attention away from the handover placing patients' safety at risk. Therefore it is vital to identify these distracters as it will enable nurses to implement strategies to optimise nursing handover thereby improving safe handover and continuity of safe patient care.

CHAPTER THREE

RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

The previous chapter discussed the available literature on this topic. It highlighted what is already known about this topic in different areas.

This chapter describes the research methods. The research design, setting, population, sample and sampling and both the inclusion and exclusion criteria have also been presented. Data collection, the explanation of the research tool, its validity and reliability and ethical procedures followed in this study also form part of this chapter.

3.2 AIM AND OBJECTIVES OF SEQUENTIAL PHASES

Phase one – quantitative phase

The aim of phase one was to optimise safe patient handover by identifying potential distracters and their frequency that could interfere with the handover process.

The objective for phase one was:

- To identify the type and frequency of distracters during nursing handover.

Phase two – qualitative phase

The aim of phase two was to collaborate with participants once they knew the distracters to come up with their own thoughts and ideas on strategies they would be able to implement in their units, to bring about a change in the handover process thereby decreasing the distracters during handover.

The objective for phase two was:

- To implement changes in handover practice as agreed upon by the participants of the focus group from the intensive care units after collaboration with colleagues and the researcher.

Phase three – quantitative phase

The aim of phase three was to assess if the implemented changes agreed upon in phase two were effective in limiting the amount of distracters resulting in improved patient safety and handover.

The objective for phase three was:

- To evaluate the effect of the implemented changes on the nursing handover.

3.3 RESEARCH DESIGN

Research design follows a systematic approach of the research process. It includes planning, structuring, execution, population, sampling, data collection and analysis (Polit and Beck, 2017). The design and methods used in this study will be discussed.

3.3.1 Research Design

Various research designs such as quantitative, qualitative and mixed method research designs can be selected by researchers to conduct a research study. According to Polit and Beck, (2017) a research design is a systematic process for obtaining answers to research questions from the type of data to be collected, how it will be collected and eventually reaching an answer to the research questions. This study was guided by positivism and constructivism. Positivism depends on quantifiable observation that results in statistical analysis

Creswell (2014), whereas constructivism depends on the views of the participants and acknowledges their own experiences.

For this study the researcher chose a mixed method design with sequential, observational, descriptive and participatory phases. It employed a before and after study intervention model in which the units of measurement would be distracters that took place during the handover period.

Mixed methods

A mixed method research design "is a procedure used for collecting, analysing and mixing both quantitative and qualitative data" (Creswell, 2014:565).

Creswell, (2014) stated that mixed method designs combine quantitative and qualitative data in giving a better understanding of one or multiple studies. Therefore it would link the data to give an in-depth understanding and builds on the strengths of both methods.

In this study the researcher used a mixed method design as one method of data collection was not enough to address the research problem and questions. This could complement the inquiry giving a better understanding of the research, whereas one method of data collection stands alone. It would strengthen data collection in this study as the data will be collected by the researcher through three sequential phases.

Sequential

Following sequential phases is one of the methods used in mixed method research designs. It gives a rich in-depth understanding of the research. For this purpose an embedded design which is explanatory in nature was chosen. An embedded design follows a before and after

study intervention model. Creswell, (2014), Gerrish, (2015) and Polit and Beck, (2017) all described a before and after study intervention model as a simple experiment. A before and after study is used when the researcher wants to report changes in an outcome after an intervention (Creswell, 2014; Gerrish, 2015; Polit and Beck, 2017). The before and after study would expose participants to an intervention "pre-test" followed by analysis. Once the intervention had been implemented measurement of the outcome would take place in the form of a "post- test".

An explanatory design follows a sequence of phases in collecting quantitative and qualitative data (Creswell, 2014). This study followed three sequential phases. Quantitative data was collected in the first phase by using a structured observation checklist followed by qualitative data collection in phase two by means of a focus group. Phase three, a quantitative phase followed phase two and used the same structured observation checklist as phase one.

Descriptive

Description is important in research (Polit and Beck, 2017). Descriptive research requires detailed and in-depth description of the phases and processes that are carried out to achieve the results that emerged. Descriptive statistics are used to describe numbers and give a visual presentation of numbers or data.

Data can be expressed by:

The mean - the sum of the scores divided by the number of scores being summed.

The median – exact centre or midpoint score from high to low.

The mode – value of the score that occur most frequently.

(Burns and Grove, 2009:471)

Participatory

In this study the participatory phase was reach by active involvement of participants throughout all three phases. Participation created a platform for seeking understanding through collaboration and reflection of experiences in establishing strategies in bringing about changes in improving patient safety and care (Creswell, 2014; Polit and Beck, 2017).

Positivism and Constructivism

This study was guided through positivism and constructivism. A positivistic approach is scientific in nature and is of the belief that reality is fixed and factual. Knowledge and data is gained through an objective approach (Creswell, 2014). Findings in a positivistic approach are dependent on observation and statistical analysis (Polit and Beck, 2017).

A constructivist approach depends on the views of the participants and acknowledges their own experiences (Creswell, 2014). In this study a constructivist approach was applied through an unstructured focus group. The focus group included a group of nine experts including a representative from each hospital participating in this research study. Representatives included in this phase were all trained in critical care nursing science and consisted of clinical facilitators, unit managers and shift leaders.

3.4 RESEARCH METHODS

Research methods are techniques used by researchers to gather and analyse data relevant to the research questions. The research methods used in this study included selection of the units of study, the participants of the focus groups, sampling techniques, data collection and data analysis.

3.4.1 Units of study and Sample

Creswell, (2014) and Polit and Beck, (2017) described a population as the total number of units, people or elements that comprise of the same characteristics and specifications for the study. The population of a study is also divided into the target population and the accessible population.

The target population is determined by the sample criteria Burns and Grove, (2009) and the accessible population is defined as "the portion of the target population to which the researcher has reasonable access" (Burns and Grove, 2009:344).

A term used to narrow down the target population is the accessible population (Botma *et al*., 2010) and is the "aggregate of objects, persons, behaviours or events that meet the sampling criteria and that are available or accessible in the study" (Botma *et al*., 2010:124).

In this study the population consisted of eight ICUs from five private sector hospitals that participated in this study. Accumulatively they had a total of 94 ICU beds. In this study the accessible units of study (population) would include the (N=94) beds in the eight ICUs of five hospitals in the private sector.

After the population was identified it was important that the researcher established criteria for the inclusion and exclusion of the population in this study. The inclusion criteria would therefore include the characteristics the researcher wanted to study, whereas the exclusion criteria would specifically refer to what the researcher does not want to include (Polit and Beck, 2017).

Various factors may influence these criteria (Polit and Beck, 2017) and include the availability of money to conduct the study, the availability of the participants, time constraints and the type of researcher design.

The inclusion criteria:

Handovers where the nursing staff had consented to the observation.

Day and night handovers.

Exclusion criteria:

Empty bed spaces with no handover.

Active resuscitation in progress.

Sample

A sample is seen as a subset of the accessible population chosen for the study (Botma *et al*., 2010). Sampling is the process of selecting a portion of the population to represent the entire population in the study (Polit and Beck, 2017) or a subgroup of the target population the researcher wishes to study (Creswell, 2014).

Care should be taken in selecting the sampling and technique. It should be appropriate and adequate. The sample should be adequate in size in order to give a true representation of the entire population. This would ensure that sufficient data could be obtained giving an accurate representation of the study.

There are two approaches to sampling, non-probability sampling and probability sampling. The most appropriate sampling method for this study in phase one and three was probability sampling as it is a quantitative sampling procedure (Botma *et al*., 2010 and Creswell, 2014)

and it includes random selection. In probability sampling each element of the population has an equal opportunity of being selected. Therefore simple random sampling was the most appropriate method to use. The goal was to choose units that would be representative of the population (Creswell, 2014). The sample size was selected by using the Raosoft calculator with an error margin of 5% and a confidence level of 95%. The sample required was (n=76) observations.

A sample size of (n=76) was required for phase one and phase three of this study. Observed bedside handovers were randomly selected. The sample included the nursing handovers of randomly selected beds on the day of data collection in the ICUs. The researcher allocated numbers to the beds and the researcher selected these numbers randomly to obtain the required sample. Every third bed was selected and this process was followed in both phase one and phase three until the required sample of (n=76) was reached. Day to night and night to day handovers were included.

3.4.2 Research Setting: Phase one and three

According to Burns and Grove, (2009); Creswell, (2014) and Polit and Beck, (2017) a research setting is the physical location in which data collection of the study takes place. This study was conducted in eight ICUs of five private sector hospitals. Four hospitals are situated in Gauteng and one hospital is situated in Mpumalanga.

In this study only adult ICUs were used with the exception of the one transplantation unit which provides care for all ages. The ICU disciplines included cardiac surgical ICU, neuro surgical ICU, general ICU and transplantation. This totalled 94 ICU beds with an average of 90% occupancy over the last three months.

The ICUs varied in size from ten to fifteen bedded units in an open plan format and beds were divided by screens with curtains in between the beds in most instances. These units also made provision for isolation and they each had on average four to five glass cubicles that made it visually more accessible for nursing staff.

Setting for phase two

The focus group meeting was held at the training centre where the researcher had access to a neutral venue. This venue was private and allowed for uninterrupted group work.

Figure 3.1 ICU bed setting and layout used in this study

Although policies were in place to regulate visiting hours, visiting hours were not strictly controlled the rationale being a more humane approach for the patients and their families in promoting a healing environment by reducing stress and anxiety. Two visitors were allowed per patient and children under the age of twelve years were restricted for infection control purposes however exceptions were made in special circumstances through collaboration with the multidisciplinary team members.

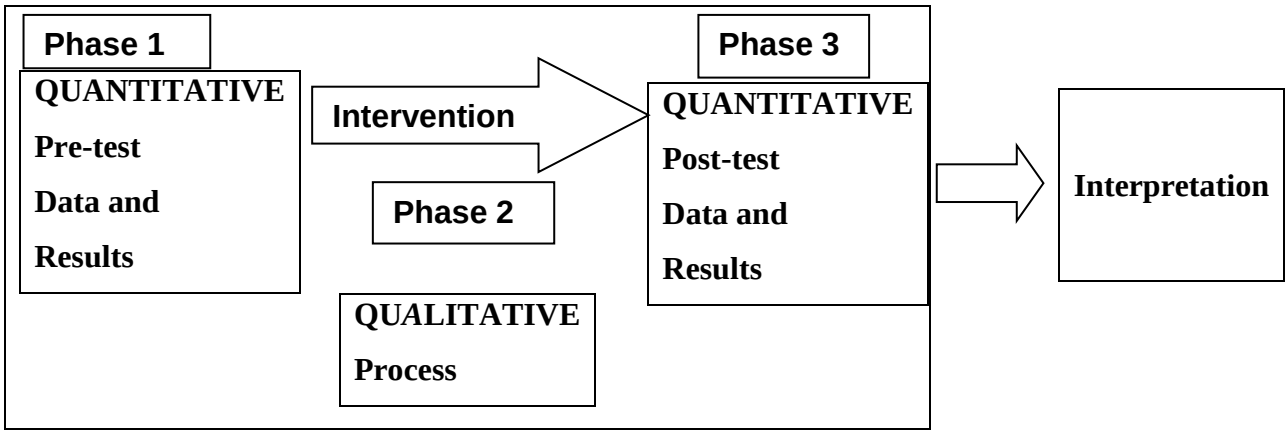
3.5 DATA COLLECTION

Data collection is a crucial step in research and gathering of information gives the researcher insight into the answers to the research questions. Data collection is a systematic and precise process of collecting information that is relevant to the objectives and questions of the research study and should conform to the ethical standards of the study (Burns and Groves, 2009). This study made use of a mixed method design with sequential observational, descriptive and participatory phases that employed a before and after study intervention model.

The data collection plan for this study included:

- Phase one observation of (n=76) handovers.
- Phase two developing a strategy for implementation through a focus group discussion.
- Phase three observation of (n=76) handovers.

An explanatory design follows a sequence of phases in collecting quantitative and qualitative data (Creswell and Plano Clark, 2011).



Source: (Creswell and Plano Clark, 2011:69)

Figure: 3.2 Embedded Design used in this study

Approval from the University Human Research Ethics Committee was granted (Appendix A) for this study. In addition, permission was obtained from the Ethics committee of the private group (Appendix E) the Hospital and Nursing managers (Appendix B and C) at each of the hospitals.

Phase one

Quantitative data was collected in the first phase. Participants were given an information letter and consented to participate in this phase before it commenced (Appendix F and G). Phase one applied observations using a structured observation checklist to establish specific distracters that occurred during handover in each of the eight ICUs from the five hospitals. Day to night and night to day handovers were included.

Observation as a method of data collection is said to have come from ancient times (Baker, 2006) and recent references are made to the late nineteen and early twentieth centuries. The aim of observation would be to monitor specific behaviour as it occurs in real time and that is of particular interest to the researcher. There are various roles that apply to the researcher during observation.

In her article on observation "A complex Research Method" Baker, (2006) refers to various authors opinions and all are in agreement that the researcher has four roles that could apply to the development of relationships in a study. These four roles are: 1) Complete observer, 2) Observer- as- participant, 3) Participant-as-an observer and 4) Complete participant.

Complete observer

Baker, (2006) refers to Gold, (1958) who described the role of the complete observer as someone that is present but there is no participation or interaction from the researcher with the participants. Here there is no attempt from the researcher to disrupt or manipulate the situation. The main role of the observer here would be to listen and observe. An advantage to this is that the researcher can remain detached, however it is also seen as a disadvantage, because the researcher may not hear all the information required and is not able to ask questions for verification. The complete observer may not be the ideal role but it has value in that it can be used in conjunction with other data collection methods.

Observer-as-participant

In this role the researcher is mostly observing but he/she may ask questions to the participants and even conduct short interviews. This could be to the advantage of the researcher. It is however important that the researcher remain professional and maintain his/her status as observer and not cross the line of becoming too friendly with participants in gathering data. Baker, (2006) in reference to Gold, (1958) stated that a negative aspect of being an observer-as-participant may be that due to these short conversations with participants information may be lost due to some form of misunderstanding between the researcher and participants and the possibility remains that the researcher may only realise this too late.

Participant-as-an-observer

In this role the researcher becomes more involved with the participant, and they may even become "friends". This could however be to the disadvantage of the researcher as he/she may lose their objectivity in the study. In becoming "friends" in this role as a participant with the participant the participants role may change into becoming more of an observer themselves by withholding information as they start identifying too much with the observer and their role (Baker, 2006).

Complete participant

The complete participant is seen as the most appropriate and ultimate role. Here the researcher plays the role of a team member and not a researcher. This could be to the advantage of the observer as he/she is seen as one of the team and their identity as researcher would be unknown to the team members (Baker, 2006).

For this study the researcher's role was that of a complete observer. The researcher made use of structured observation while observing specific behaviour and its frequency as it occurred in the natural setting. This was measured in time intervals.

The researcher only observed the specific behaviour listed on the structured observation checklist. Any other behaviour not identified on the structured observation checklist was ignored by the researcher. The researcher did not make any attempt to ask questions or interrupt the handover. The researcher however made use of this observation phase in conjunction with discussions from a focus group in phase two. This would give a rich in-depth understanding of the behaviour observed.

According to Creswell, (2014); DeVos *et al*., (2011) and Polit and Beck, (2017) observation can be unstructured or structured. Many authors (Creswell, 2014; De Vos *et al.,* 2011; Polit and Beck, 2017) are of the opinion that unstructured observations are qualitative in nature as it records personal accounts of an event as they have been observed whereas structured observation are more descriptive and quantifiable in nature and use numerical data and are specific in what needs to be observed. Structured observation is a preferred method of observation when the researcher is interested in observing behaviour that frequently occurs and the targeted behaviour can be recorded in time intervals (De Vos *et al*., 2011). Therefore structured observation was the most appropriate method of observation in this study for phase one and phase three as it is quantitative and uses a structured observation checklist in observing specific behaviour and the frequency of the distracters as they occur. It can be measured in time intervals.

Phase two

The second phase in this study a qualitative phase was exploratory in nature and could refine and explain the patterns provided in the first phase. It made use of open-ended questioning. The questions were posed to the focus group. The distracters that emerged in phase one were discussed by means of open ended questioning during which participants were given the opportunity to give their own views in response. The focus group included nine experts including a representative from each hospital who consented to participate in a recording (Appendix H) and collaborated to establish strategies to manage and decrease the distracters. Representatives included in this phase were all trained in critical care nursing science and consisted of clinical facilitators, unit managers and shift leaders.

These characteristics made them unique as they were not only experts in their field but all had leadership positions and were highly respected by colleagues thus placing them in a position to get the cooperation from nursing staff in bringing about a change to enable nurses to deliver safe quality patient care. An agreement on the date of implementation of these strategies was reached by the group of experts.

Phase three

Phase three followed the same quantitative approach as phase one. Phase three evaluated the effect of the changes agreed upon by the expert group in phase two. The handover was evaluated once implementation of changes had occurred using the same structured observation checklist (Appendix J) from phase one.

3.5.1 Instrument

Research instruments or checklists gather information that answers research questions (Polit and Beck, 2017). It guides the data collection process as it stipulates exactly what data is relevant in the study.

An existing structured observation checklist was used. This structured observation checklist was used by the developer of the instrument Spooner *et al*., (2015) in a similar study. Permission had been obtained from the author of the checklist (Appendix I). The instrument covered the source of distracters, such as conversational and procedural interruptions as well as the reason and duration of each interruption measured in minutes.

The structured observation checklist was divided into various sections. (Appendix J) It included the date on which the structured observation checklist was used as well as the observation number that was allocated by the researcher. It provided for the ICU area, day or

night shift as well as total number of handovers. Other sections included were start, finish and total time measured in minutes as well as the patient group from various disciplines, the oncoming and outgoing nurses' experience in years and nursing level. The nursing levels here applied to the South African Nursing Council Act 33 of 2005.

The structured observation checklist was also divided into interruptions. Interruptions are defined as "a break in the performance of an activity" (Spooner *et al.,* 2015:20). The instrument included the source of interruptions. Sources of interruptions required by the structured observation checklist included conversations unrelated to the handover. Procedural interruptions were identified as equipment alarming that may distract the handover process. Reasons for the interruptions were also included and were listed as nurses saying goodbye, doctors interrupting the handover by requesting information regarding the patient, ordering special investigations such as x-rays and problems with infusion lines that ran through the infusion pumps causing them to alarm. It also provided for measurement of the duration of the interruption in minutes.

3.5.2 Data collection procedure

Permission to undertake the study was obtained from the Universities Human Research Ethics Committee (Medical) and the ethics committee of the private hospital group (Appendix A and E). With permission being granted, the researcher reported to the unit managers of the relevant ICUs participating in this study. Meetings were scheduled with the nursing staff and they were informed regarding the proposed research study. An information letter for participating in the study was handed out to each staff member (Appendix F). Consent to participate in the study had been obtained from participants (Appendix G). The data collection in this study took place over a period of six months.

Phase one

Phase one started with structured observation and was quantitative in nature. Consent was obtained from the nursing participants to be observed before this phase was commenced. A sample of (n=76) bedside handovers were required to be observed for phase one of this study. Day to night and night to day handovers were observed. The ICU beds selected in the randomization were numbered on a list from one to seventy six. Every third bed from the total (N=94) was allocated a number from the list. The observed bed spaces were randomly selected in that every third bed in each ICU unit was allocated a number from the list and whom ever did the handover at the bed at that time was included. According to Polit and Beck, (2017) elements or units from which the sample will be chosen are consecutively numbered on a list. The list will then be used to draw the required sample. Two observations were done each day from Monday to Friday. This process was followed until the required sample of (n=76) were reached.

Staff members on different shifts were responsible for handover even though the same bed spaces were observed. A total of 42 day and 34 night handovers were observed. All the day time handover were observed first, followed by the night time handovers the following week. The researcher worked night duty for the period of collecting data for night time handovers however during this period of night duty one of the ICUs was closed as a result of infection prevention control for an unlimited time period. This led to a reduction in the amount of bedside handovers observed at night. In order to make up for the required amount of handovers to be observed additional day time handovers were observed during this period in time. This resulted in more day time than night time handovers being observed. The objective was not to compare day to night handovers observed but to get a view across both

shifts. A total of (n=76) observations were done during phase one and another (n=76) in phase three of this study.

The researcher observed the handover process and completed the structured observation checklist whilst using a stopwatch for timing purposes since the checklist required the time taken for handovers.

This structured observation checklist was used in a similar study by Spooner *et al*., (2015) to identify distracters during handover. Every effort was made not to influence any behaviour during the handover process. Participants were not questioned during this phase. It was observed that during the handover period some ICUs used face to face handover between two nurses facing each other at the patient's bedside, while other ICUs preferred group handover at the bedside of each patient conducted by the shift leader only, all staff members on duty attended until handover for all patients were completed.

The observation procedure during data collection requires that the researcher uses all their senses (Baker, 2006) and applies specific techniques to quantify behaviour. Various methods can be used during the data collection procedure. According to Creswell, (2014); De Vos *et al*., (2011) and Hintz, Volpe and Shapiro, (2002) data collection procedures are preferred in collection of behaviour during structured observation and two procedures were identified that applied to this study.

- Frequency or interval recording
- Duration recording

Frequency or interval recording

The process of frequency or interval recording also referred to as event recording, (Hintz *et al.,* 2002) looks at the number of times a specific or target behaviour occurs. The researcher can then measure these frequencies of specific behaviour each time it occurs during a specific time period (Creswell, 2014; Hintz *et al.,* 2002; De Vos *et al*., 2011).

The structured observation checklist used by the researcher in this study looked at specific behaviour listed on the structured observation checklist its frequency and the time period in which it occurred during the handover process and was noted on the structured observation checklist each time it occurred. Any behaviour not listed on the structured observation checklist was ignored and excluded from this study.

As a complete observer the researchers role was to listen and observe. Participants were not questioned and there was no participation or interactions between the researcher and the participants. In this study the time period involved in the observation of handover was from Monday to Friday between 06H45 and 07H25 in the morning and again at 18H45 and 19H25 in the evening.

Behaviour	Time period of 09:00-09:15 observation	
	Time slots	
Attentive listening	09:02	x
	09:03	x
	09:04	
	09:05	x

Source: De Vos *et al*., (2011:182)

Figure 3.3 Example of an interval recording sheet

Duration recording

Some authors (Creswell, 2014; De Vos *et al*., 2011; Hintz *et al.*, 2002) are of the opinion that duration recording can be used in conjunction with frequency recording. During this data collection procedure the specified or target behaviour is recorded from onset time to end time and the best tool for collecting duration recording would be the use of a stopwatch. In this study it applied to the structured observation checklist as it provided for measurement of each distracter in terms of time usage.

In this study the researcher activated the stopwatch from the start of each distracter and stopped at the end of each distracter. The time period was then recorded on the structured observation checklist and the stopwatch was reset. The duration of each distracter was summed in minutes and recorded on the structured observation checklist.

These structured observation checklists were numbered by the researcher for analysis purposes for phases one and three of this study. As previously explained, data observation as the complete observer may not be the ideal method during observation, but when used in conjunction with other data collection methods like qualitative data collection by means of a focus group, it would give a clearer picture and in-depth understanding of emerging patterns observed in phase one.

Behaviour	Time period of 09:00-10:00 observation		Duration
	Start time	End time	Minutes
Eye contact	09:02	09:05	3 min
	09:10	09:12	2 min
	09:15	09:21	6 min
	09:25	09:36	11 min

Source: De Vos *et al*., (2011:18)

Figure 3.4 Example of a duration recording sheet

ICU BEDSIDE NURSING HANDOVER OBSERVATION – INTERRUPTIONS

DEMOGRAPHICS		
Date: 8/11/2016		Observation number: 4
ICU area:	Shift: Day	Total number of patients handed over:
Start time: 7:10	Finish time: 7:25	Total time (mins): 20 min
Patient Group: ☑ Cardiac surgical ☐ General ☐ Orthopaedic	Oncoming RN experience: 1. Years nursing: 10 2. RN level:	Outgoing RN experience: 1. Years nursing: 7 2. RN level:

INTERRUPTIONS

No	Source of interruption Conversational – conversations unrelated to handover (Nurse, doctor, family, physiotherapist), Procedural – equipment alarming/interfering with handover (dialysis alarming, infusion pump alarming, pager)	Reason (nurse saying goodbye, doctor requested an update about patient, doctor wanted the nurse to order an x-ray, infusion ran through & pump alarmed)	Duration of each interruption (mins)
1	Social Conversation.	Nurse greeting	1 min
2	Monitor Alarm	Nurse attend to alarm	45 Seconds
3	Conversation.	unrelated to patient	1min 25 seconds
4			
5			
6			
7			
8			
9			
10			

Interruption defined as a break in the performance of an activity.

Field Notes

Nurses interrupt each other. Engage in social conversation, unrelated to patient handover.

Monitor alarms being reset by oncomming nurse. Verbelize that limits are incorrect.

Observed handover
V1 18.2.16

Figure 3.5 Instrument used to collect observed data

Phase two

Phase two was carried out by means of a focus group. This was a qualitative phase and was exploratory in nature. It took place in a non-threatening environment and the focus group lasted for two hours. The environment where these groups take place should make the participants feel safe (Creswell, 2014; De Vos *et al*., 2011; Polit and Beck, 2017).

The researcher prepared herself for the focus group by familiarising herself with the data collected in phase one. Once all the data from phase one was analysed a venue was booked and confirmed for a pre-set date.

One month prior to the focus group, selected participants were invited by the researcher to join the focus group. An e-mail calendar appointment invitation was sent to each participant.

The focus group was made up of a group of nine experts including a representative from each hospital participating in this research study. Representatives included in phase two all had to have specific characteristics that would make them experts in the field of critical care. Therefore they were purposively selected for their skills and knowledge. They all had a post graduate qualification in critical care nursing science, worked full time and were seen as leaders in their ICUs. They consisted of clinical facilitators, unit managers and shift leaders. The invitation to participate in the focus group explained the reason for the focus group including that it was purely voluntary and that the interview would be recorded. Recording of the interview would only commence once participants had given written consent to do so (Appendix H). All participants replied by e-mail confirming their willingness to participate in the focus group.

On the day of the focus group the researcher made sure that the room was well prepared with enough tables, chairs, and recording instruments. The researcher once again familiarised herself with the content. Participants were welcomed to the venue.

According to Creswell, (2014) De Vos *et al*., (2011) and Polit and Beck, (2017) a focus group can be used to close a gap among participants. It gives a better understanding with regards to what people think and feel. Opinions views and experiences are shared. Participants in these focus groups have specific characteristics (Creswell, 2014; De Vos *et al*., 2011; Polit and Beck, 2017). This applied to this study in that all participants had been trained in critical care nursing science. The authors were also of the opinion that the size of a focus group should include six to ten participants. In this study the focus group consisted of nine participants

The purpose of the focus group was once again explained to the group of experts including that their participation was voluntary and that the interview would be recorded only once they consented in writing (Appendix H). Numbers were assigned to experts in the group to protect their anonymity and it was made clear that they would only be referred to by the number assigned to them. Once all consents had been obtained from the experts, a Phillips voice tracer audio recorder was used to record the focus group meeting. Background to the study was given to the group of experts. Questions were set according to findings that emerged from the observations in phase one. The type and frequency of distracters were presented to the experts in the focus group. Open-ended questions regarding the findings were posed and participants were given the opportunity to give their own views in response.

Some of the questions that arose are listed below:

- What in your experience are your biggest challenges when it comes to distracters during the handover period?
- Why do you think distracters happen during the handover period?
- How do you feel when social conversation among staff members and alarms interrupt the handover? Can you describe your feelings?
- Do you think distracters cause a break in concentration?
- How does it impact on your patients' safety and working environment?

The second objective aimed to implement changes in handover practice as agreed upon by the participants from the intensive care units after collaboration with colleagues and the researcher. To answer this objective the following questions were posed to the group of experts in the focus group.

- Thinking back on our discussion regarding distracters and your experience, what do you think can be done to limit the amount of distracters experienced?
- How would you be able to implement these changes and manage them?

Open-ended questioning gave the researcher the opportunity to ask the participants to think back and reflect on their own personal experiences whereafter they responded to the specific questions (Creswell, 2014; De Vos *et al*., 2011; Polit and Beck, 2012). Because the focus group questions were open-ended the researcher's role was to guide the discussion thereby giving the group of experts the freedom to express their own views and feelings.

These experts deliberated on the strategies that emerged from the focus group in order to implement relevant strategies to manage and decrease the distracters. Two distinct strategies

for change that could possibly limit the risk and frequency of distracters were agreed upon by the focus group.

It was suggested by the group of experts that each unit should have the freedom to choose the strategy they would like to implement. A period of six weeks was requested in order to give them enough time to implement the chosen strategy and to get the cooperation of their staff members. A collective agreement on the date of implementation of these strategies was reached by the group of experts after which the researcher would go back to their ICUs and evaluate the implementation of the new strategies agreed upon, by means of structured observations using the same structured observation checklist that was used in phase one.

Phase three

Phase three was quantitative in nature and evaluated the new handover after strategies agreed upon by the experts in the focus group during phase two had been implemented. The same process that was used in phase one was repeated in phase three using the same structured observation checklist. A total of 76 handovers were observed during phase three over a period of one month.

3.6 DATA ANALYSIS

Data analysis is the process of structuring and organising information collected. It is both objective and systematic.

"Descriptive statistics convert and summarise a collection of data into an organised, visual representation or picture" (Brink, 2006:102). Descriptive statistics can be divided into measures of central tendency or variability (Polit and Beck, 2017).

Descriptive statistics are used to describe numbers and give a visual presentation of numbers or data, therefore measures of central tendency (SD) is most appropriate in this study.

3.6.1 Method of data analysis

Phase one and three

The checklists were thoroughly checked for completeness before analysis commenced. The results were inputted into a password protected computer.

Descriptive and inferential statistics were used to analyse the quantitative results of this study in phase one and phase three. Descriptive statistics for frequency and percentage were calculated for demographic data which included time frames, years of nursing experience and distracters. Association of the frequency of distracters was compared between areas of discipline such as cardiac surgical ICU, neuro surgical ICU, general ICU and transplantation.

Statistical analysis approach.

Measures of central tendency (SD) describe the following:

The Mode – the value of the score that occurs most frequently.

The Median – the exact centre, midpoint score and in research reports it may be abbreviated as **Md** or **Mdn.**

The Mean - the sum of the scores divided by the number of scores and can also be referred to as the average. In research studies it may be symbolised as **M** or **X** (Polit and Beck, 2017).

In statistical data analysis, inferential statistics make use of Chi-square, analysis of variance (ANOVA) and a *t*-test. It is designed to test for differences in frequencies of observed data and compare them within the frequency that could be expected (Polit and Beck, 2017).

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Figure 3.6 Chi-square formula

O =Observed frequency

E =Expected frequency

$\sum$ = Summation

X2 = Chi Square value

Multivariate logistic regression was used to test for association between distracters and the time spent on distracters by various areas of discipline. The Chi-square test was used to test for association between the distracters identified during phases one and three. This would show whether the proportions of the distracter in phase one and phase three differed. A one-way (ANOVA) analysis of variance was conducted to assess differences between the mean values of the different ICUs for time in minutes spent on distracters after implementation of the new handover strategies agreed upon in phase two. To test if the variances of the time between the groups are equal a Levene's test was calculated. A Welch test was computed assuming unequal variances in time in minutes between the ICUs. It was therefore needed to follow-up with a Post-hoc Games-Howell test to indicate which specific ICU area differed and where specific differences existed. A *t*- test analysis of log distribution in seconds was carried out during phase three. The independent *t*-test assuming equal variances was computed to test the differences between the mean values of phase three and phase one in time spent on distracter on log disruption in seconds.

Phase two

3.6.2 Qualitative Content Analysis

Qualitative content analysis is one of numerous research methods used to analyse text data. Content analysis is a research method that has come into wide use in health studies in recent years. Researchers regard content analysis as a flexible method for analysing text data (Cavanagh, 1997).

Qualitative data was analysed using Hsieh and Shannon's, (2005) content analysis. These authors describe three types of content analysis including Conventional content analysis, Descriptive analysis and Summative analysis. This study used Conventional content analysis.

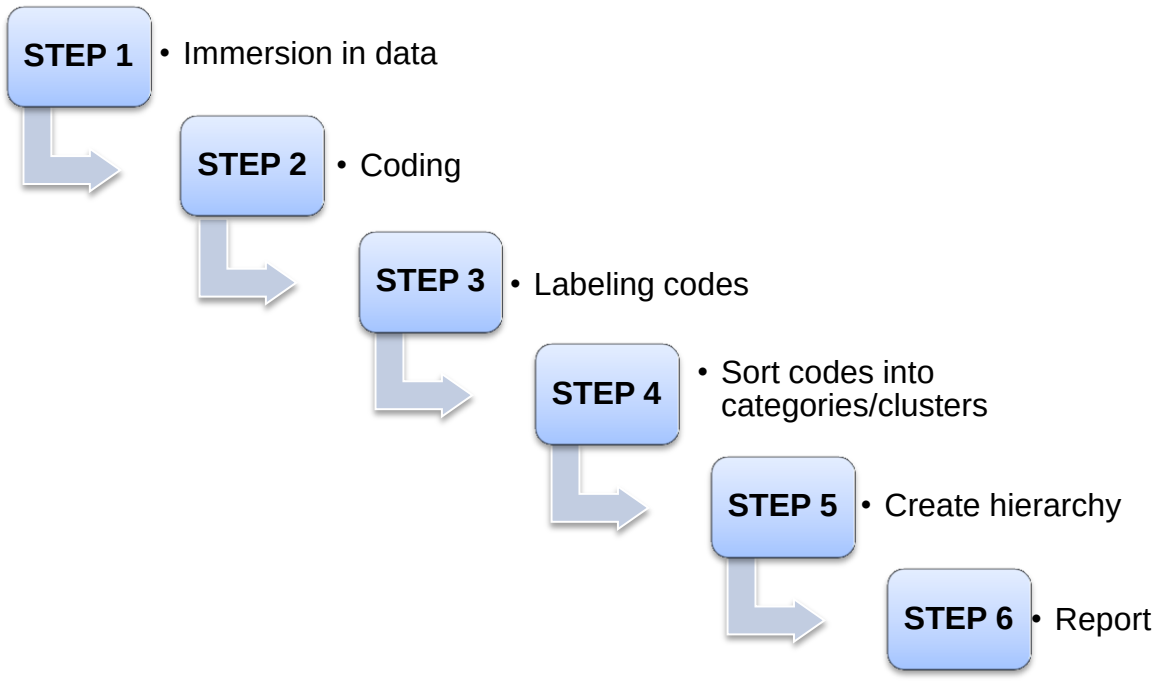


Figure: 3.7 Steps in Conventional content analysis (Hsieh and Shannon, 2005)

3.6.3 A systematic approach to content analysis

Step one: Immersion in data

Firstly the researcher copied the audio–recorded interview to her computer. Thereafter the researcher immersed herself into the content by listening attentively to the audio-recordings while referring to field notes. Particular attention to detail such as tone of voice, non-verbal communication, laughter and background noises was noted. Once the researcher felt confident with the content of the audio–recording, the researcher transcribed the recording verbatim. The transcript was verified with the audio–recording for accuracy. Several hours were spent on reading and re-reading the transcript until the researcher had in depth knowledge of the content.

Step two: Generation of codes

With guidance from her supervisor the researcher worked systematically through the data with the research questions in mind. The researcher read through the transcript and used highlighters to identify key words and phrases.

Step three: Labelling codes

As the process developed labels emerged. These words were grouped and coded. The aim of coding at this stage was to sort and organise the words and phrases according to their significance related to the research questions and to match them with the data extracted from the transcript.

Step four: Searching for categories

Searching for categories started once all the data were coded. The researcher used tables to write down each code with a brief description next to each code. Highlighting the words in

colours matching each code aided in quick identification of each code. The codes therefore became the building blocks in searching for the categories.

Step five: Create hierarchy

Categories were organised and the final step was placing the categories in a hierarchical order. Naming and defining categories required that the categories told the story and fit into the data in relation to the research questions of this study. From the transcriptions sub-categories emerged and were collapsed into categories that gave structure and meaning to the data. The researcher collaborated with her supervisor in naming the sub-categories and categories ensuring that they had enough depth and at the same time giving clear and conscious information about the categories. At the end of this step the researcher was satisfied that the categories were clearly defined and named.

Step Six: Reporting

Writing the report required the researcher to contextualise the content related to the study in such a way that it told a logical story of the data, keeping it interesting with sufficient evidence from data extracts. It had to have enough merit in convincing the reader of its validity therefore extracts from the data to enable her to capture the "heart" of the points were used.

3.7 RESEARCH RIGOR

For this study an existing structured observation checklist was used thus ensuring validity and reliability of the study. Validity and reliability were maintained by ensuring that the findings were accurate, unbiased and adequately represented the target population. The researcher adhered to the inclusion and exclusion criteria and consistency was maintained in the sample

selection. The study was done in accordance with the procedures and protocols of the Universities Human Research Ethics Committee (Medical).

The structured observation checklist was developed by a well-known researcher Spooner *et al*., (2015) and the resulting work had been published. Raosoft calculation was used to establish the sample size. Only the researcher collected data to ensure consistency. An accredited statistician had been consulted regarding further data analysis for the quantitative phases. The statistical analysis was done with the assistance of an accredited statistician to ensure accurate interpretation and analysis of all data collected.

Trustworthiness

Trustworthiness refers to the establishment of validity and reliability of qualitative research. Polit and Beck, (2017:747) define trustworthiness as "the degree of confidence the researchers have in their qualitative research."

Trustworthiness is a means of judging soundness of a qualitative research as identified by Lincoln and Guba (Polit and Beck, 2017). This guide includes criteria such as credibility, dependability, confirmability and transferability and gives rigour to qualitative research (Cope, 2014; Houghton *et al*., 2013).

Credibility

In referring to Lincoln and Guba's four criterion for trustworthiness Polit and Beck, (2017) as well as Polit, Beck and Faan, (2012) describe credibility as the confidence and truth of the findings and the interpretation thereof by the researcher. They described two methods of ensuring credibility in qualitative research. The collection of data in a believable manner will

display credibility. The steps taken in writing reports will show that the researcher's results are credible (Houghton *et al*., 2013; Polit and Beck, 2017).

There are additional methods for enhancing credibility (Cope, 2014; Guba and Lincoln, 1994; Houghton *et al*., 2013; Polit and Beck, 2017). Prolonged engagement and persistent observation is a method to enhance credibility during data collection. It emphasises the importance of spending enough time in the research field thereby avoiding any misinformation. This will not only enable the researcher to gain an in-depth rich understanding of the phenomenon under study, but will also build a trusting relationship between the researcher and participants. A relationship of trust will promote a more detailed response from participants in their willingness to share their views and emotions. This will ensure saturation of key categories under discussion. Persistent observation is of great significance in ensuring the quality of data collection. Through persistent observation the researcher should be attentive in their observation by focusing on the key characteristics of the discussion.

In this research study credibility was ensured by applying several methods. It started with prolonged engagement and persistent observation. The researcher is well known by the hospitals participating in this study, and has been so for the last twelve years. Both have a good trusting and working relationship with each other.

The researcher went to each of the eight ICUs from the five hospitals participating in the research. A meeting was scheduled with each ICU in which the researcher verbally informed all staff member regarding the intent of the study. An information letter was given to each participant with a detailed description of the study. The researcher made sure she spent enough time in the research field. The researcher focussed on key characteristics that

emerged from the discussion in the focus group by being attentive in observation. It resulted in field notes that gave depth to the discussion.

Dependability

Dependability refers to the consistency and stability of data collected over time in similar conditions (Cope, 2014; Houghton *et al*., 2013; Polit and Beck, 2017). Therefor the research process followed should stay the same. Dependability and Credibility are closely related (Polit and Beck, 2017). The rigour of dependability can be achieved in qualitative research where similar studies have been conducted by various researchers under similar circumstances with similar end results thus testing the dependability (Cope, 2014; Houghton *et al*., 2013; Polit and Beck, 2017). In this research study dependability was achieved by maintaining consistency throughout the various phases. Dependability was furthermore confirmed in that this research followed similar studies conducted by well-known published authors. Dependability will however be difficult to ascertain because the study is limited to random sampling.

Confirmability

Confirmability refers to the researches ability to remain objective in that data obtained is representative of the participants own views and not the opinion of the researcher, thereby preventing bias from the researcher (Cope, 2014; Houghton *et al.*, 2013; Polit and Beck, 2017). Observer bias may be a potential risk.

In this study observer bias was prevented by the presence of the researcher's supervisor that was present at the focus group. The supervisor is experienced in qualitative research. The researcher and her supervisor reached consensus regarding the data thereby ensuring

confirmability. Confirmability was enhanced by rich quotes (Cope, 2014) obtained from the group of experts response to emerging categories. It reflected the voice of the participants.

Transferability

Transferability refers to the degree in which the findings will be applicable in other settings and groups (Cope, 2014; Polit and Beck, 2017). The researcher should therefore provide sufficient information regarding the findings.

This will enable the reader to make meaning of the findings. In this study transferability was ascertained by using random sampling and thick description of data saturation using verbatim transcripts. Tape recordings and accurate transcription provide a record. Meanings obtained from the conversation with the participants were confirmed and amended as necessary.

3.8 ETHICAL CONSIDERATIONS

Ethical principles to be considered are as follows: "principle of respect for persons, the principle of beneficence and the principle of justice" (Burns and Grove, 2009:188).

The principles of respect for persons include the protection of human rights. The human rights that require protection are: " the right to self –determination, the right to privacy, the right to anonymity and confidentiality, the trait to fair treatment and the right to protection from discomfort and harm"(Burns and Grove, 2009:189).

Informed consent was obtained in writing from every participant by the researcher to ensure that the ethical aspect of this study is taken into consideration. Participating in this researcher was completely voluntary. All participants had the right to withdraw from the study at any time, had they wished to do so.

Participants received an information letter informing them of the research and how data would be collected. The right to privacy was taken into consideration and explained to the participants (Burns and Grove, 2009).

The researcher aimed to protect the anonymity and maintain the confidentiality of all data during the study. A focus group is not totally anonymous however the researcher aimed at maintaining participant's anonymity and confidentiality by identifying participants by numbers and codes.

An experienced researcher advised the researcher and assistance was provided during data analysis. This study was conducted with the utmost sensitivity to all participants and their views.

- Permission to undertake the study was granted by the Universities Human Research Ethics Committee (Medical) (Appendix A) and Postgraduate Committee.
- The permission to use the structured observation checklist ICU Bedside Nursing Handover Observation – Interruptions, was sought from the author of the instrument in the form of writing and permission was granted through e-mail. (Appendix I)
- The unit managers of the selected ICUs and participants were given an information letter (Appendix F) which explains the purpose of the study, the procedure and the consent form (Appendix G) to sign if they accepted to participate in the study. The information letter explained that participation was purely voluntary and those participants had the right to withdraw consent anytime during the data collection period without any penalties. The benefits that the research results were likely to bring to the units were also made clear. The steps that were followed to ensure

anonymity and confidentiality during the entire period of study and thereafter were also explained.

- Consent to participate in a recorded focus group (Appendix H) was only obtained on the day of the focus group.
- The letter of request for permission (Appendix B and C) was submitted to each hospital where the study was conducted to give permission to observe the handover process. The detailed letter explaining the research purpose, data collection procedure and instrument was submitted to the Ethics Committee of the private hospital group. Permission to undertake the study was granted in response (Appendix E).
- Confidentiality and anonymity was maintained throughout the period of the study. This was done by giving each participant a number. No participant's name or hospital can be linked to either recording or transcribed data and will only be accessible to the research team even after reporting or publishing the research.

3.9 SUMMARY

This chapter presented the research methodology in detail. The research design was carefully selected to appropriately meet the purpose and objectives. The structured observation checklist used for data collection has also been described in detail. This structured observation checklist successfully met the objectives. The following chapter presents data analysis and research findings.

CHAPTER FOUR

RESULTS AND FINDINGS

4.1 INTRODUCTION

This chapter presents the research results and findings. The purpose of this study was to optimise the nursing handover in the intensive care unit by identifying and managing distracters which may interfere with the handover process. Use was made of a mixed method design that included quantitative and qualitative interpretive methods. It employed a before and after study intervention model to obtain these findings.

Descriptive and inferential statistics were used to analyse the quantitative results of this study in phase one and phase three. Data from phase three was collected after implementation of the new handover strategies as agreed upon in phase two. Qualitative findings in phase two were exploratory in nature and descriptive and interpretive methods were used to obtain these findings. Categories and sub-categories that emerged from the focus group will be presented. The focus group was recorded and transcribed verbatim. Analysis was done by using Hsieh and Shannon's, (2005) content analysis as described in chapter three.

The research questions used in this study were as follows:

- What are the distracters affecting the ICU handover and the frequency of these?
- How can these distracters be managed?
- Does the implementation of the management strategy reduce the nature and frequency of distracters?

4.2 APPROACHES TO DATA ANALYIS

The study followed a mixed method design with sequential, observational, descriptive and participatory phases. It employed a before after study intervention model.

In this study the population consisted of eight ICUs from five private sector hospitals that participated in this study. Accumulatively they had a total of 94 ICU beds. In this study the accessible units of study (population) included the (N=94) beds in the eight ICUs of five hospitals in the private sector. Raosoft calculation with an error margin of 5% and a confidence level of 95% was used to calculate the sample size needed. The sample required was (n=76) observations for phases one and three of this study.

Phase one of this study a quantitative phase required a sample of (n=76) handovers to be observed. It made use of structured observation in collecting data. A structured observation checklist from a well published author Spooner *et al.*, (2015) was used. Only behaviour listed on the structured observation checklist was observed. Observation included day to night and night to day handovers and a variety of disciplines were included.

Phase two made use of a focus group consisting of a number of experts. The experts were presented with the results from phase one and asked to collaborate. The purpose was to deliberate and come up with strategies that they might be able to implement in their own units. The discussion was recorded and transcribed verbatim. Once the distracters were identified, strategies could be discussed that might assist in reducing them. Each expert decided on strategies that they would be able to implement in their unit and manage in order to bring about a change.

Phase three followed the same structured observation as phase one. It took place two months after implementation of the new handover strategies. Phase three required a sample of (n=76) observations. These were carried out two months after implementation of the new strategies at the same hospitals.

An accredited statistician was consulted with analysis of the data in phase one and phase three where use was made of descriptive and inferential statistics to describe the data in an organised way.

Descriptive statistics made use of means (M), standard deviations (SD), and percentages. Contingency tables, graphs and mosaic plots were used to give a visual representation of the findings. Inferential statistics were used to describe the differences in frequencies of variables observed and use was made of the chi-square test for this purpose. A computed probability of less than 0.05 indicates a significant relationship in this study. "In statistics a significant result means that the obtained results are not likely to have been the result of chance at a specified level of probability" (Polit and Beck, 2017:382).

One way analysis of variance (ANOVA), a parametric procedure was used to test the variance between mean values of groups (Polit and Beck, 2017). This was carried out to establish if there was a statistical difference among mean values in phase three after implementation of the strategies agreed upon in phase two when compared to phase one of the study. This would enable the researcher to compare if differences among phase one and phase three exited after implementation of the new handover strategies.

The differences between the mean values of phase one and phase three in this study was calculated using the independent t-test. Violation of the homogenous variances or skewness

was tested using the Levene's and Welch test. In addition, a post–hoc Games-Howell, another non-parametric test, was computed. It adjusts for unequal variances and could therefore indicate variances in time spent on distracters among the different ICU disciplines and where those specific differences exist. If the assumption of skewness is made this post hoc test should be used.

4.3 PHASE ONE

4.3.1 Sample characteristics

It is standard practice for handovers to be done at the patient's bedside in ICU in many of the private health care facilities. In this study handovers were observed from day to night and night to day members of staff.

Differences in handover styles have been observed during phase one between the ICUs. It was observed that even though the ICUs may be located at the same hospital different handover styles existed between them. Face to Face also known as one to one handover between two nurses facing each other at the patient's bedside was one method used by five of the ICUs. Group handover at the bedside of each patient led by the shift leader, accompanied by a group of staff members until handover for all patients was completed, was a second method used by three ICUs.

Table 4.1 Summary of handover style among oncoming and outgoing Registered Nurses phase one

	Handover styles			
	Face to Face		Group handover	
Oncoming and Outgoing RN nurses	*n*	*%*	*n*	*%*
	40	53	36	47

In this study handovers were done verbally face to face and in a group at the patient's bedside. Results summarised in **Table 4.1** shows that during phase one 53% (*n*=40) handovers were done face to face and 47% (*n*=36) of the handovers were done in group handover. Oncoming nurses totalled 40 and outgoing nurses total 40. A total of 80 nurses participated in face to face handover in phase one. The total number of nurses attending group handover was unpredictable as it varied from ICUs each day according to the needs of patients and ICUs. The accumulative total for nurses attending group handover from the eight ICUs during phase one totalled 504. A total of 274 were oncoming nurses and total number of 230 was outgoing nurses that were involved in group handover.

Table 4.2 Summary of handovers in phase one

Shift	**No**	**Phase One**
	n	*%*
Day	42	55.3
Night	34	44.7
All	76	100

A total of (*n*=76) handovers were observed during phase one. A summary of the handovers in phase one listed in **Table 4.2** indicates that an observed 55.3% (*n*=42) were done during the day and 44.7% (*n*=34) at night. Day to night and night to day handovers were observed in each ICU. More handovers were observed during the day than night in phase one of this

study. Day observations were carried out first. The night observations were done the following week.

One of the ICUs was closed for infection control purposes during the data collection period at night during phase one. To make up of the difference more day handovers were observed to get to the required sample of (n=76). As previously explained in chapter three the aim was to get a view of both shifts and not to compare day to night time handover.

Table 4.3 Summary of years of critical care experience among oncoming and outgoing Registered Nurses phase one

		Years of experience
		Phase One
Oncoming RN years	Mean (Std dev)	6.7 (SD± 3.0)
Outgoing RN years	Mean (Std dev)	7.2 (SD± 3.4)

The oncoming registered nurse is seen as the nurse that will come on duty to take over from the outgoing registered nurse who is at the end of his/her shift for the day. The outgoing nurse would therefore handover the care delivered to the patient from the previous twelve hours. This enables the oncoming nurse to plan the nursing care to be delivered to the patient for the next twelve hours, thereby ensuring continuity of safe patient care.

Table 4.3 provides a summary of the range in years of experience among oncoming registered nurses. Findings indicate that the range of experience in years among oncoming registered nurses phase one in this study was a mean value of 6.7 (*SD*± 3.0) and outgoing registered nurses a mean value of 7.2 (*SD*± 3.4). The years of experience of nurses could be seen as an essential part for the delivering of safe patient handover. It could therefore be expected that more experienced nurses would be more knowledgeable and skilled to deliver safe handover contributing to the continuity of safe patient care.

Table 4.4 Observed handovers in area of discipline phase one

Characteristic	**Phase One**	
	n	*%*
Cardiac Surgical	22	29.0
General	9	11.8
Neuro Surgical	27	35.5
Transplant Unit	18	23.7
All	76	100

Data collection was carried out in ICUs which included a number of disciplines. The results in **Table 4.4** show that a total of 29.0% (*n*=22) handovers were observed in the Cardiac surgical discipline. The General ICU accounted for 11.8% (*n*=9) handovers observed in the general ICU discipline. The neuro surgical discipline accounted for 35.5% (*n*=27) handovers observed. A total of 23.7% (*n*=18) handovers were observed in the transplant unit. The total number of handovers that were observed during phase one accounted for (*n*=76).

4.4 PHASE ONE RESULTS

4.4.1 Number and duration of distracters

Table 4.5 indicates the number and duration of distracters observed during the handover period in phase one.

Table 4.5 Number and duration of distracters observed phase one

Number and duration of distracters				
Distracter	*n*	*%*	Length of time in minutes	Mean time
Social conversation	37	48.7	25	12.5
Monitor alarms	14	18.4	5.36	2.68
IV alarms	13	17.1	9.25	4.62
Dr's rounds	9	11.8	17	8.5
Others	3	4.0	14	7

The distracters observed during phase one listed in **Table 4.5** totalled 76. The main distracter identified was social conversation (37/76; 48.7%) a period of 25 minutes was spent on social conversation with a mean time of (*M*=12.5) minutes. Monitor alarms, the second most common distracter accounted for (14/76; 18.4%) a total of 5.36 minutes was spent on this distracter with a mean time of (*M*=2.68) minutes. Distracters caused by IV alarms numbered (13/76; 17.1%) 9.25 minutes was spent on this distracter with a mean time of (*M*=4.62) minutes. Doctors' round accounted for (9/76; 11.8%) 17 minutes was spent on distracters from Doctors' rounds with a mean time of (*M*=8.5%) minutes. Distracters making up a group of others included visits by phlebotomists, physiotherapists, family members, ventilator alarms and x-rays done, accounted for (3/76; 4.0%). They required a period of 14 minutes to be spent on these distracters with a mean time of (*M*=7) minute. Results listed in **Table 4.5**.

4.4.2 Time spent during handover on distracters by ICU discipline in phase one

A considerable amount of time was spent on distracters in different ICUs.

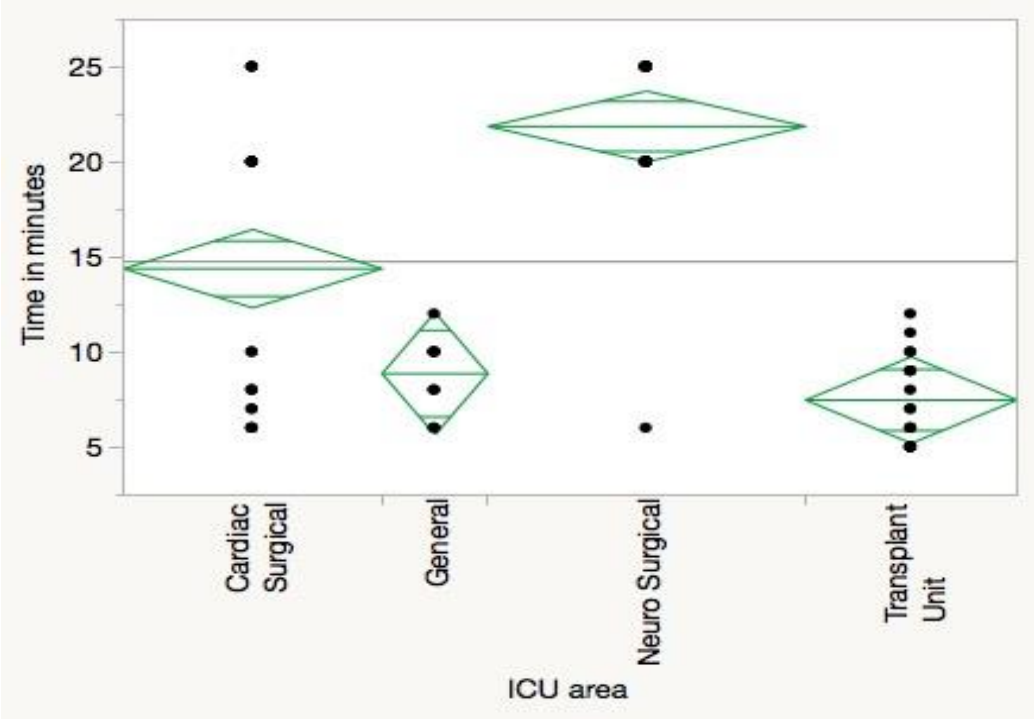


Figure 4.1 Analysis of time spent on distracters by ICU area phase one

The results illustrated in **Figure 4.1** indicate that the mean time spent on distracters in the Neuro surgical ICU was (*M*=21.9) minutes. Cardiac surgical ICU time spent on distracters was greater with a mean time of (*M*=14.4) minutes greater than General ICU (*M*=8.9) and the Transplant unit (*M*=7.5) which had the lowest mean time.

Summary of phase one

- Handovers were done face to face and in a group.
- A large number of distracters 76 occurred during the handover period.
- Social conversation among nurses interrupting the handover was the most common (48.7%) followed by monitor alarms (18.4%) IV alarms (17.1%) Doctors' rounds (11.8%) and others (4.0%) which included visits by phlebotomists, physiotherapists and family members.
- A great amount of time was being spent on distracters during the handover period in the various ICU areas during phase one. The mean score for time spent on distracters in one unit was a mean value of (M=21.9) minutes.

From the statistical information gained in phase one it is clear that there were four areas that needed attention. Those four areas would form the starting point of the discussion in the focus group during phase two.

4.5 PHASE TWO

The aim for phase two was to collaborate with selected participants to come up with their own thoughts and ideas on strategies they would be able to implement in their units, to bring about a change in the handover process thereby decreasing the distracters and time spent on them.

Changes that need to be made in a process will not happen spontaneously and the people in charge must be in agreement before the change can be enforced. In order to accommodate the changes related to phase one, it was necessary to obtain the cooperation of the unit mangers, shift leaders and clinical facilitators of all the ICUs included in this study.

The role players who were invited to participate in phase two were not only specialists in the field of critical care nursing, but they were also role models and leaders. These characteristics make them unique in this context as this will enable them to enlist the cooperation from their staff members to bring about the changes needed.

Phase two was a qualitative exploratory phase where these role players collaborated on how and what changes they would implement to decrease the distracters.

Four significant distracters of concern were identified from the results obtained in phase one. These have been identified as social conversation, monitor alarms, IV alarms, and Doctors rounds. A fifth distracter made up the group labelled others and included visits by various members of the treating team.

These four areas need attention, because statistics have shown them to create interruptions at the handover. The researcher therefore chose a qualitative phase including a focus group to explore and make meaning of why these distracters occur and whether they could be managed

or stopped. Feedback of these four distracters would therefore form the starting point of the discussion in the focus group during phase two.

Qualitative findings were exploratory in nature and descriptive and interpretive methods were used to obtain the findings. Categories and sub-categories that have emerged from the focus group will be presented. The focus group proceedings were recorded and transcribed verbatim. Analysis was done by using Hsieh and Shannon's (2005) content analysis described in chapter three.

4.5.1 Description of participants

Participants from the focus group were purposively selected. They had to have specific characteristic that qualified them as experts in their field. These characteristics included that they all held a post graduate qualification in critical care nursing science, worked full time and fulfilled leadership positions in their respective ICUs. This was done to ensure that the focus group would be particularly knowledgeable in the field of critical care nursing and had the authority to make changes.

The choice of senior staff was considered important if changes in the handover process were going to be successful. As leaders they would be able to apply their skills in change management by clarifying questions, sharing ideas, stimulate critical thinking and improve team dynamics enabling them to get the cooperation from their staff members needed to bring about changes.

Participation was voluntary and experts consisted of clinical facilitators, unit managers and shift leaders. Of the nine participants in the focus group, seven were not first language English speakers. This is clearly visible in the verbatim transcriptions.

4.5.2 Confidentiality of participants

Maintaining the confidentiality of participants is of great significance. Participants in the focus group may have been known to each other because they work for the same company. Every effort was made to ensure that the participants understood the process and informed consent was obtained. Confidentiality was maintained throughout by assigning numbers to the participants and hospitals. Participants and hospitals were only identified by a number allocated to them, therefore no names of the participants or hospitals could be linked to the data other than by the researcher. Audio-recordings from the focus group have been saved on computer and this computer is password protected.

4.5.3 Emerging categories and sub-categories

Emerging categories and sub-categories were identified from verbatim transcriptions of the audio-recording. The researcher and supervisor, who is experienced in content analysis, collaborated in creating categories and sub-categories.

The researcher followed specific steps to enable her to extract sub-categories and categories from the transcribed data obtain through the discussion:

Firstly the researcher immerged herself in the data listening to the audio-recording repeatedly until she obtained a sense of the whole.

Thereafter the researcher transcribed the recording verbatim and spent several hours reading and re-reading to gain an understanding of what the participants was talking about. This step was followed by the generation of codes.

With assistance from her supervisor the researcher started to highlight key words and phrases in text that appeared to representative of thoughts or concepts.

As the process continued labels for the codes emerged. At this stage the words were grouped and coded, aiming to organise the words and phrases with the researcher's questions in mind. This followed the search for categories. The search of categories was then embarked on.

In her search for categories the researcher wrote down the codes in tables with a brief description next to each. Codes were organised into categories when they described similarities or differences in text that belonged together. Emergent codes and categories were grouped into clusters. Some of the codes were combined and others split into sub-categories. They were finally organised into a hierarchical structure. The categories would therefore be an expression of what is visible and obvious from the findings in text.

A summary of significant phrases and words that lead to the development of the four categories are listed in **Table 4.6**

Table 4.6 Summary of significant phrases and words leading to the development of Categories

Significant phrases and words	Keyword	Transcription Appendix K	Page
Somebody must stop and look at alarms. Where was I?	Alarms	(PAR08)	206
Alarms are constantly ringing	Alarms	(PAR03)	206
Take a lot of time to attend to alarms It breaks concentration	Alarms	(PAR07)	206
Attend to bedside alarms infusion pumps ring must stop handover Alarms were never set. Lot of noise in the unit. It's the break of training of thought.	Alarms	(PAR 02)	206
A lot of activity x-ray, lab technicians busy at patient's bedside Physiotherapist is already in unit at handover busy with patient,	Busy Busy	(PAR02)	206
Doctors busy at beside, staff must stop handover.	Busy	(PAR08)	207
That interruption first of phone call takes the focus away	Interruption	(PAR03)	207
Phone calls causes a lot of interruption, it breaks the flow of handover.	Interruption	(PAR05)	207
Phone calls at bedside disrupt the whole team	Disrupt	(PAR01)	207
Phone calls are a lot it disrupt the handover, I am just wasting my time.	Disrupt	(PAR07)	207
It is the worst time for us, the visitors [family] are coming If they [visitors] are already there at handover it makes us anxious	Visitors	(PAR02)	207
If there are people [visitors] outside you get distracted	Visitors	(PAR08)	207
Suddenly they [visitors] want to see the Doctor and it's handover, so it's a lot of disruption	Visitors	(PAR01)	207
active busy on their laptops an cell phones	Active	(PAR02)	208

Patient can get restless and active	Active	(PAR03)	208
It is not the patient lying still, they are active	Active	(PAR04)	208
Women like to talk I see something come up, I will start talking	Talk	(PAR03)	208
Sometimes it talking really gets out of hand	Talk	(PAR01)	208
It is the patients themselves that start talking	Talk		
You have to bring them [nurses] back to conversation on handover	Conversation	(PAR02)	209
To get them back to on board to the conversation at bedside takes some time	Conversation	(PAR06)	209
Having their own conversation. So we correct each other	Conversation	(PAR08)	209
You get irritable when distracted, it changes the mood of the team, what was I saying	Mood	(PAR08)	209
The vibe [mood] is already up	Mood	(PAR01)	209
Negative mood takes the focus away when distrusted, I am also anxious now	Mood	(PAR04)	209

Categories and sub-categories listed in **Table 4.7** are supported by quoting narrative extracts from the data. Italic font was used in quoting these verbatim narratives and no language editing of recordings was done. This gave meaning to the categories and sub-categories and a rich in-depth understanding of the participants views, ideas and feelings.

Table 4.7 List of categories and sub-categories

Categories	Sub-categories
Loss of concentration	• Bedside alarms • Patient care procedures • Telephone calls
Timing	• Family visits • Busy patients
Conversations	• Social conversation • Business conversation
Psychosocial behavioural patterns	• Emotional stressors

Category One: Loss of concentration

Loss of concentration during bedside handover in the ICU environment can be directly linked to distractions diverting nurses' attention away from completing the task at hand. In this vulnerable environment, many factors play a pivotal role such as background noises and colleagues. This places the patient's safety at risk and compromises the continuity of safe patient care.

Sub-category

- **Bedside alarms**

Bedside alarms in the ICU include monitor alarms, ventilator alarms and alarms from invasive devices such as intravenous lines. Alarm limits are set according to the patient's vital data and ever changing condition to ensure the continuity of safe patient care. It is important to note that these alarms will continue to discharge until the nurse stops what he/she is doing and attends to the alarm. This may lead to a loss of concentration which is of particular significance during the handover period. Not only does it divert the nurses' attention away from the handover but it also causes a break in communication that may lead to the loss of

vital information regarding the patients care. The nurse will stop the handover to attend to the alarm and reassess his/her patient. This may take a few seconds or minutes.

When participants were asked how they felt about bedside alarms, the impact it has on their concentration and the handover, they replied in the following way.

One of the participants said …

(PAR08) *"Somebody must stop and look at the alarms. Now you must stop thinking. Where was I? The quality* [of the handover] *is already distorted."*

Followed by two participants that replied …

(PAR03) *"It is the break of the training of thought* [train of thought] *you know and…. That is a big thing!"*

(PAR07) *"To get them* [nurses] *back on board is going to take them some time and that is why sometimes in my opinion the handover takes too long".*

Drawing from her own experience a participant verbalized that …

(PAR02) *"Bedside alarms, infusion pumps ring. Alarms were never set you must stop handover. It is a lot of noise in the unit, it breaks your attentions. We expect them* [nurses] *to still carry on attend to the alarms until handover is finished."*

- **Patient care procedures**

Patient care procedures are unavoidable and an essential part of the daily routine in the ICU to ensure patient safety and continuity of safe patient care. These care procedures can include a wide range of procedures such as x-rays, doctors' rounds, treatment from the physiotherapist and visits from the phlebotomist. Patient care procedures need to be planned with great thought and not interrupt handover periods.

It is imperative that the handover period should be seen as a "golden" and "sacred" time for nurses. It is a time where exchange of vital information regarding the patient's care takes place from the outgoing nurse to the oncoming nurse. Nursing care to be delivered to the patient will therefore be planned according to information received during this handover period. An interruption from any procedure during this handover period will lead to a break in concentration from the nurse that is handing over. This break in thought may lead to omission of important information that can delay the patients treatment, putting the patients health and safety at risk and prolonging the patients stay in the ICU that may have a greater cost implication on the patient.

A participant commented…

(PAR02) *"There is a lot of activity, x-rays, the lab technicians are busy at the patient's bedside, you know, the physiotherapist is already busy in the unit as well, so there is a lot of activity at the patient's bedside which is quite disruptive."*

All participants agreed and acknowledge that they do understand that patient care procedures need to be done but not during handover as it becomes disruptive.

Two participants complained …

(PAR09) *"Staff must stop handing over and go and help to assist with the x-ray".*

(PAR08) *"At 7:15 am the Doctor is already there busy at the beside so if the handover was not done quickly enough then you need to stop and then somebody needs to go and do rounds. Yes this bothers us!"*

- **Telephone calls**

Telephone calls play an important role in communication between members of the multidisciplinary team in treatment of the patient and concerned family members. It can however place a great deal of anxiety and stress on nursing staff when they are called away from the bedside handover to attend to these telephone calls. In some units the disruptions is increased as each bed has its own telephone at the bedside of the patient. Telephone calls during bedside handover do not only interrupt the handover but have a direct impact on the whole team.

As one participant said…

(PAR01) *"It disrupts the whole team handover, because now they are listening to my conversation. What am I talking about"?*

With this break in attention staff members do not concentrate. Not only does it prolong the bedside handover but they have to re-orientate themselves to what was said before the distraction.

One of the participants verbalized that …

(PAR03) *"I think just that interruption, first of the phone call, obviously you can't stop that, but then if you say no I am busy with handover, already it is a negative vibe!. It just …, I don't know.....takes the focus away".*

- **Summary on category one**

Participants have clearly expressed that bedside alarms, patient care procedures and telephone calls directly impact on the dynamics of bedside handover. It does not only disrupt the handover process but has a negative impact on the train of thought from the nurse that is handing over. Participants verbalised that during these periods of distracters they have to think carefully re-orientating their thoughts to what was said before.

This loss of concentration may lead to ineffective communication and the loss of vital information thus compromising patients' safety and care. Anecdotal evidence confirms that any distraction during handover diverts attention away from the task at hand, affecting decision making and prolonging handover that may lead to errors in treatment in the already vulnerable ICU patient. Not only does it affect safe patient handover but it can increase stress and anxiety levels among staff members as they may feel rushed in completing the handover due to time lost.

Category two: Timing

Effective time management is arguably one of the most important factors during bedside handover. Intensive care units (ICUs) are time and procedure driven. Nurses see this as their "sacred" moment - their time. It may seem selfish but during this short period of time that may last for approximately fifteen to twenty minutes the most important nursing task will be

to complete the handover. Nurses put a lot of time and energy into handover ensuring it is accurate and factual to the patient's diagnosis and health needs. Information handed over during this time period will directly impact on the continuity of care as the patients care for the next twelve hours will be planned according to the information received.

Distracters during this time period not only place the safety of patients at risk which may lead to adverse events, it delays handover time. Nurses may feel that it increases their workload as they now try to work faster trying to complete the handover with less accuracy.

Sub-categories

- **Family visits**

Previously visiting time in the ICUs was strictly controlled by set visiting hours and family members were only allowed to visit during these time periods. Nurses are of the opinion that family visits increases the patients physiological and psychological stress and increased their own work load as they now have to attend to family members as well.

In recent years there has been a move toward a more family friendly, open and unrestricted visiting period. Most participants felt that unrestricted visiting hours allow family to visit patients randomly including during handover time distracting the handover.

If this is the case synchronizing times between handover and family visits are critical. Literature has shown that unrestricted visiting hours is not only beneficial to the family but also to the patients as it decreases levels of fear and anxiety in both. This is still widely debated among nurses themselves as they feel that it takes away their handover time when visiting and handover coincide.

One participant commented that…

(PAR02) *"This is the worst time for us in our unit. It is that handover period the visitors* [family] *are coming."*

There is a general feeling that family visits during the handover period break the flow of the handover and that nurses will pay more attention to the family member visiting than the handover itself.

A participant verbalised that…

(PAR01) *"Visiting hours is* [are] *anytime. It can be as early as 06:45 am* [handover]. *The visitors* [family] *all of a sudden wants to see the doctor, so they also stay and also contribute to a lot of disruption, because the wife will ask this…, and the family ask* [asks] *that…, so it is a lot of disruption during handover."*

Another nurse had the following to say about family visits during handover…

(PAR08) *"If there are visitors* [family] *outside you get distracted, you get irritable when distracted and do not listen properly."*

However one of the participants argued …

(PAR03) *"I think we see it as disruptive, but if you can look at my personal feedback that I get, you know from visitors and all that they are experiencing it much more positive than we are."*

- **Busy patients**

The new generations of intensive care patients are well informed and not necessarily scared of hospitals. Thanks to modern technology and the internet patients now know what to expect about both the environment and equipment before they are even admitted to an intensive care unit. Some are much more active, busy on their tablets, cell phone and laptops. WiFi is freely available for patients to use and in this enclosed environment patients like to "catch up" with the latest news and social media, regardless of how "sick" they feel. This heightened amount of physical activity from patients causes distracters during bedside handover.

As one participant said…

(PAR02) *"Your non ventilated patients, they might be on all their inotropes and that type of thing, but they are still active busy on their laptops or on their cell phones. That causes major interruptions as well because they are now moving, they are fidgeting taking off their sats* [saturation] *probe".*

Hospitals today try to bring some form of normality into the life of patients. It brings about a change in the ICU patient as these patients are more awake due to less sedation being used. Therefore patients are more able to participate and engage if they wish to. This involvement of patients can potentially distract the bedside handover as it may set off alarms and disrupt the flow of the handover.

A participant experiencing this commented that…

(PAR03) "*We don't see those ICU-ICU patients we had previously… you know the one that have been paralysed and sedated and things, so it is more awake sedation these days that we are promoting. Usually our sedation vacation starts at about 06:00am in the morning so that the Doctor when they come on their rounds can observe, so that is the time when the patient can get restless and active you know the patient wakes up all of those things so your alarms might have been set correctly, but suddenly now your patient is awake,* [and] *it's handover you know how it goes".*

Other participants agreed…

(PAR01) *"I agree with* PAR03 w*ith the sedation vacation. It contributes a lot* [to the interruptions]".

There was one participant that felt…

(PAR02) *"It is not the patient lying still you know they are active. That is the one thing and if you think also we have got extended visiting times, so that plays a big role".*

Two participants disagreed …

(PAR 09) *"I really think it is not sedation interruption* [vacation] *as such with us, because we are doing it a little bit later in the morning".*

(PAR 08) *"Our sedation interruption* [vacation] *is not that early… we wait for the Doctor so there would be no interference"*.

- **Summary on category two**

Different views were expressed by participants regarding family visits and busy patients that could potentially cause distracters during bedside handover. Although nurses still feel that handover time is their "sacred" time one should not overlook the important role family members play in the healing process of the already compromised ICU patient hence the need for unrestricted visiting hours. Empirical evidence has shown that the presence of a family member not only reduces anxiety and stress in a patient, it promotes healing.

Getting the timing right in limiting distracters during bedside handover remains a challenge. Participants have expressed that sedation vacation plays a role. Resulting in more awake and active patients during the handover period.

Category three: Conversations

Effective communication is key in transferring vital information regarding the patients care from the outgoing nurse to the oncoming nurse in ensuring continuity of patient care. Handover has however often been described by literature as cold and clinical with no room for social interaction among nurses themselves and patients. This has often led to feelings of detachment and anxiety as nurses were too afraid to ask questions in seeking clarification. Various handover tool guidelines have been developed throughout the year in this hospital group, making it less clinical, allowing for more verbal interaction among nurses and greater group cohesion. A comprehensive approach has been adapted whereby nurses, patients and family members are more involved in the handover process. This poses various risks as

nurses' attention may be diverted away from the handover by engaging in social conversation among themselves and patients. Vital information regarding the patients care may be lost placing patients safety at risk as the handover may become social time replacing the "business" at hand.

Sub-categories

- **Social conversation**

Various studies have confirmed that social conversation among nursing staff is one of the most disruptive elements during the handover process. Nurses tend to engage in social conversation especially when they are familiar with long term patients or it may be communicating with a colleague they have not seen for a while due to opposing shifts. Not only does it divert the nurses' attention away from the handover itself but discussions are usually centred on topics unrelated to the patient. This prolongs the handover process. Vital information may be lost compromising the continuity of care as the nurse handing over has to consider her last action during the handover before the interruption. Studies have been conducted during the last decade confirming the interrelationship between social conversation and distracters in the working environment.

Drawing from her own experience one participant said…

(PAR02) *"Women like to talk. You will never take it away from them. I think it is that long lost friend they haven't seen for the last two days type of thing".*

One participant's concern was that…

(PAR01) *"Sometimes it* [talking] *really gets out of hand…. you must say let's go".*

Another participant felt that it was an opportunity for training and auditing …

(PAR03) *"I see my handover as a training session. I see something that comes up, I will start training because the whole group is there. So if something triggers your alarm it is also like a supervisory time for me because I will say, guys the lines are not done. I am doing my auditing as well. So yes…, lots of disruptions come in from that".*

Although participants agreed that social conversation leads to distracters during handover, they felt united in that the handover should not be too cold and clinical.

One unit manager's view was this…

(PAR 02) *"I also feel that this is the time I am bonding with my day and night staff. For me in my unit specifically it is a time of bonding as well and you know we learn. I need to learn to sort of avoid that but I don't want it* [the handover] *to be too cold and too clinical".*

There was a mutual feeling among the group of experts that it is not only nurses engaging in social conversation distracting the handover, but in some cases patients will start engaging in social conversation during the handover themselves.

One of the participants said…

(PAR01) *"Sometimes the patients themselves, especially these long-term patients…..you know she is the one that greets you by name? Then she starts talking and it is handover*

It is the patient so you don't want to be rude".

Two participants replied by saying…

(PAR02) *"They* [nurses] *do get easily distracted in conversation.*

(PAR08) *"Especially if it is a regular customer*, [patient] *because I mean they know the patient by name, so they will go into conversation".*

- **Business Conversation**

Handover has always been seen as one of the most important nursing tasks to be performed during the day. During handover nurses advocate for their patients, in speaking for those who cannot speak for themselves and this is of particular significance in the critical care environment. Therefore it is essential that nurses get to the "business" at hand, the handover itself. One can therefore refer to handover as "business conversation". It has its own set of rules in use of languages by means of medical terminology. It is factual, to the point, with specific attention and detail to the patient's physical and psychological needs as well as treatment regime, to ensure continuity of safe patient care. Nurses will therefore use various handover guidelines in assisting them to reach their goal.

The risk in business conversation during handover is that it might be perceived by some nurses as too clinical. They may become bored and experience feelings of disengagement. They will start losing interest engaging in conversation distracting the handover. This in itself distracts the nurse handing over, not only diverting the nurses' attention away from the business at hand but it disrupts the thinking process, with the potential risk of vital information being lost compromising patients safety and care.

Handover should therefore be seen as business time and has a small window period of approximately fifteen to twenty minutes. It is a period where vital information is being transferred from the outgoing nurse to the oncoming nurse, regarding the patients care. It will have a direct impact on the type of nursing care rendered to the patient.

One participant stated that…

(PAR02) *"It should not be a social party you know. You have to bring them [nurses] back to the conversation on handover. You are in control of that handover. You have to bring those boundaries on handover".*

Two participants responded to PAR02…

(PAR01) *"You have to draw a line".*

(PAR06) *"I want to agree with the other participants. To get them back to on board to the conversation at bedside takes some time. You know… handover …. It takes a lot of time and then they* [nurses] *rush."*

Followed by one nurse that stated…

(PAR08) *"I think we have learned, we call the people* [nurses] *to order and this is the thing we do. We do correct each other as we go on to make things easier. Otherwise they talk* [about] *other things having their own conversation. So we correct each other".*

- **Summary on category three**

Findings from the focus group discussion confirmed that conversation is one of the most disruptive attributes during handover. It deflects nurses' attention away from the handover with the potential of pertinent information being lost regarding the patients care. However we have to recognize the risk of the handover becoming to "cold" and "clinical". This in itself may distract nurses' attention away from the handover. Participants have expressed that they see handover as a time for bonding and in-service training. It may unexpectedly spill over into social conversation unrelated to the handover. Balancing handover and social conversation remains a challenge. It is a delicate balance and challenging at most times for nurses as "business time" handover unintentionally becomes part of social time, increasing the risk of adverse events compromising patients' safety.

The aim of handover should be to transfer key information regarding the patient from one nurse to another thus ensuring continuity of safe patient care. In accepting the patient at handover the nurse accepts accountability for their actions which in turn will continue the quality of patient care, patient satisfaction, and patient safety.

Omission of important information during handover may place the patient at a higher risk for development of complications. Dosage of medication and information around medication may be lost, compromising patient safety. Therefore effective communication is essential in the transfer of information to ensure continuity of safe patient care. This is particularly important in the intensive care setting.

Category Four: Psychosocial behavioural patterns

It is has been widely publicised that distracters during handover have a profound impact on the nurses' frame of mind. The frequency of distracters during handover subconsciously increases the body's response to emotional stressors. This heightened activity may lead to various fluctuations in the nurses' cognitive appraisal, when confronted with these situations on a daily basis placing patient's safety at risk. Distracters have the potential of being perceived as time wasters and nurses feel rushed to complete the handover as they are pressed for time. This in itself increases the body's response to emotional stressors that has the potential of modifying the nurse's physical and psychological behaviour, compromising the continuity of safe patient care. The latter may result in mental fatigue and decreased levels of concentration, resulting in the loss of vital information and failure to complete tasks that may lead to adverse events.

- **Emotional stressors**

A break in any form of communication caused by distracters during handover may bring about strong emotional connections associated with feelings of frustration, anxiety and confusion. It prolongs the handover period and leads to the depletion of physical and physiological energy levels. As a result it places the nurse in a destructive frame of mind and they may adapt to ineffective coping mechanisms due to increased stress levels. The ICU environment is procedure and time drive, therefore nurses are of the opinion that it increases their workload as they now have to go back and revisit the nursing document for clarification regarding the patients care. Participants verbalised that distracters during handover, disrupts their thinking process and memory, compromising their own mental wellbeing. This brings about changes in the team dynamics on a behavioural level compromising the continuity of safe patient care.

Participants expressed how these emotional stressors made them feel when distracted…

One participant stated that…

(PAR08) *"You get irritable when distracted… it changes the mood of the team. What was I saying? So it can affect the quality of handover you are going to give to the next person,* [nurse] *because now you must stop and think…, I must reprimand the people* [nurses] *who is* [are] *interrupting and making noise. The quality* [of handover] *is already distorted".*

Participants associated with each other's emotional responses when distracted during handover. The participant collectively agreed that they experience feelings of helplessness, frustration, and confusion when pulled away from the handover. This not only affects the patient, but changes the nurses' emotional intelligence and actions. It has an effect on once cognitive thinking skills, with a possible risk to patient safety.

As one participant said…

(PAR01) *"I am just wasting my time!* [slamming hand on table in frustration]. *I am also disrupting the whole team handover. Already they* [nurses] *are also anxious. The vibe* [mood] *is already up!"*

One participant replied and another two agreed with (PAR01)…

(PAR04) *"We agree. You are eating into my handover time. I am also anxious now. The negative mood takes the focus away when distracted. Where am I now?*

[confusion]. *Now we have to go back and look for information. It…it's frustrating!*

- **Summary on Category four**

From the focus group discussion it was found that there was a direct link between distracters and the fluctuation of emotions. It has the potential to modify physical and psychological behaviour of nurses which could result in mental fatigue. This has a negative impact on the nurses' critical analytic thinking skill as they now feel rushed to work faster with an increase in workload to complete the handover in a set time frame. Feeling rushed to complete the task at hand may result in poor communication and loss of vital information compromising the continuity of safe patient care. The human body cannot continuously engage in emotional stressors. Development of unhealthy coping mechanisms in dealing with exposure to emotional stressors on a daily basis has a negative impact one's physical and mental health and may lead to burnout among nurses.

In order to extract suggestions on how to manage the distracter the researcher posed a question.

Researcher…

"*Thinking back on our discussion regarding distracters and your experience, what do you think can be done to limit the amount of distracters experienced?*"

One of the participants responded immediately by saying…

(PAR01) *"A suggestion, maybe because I don't know how everyone's handovers work, but ours mostly the shift leader hands over. So, if the shift leader is handing over then the nurse can still attend to monitors and IV's* [intravenous devices]*... otherwise maybe have a floating nurse who does that."*

Another participant responded by stating…

(PAR04) *"Yes..., I agree with this, so that the continuity of patient care does not get disrupted. Maybe one should start that!* "

Three participants disagreed…

(PAR06) *"We don't do group handover, we do it at the bedside of the patient one to one."*

(PAR 09) "*It does not work for us. If the Doctor comes to bed number two and we are handing over we are both there to assist. It does not necessarily stop the discussion between nursing staff... no."*

(PAR07) *"I want to agree with what the other two participants said. We have tried it in our and we felt that it takes up too much time. We prefer ono to one handover."*

This lead to a strong response from one participant…

(PAR03) *"There is one thing I want to say! We also do one to one handover and we see a lot of things that get lost in translation. You know important things, we do the one to one and that is sometimes too quick in the unit. I want to agree with* PAR 01, and PAR04, *if we can do group handover and the shift leader does the handover, you could have a floating nurse on the floor attending to alarms and doctors rounds. I think… you will get the important information and sort of force them* [nurses] *to listen."*

Three participants suggested…

(PAR06) *"In terms of the alarms going off, we could increase the alarm limits before handover and decrease the limits after."*

(PAR07) *"I like the idea of setting alarm limits before and after handover…umm… I think it will kind of bring the focus back to the patient and alarms. Alarms are a big challenge for us during handover there is a lot of noise in the unit. It* [alarms] *… you know takes the focus away."*

(PAR09) *"Absolutely I agree with the other participants. If we can get the nurse to set their alarms before handover the noise levels in the unit will be less. It irritates me when the monitor alarms keep on alarms during handover and people* [nurse] stop *listening to the handover… because know they are checking wat is going on. For me it would work."*

One participant agreed by saying…

(PAR01) *"This will force a person* [nurses] *to attend to alarm limits as soon as possible, and that is a standard. Then we will all adhere and we all know after handover if I walk pass my monitor your alarms limits will be reset."*

This was followed by three participants that argued the following point …

(PAR02) *"I am just a bit worried about the cognitive thinking of some staff and their critical thinking skills. Not everybody is going to go back and reset their alarms. You know people are … you are dealing with people. I check alarms and I can see they* [nurses] *haven't set alarms umm… It will start with training, training, training…"*

(PAR04) *"Umm..., it is like* PAR02 *said. Like in my unit I work with a lot of agency staff. People forget! … it is human nature. So I do not think it would be really ideal, because after handover you are already rushing to other things that have to be done. Yes… it is a requirement that somebody must stop and look at alarms, but we know how often this happens… I don't think it is going to work for us."*

(PAR05) *" I also want to agree with what the other participants said. I really feel that it is not ideal to set the alarms before and after handover. Umm… and the trend will become they stay there where they are set so* [ja]…"

One participant felt strongly that …

(PAR03) *"I think alarms are a big challenge. It is like the other participants said. The insight and you know the urgency to set it back again… because to get them to set it for a patient in a bed is already a challenge and need a lot of training. For me it will be time consuming and will we benefit from it?..."*

Researcher…

"How would you be able to implement these changes and manage them?

One participant had the following to say…

(PAR02) *"Something I have learned is that you have to sell the idea, like you can almost have like a focus group with them* [nurses] *you know they* [nurses] *need to come up with ideas and you then lead them to what you want them to do."*

One participant replied …

(PAR07) *"Yes! ... they* [nurses] *need to think it was their idea."*

In response one participant suggested the following …

(PAR08) *"Why don't we have two option then we can use the one we feel most comfortable with?"*

Through collaboration six participants made the following suggestion …

(PAR01) *"We would like to try the option of having a floating nurse on the floor with handover done by the shift leader. Yes… she* [the floating nurse] *can then attend to alarms everything you know...* "

This option was selected by five ICUs, while participants from three ICUs suggested the following…

(PAR09) *"We would like implement setting alarms before and after the handover period was completed. That will work for us."*

Researcher…

"How much time do you think is needed to implement these new strategies before I can re-evaluate whether it brought about a change in limiting distracters in your ICUs?"

Five participants collectively came up with the suggestion that six weeks was needed to put time into training the staff. The month of May was suggested and all agreed.

4.5.4 Summary of phase two

Phase two focused on the development of categories that emerged from discussion by the group of experts on the distracters identified in phase one. The purpose of the focus group was to explore and describe their ideas and feelings in order to make meaning of why these distracters existed and how to manage them in order to reduce handover time.

The group of experts expressed mutual feelings of concern regarding the effect of these distracters on patient safety and the continuity of safe patient care. They felt that this matter required immediate attention and that change was inevitable.

The group of experts in phase two therefore collaborated in order to establish strategies they could implement in order to limit these distracters. During the discussion the group of experts collectively agreed on specific strategies to be implemented to enable them to bring about changes in limiting the amount of distracters placing patient's safety at risk during the handover period.

These experts developed strategies they could implement in their units to bring about a change. The group of experts settled on two options they thought they could implement in their units. A representative from each unit was asked to choose one of two options to make a change which they felt they would be able to implement in their units and manage it.

The options offered were:

- A "floating nurse" on the floor during the handover period who would attend to all distracters. This was selected by three hospitals.
- Setting alarms before and after the handover period was completed. This option was selected by two hospitals.

Choices of these strategies should therefore have a direct impact on the results from phase three. The group agreed that a period of two months should be allowed in order for them the gain the cooperation of their staff members to enable them to implement the new strategies agreed upon. The group of experts collectively agreed on a date upon when the researcher would return to their ICUs to re-evaluate whether the new strategies had brought about any change after implementation in limiting the amount of distracters identified.

4.6 PHASE THREE

The same structured observation checklist from phase one was used during the re-evaluation in phase three.

The approach to data analysis as well as the sample characteristics for phase three and phase one remain the same as the same instrument was used during phase three and phase one. Data in phase three were only obtained once the new handover strategies agreed upon in phase two had been implemented for a period of two months.

4.6.1 Sample characteristics

The same differences in handover styles were once again observed during handover in phase three when compared to phase one. Face to face handover between two nurses facing each other at the patient's bedside and group handover at the bedside of patients led by a shift leader accompanied by a group of staff members until handover for all patients were completed was the two main handover styles observed among the ICUs in phase three. However in contrast to phase one, it was observed that some ICUs changed their handover style during phase three after the implementation of the new handover strategies agreed upon by the group of experts during phase two.

During phase three, five ICUs did group handover in contrast to phase one where three ICU's did group handover. Three ICUs continued with face to face handover during phase three whereas five ICUs did face to face handover during phase one.

Table 4.8 Summary of handover style among oncoming and outgoing Registered Nurses phase three

	Handover styles			
	Group handover		**Face to face handover**	
Oncoming and Outgoing RN nurses	*n*	*%*	*n*	*%*
	40	53	36	47

Results summarised in **Table 4.8** shows that during phase three 52% (*n*=40) handovers were done using group handover and 47% (*n*=36) of the handovers were done face to face after implementation of the new handover strategies. This is in contrast to phase one. During phase one 53% (*n*=40) of handovers were done face to face and 47% (*n*=36) of handovers were done in a group. Oncoming nurses that participated in face to face handover during phase three totalled 36 and outgoing nurses 36.

A total of 72 nurses participated in face to face handover during phase three whereas in phase one 80 took part. The total number of nurses that attended group handover was unpredictable as it varied from ICUs each day according to the needs of patients and ICUs. The ICUs also experienced a "quiet" period with fewer patients being admitted during phase three of data collection. The accumulative total of nurses from the eight ICUs that attending group handover during phase three totalled 478 in contrast to phase one that totalled 504 in spite of one ICU being closed during the data collection period in phase one as a result of infection control purposes. The total for all oncoming nurses that attended group handover during phase three were 240 and outgoing nurses were 238.

Table 4.9 Summary of handovers in phase three

Shift		**Phase three**
	n	*%*
Day	38	50.0
Night	38	50.0
All	76	100

A total of (*n*=76) handovers were once again observed during phase three. Results from **Table 4.9** show that an observed 50.0% (*n*=38) handovers were observed during the day and 50.0% (*n*=38) at night. Day to night and night to day handovers were observed in each ICU.

Table 4.10 Summary of handovers comparing phase three and one

Shift		**Phase Three**		**Phase One**		**All**
	n	%	*n*	%	*n*	%
Day	38	50.00	42	27.63	80	52.63
Night	38	50.00	34	22.36	72	47.36
All	76	50.00	76	50.00	152	100

Table 4.10 provides a summary of handovers in phase three and one. From the findings obtained it can be seen that a total of 152 handovers were observed during this study. An observed 52.63% (*n*=80) were done in total during the day and 47.36% (*n*=72) at night. Half of the handovers (*n*=76) were observed during phase three and the same amount (*n*=76) were observed during phase one of this study. Day to night and night to day handovers were observed in both phases three and one. In total more day handovers were observed in the study 52.63% (*n*=80). The night shift handovers accounted for 47.36% (*n*=72). As previously explained more handovers were observed during the day in phase one as a result of one of the ICUs being closed as a result of infection control during the period of data collection in phase one. The aim was to get a view of both shifts and not to compare day to night time handover.

Table 4.11 Summary of years of critical care experience among oncoming and outgoing Registered Nurses phase three

		Years of experience
		Phase three
Oncoming RN years	Mean (Std dev)	6.2 (SD± 2.6)
Outgoing RN years	Mean (Std dev)	7.4 (SD± 3.7)

Table 4.11 indicates the ranges of experience in years among oncoming and outgoing registered nurses during phase three of this study. During phase three the mean value of years in experience among oncoming registered nurses **Table 4.11** was 6.2(*SD*±2.6), whereas the outgoing registered nurse had a mean value of 7.4 (*SD*± 3.7).

Table 4.12 Summary of years of critical care experience among oncoming and outgoing Registered Nurses between phase three and phase one

		Years of experience		
		Phase Three	**Phase One**	**Total Average**
Oncoming RN years	Mean (Std dev)	6.2 (SD± 2.6)	6.7 (SD± 3.0)	6.4 (SD± 2.8)
Outgoing RN years	Mean (Std dev)	7.4 (SD± 3.7)	7.2 (SD± 3.4)	7.3 (SD± 3.5)

From the summary listed in **Table 4.12** it can be seen that in phase three the experience was similar to phase one with the mean value of the oncoming registered nurses' experience in phase three 6.2(*SD*±2.6) compared to phase one 6.7(*SD*±3.0). The outgoing registered nurses had similar results, the years of experience from outgoing registered nurses in phase three was 7.4(*SD*±3.7) and in phase one 7.2(*SD*±3.4). The total average mean for the outgoing registered nurses' experience was 7.3(*SD*±3.5) compared to the total mean of the oncoming registered nurses' year experience that was 6.4(*SD*±2.8). With this small margin in difference in years of experience in critical care nursing among the oncoming and outgoing registered nurses it would be expected that the handover should yield similar results.

Table 4.13 Observed handovers in area of discipline phase three

Characteristic	**Phase three**	
	n	*%*
Cardiac Surgical	22	29.0
General	9	11.8
Neuro Surgical	27	35.5
Transplant Unit	18	23.7
All	76	100

Data collected in phase three were collected from the same ICUs that included a number of disciplines. **Table 4.13** will show that during phase three a total of 29.0% (*n*=22) handovers were observed in the Cardiac surgical discipline. The General ICU accounted for 11.8% (*n*=9) handovers observed in the general ICU discipline. The neuro surgical discipline accounted for 35.5% (*n*=27) handovers observed. A total of 23.7% (*n*=18) handovers were observed in the transplant unit. The total number of handovers observed during phase three accounted for 76.

Table 4.14 Observed handovers in area of discipline phase three and phase one

Characteristics	Phase Three		Phase One		Total	
	n	*%*	*n*	*%*	*n*	%
Cardiac Surgical	22	14.47	22	14.47	44	28.94
General	9	5.92	9	5.92	18	11.84
Neuro Surgical	27	17.76	27	17.76	54	35.52
Transplant Unit	18	11.84	18	11.84	36	23.68
All	76	50.00	76	50.00	152	100.00

Results from **Table 4.14** indicate that a total of 28.94% (*n*=44) handovers were observed in the Cardiac surgical discipline. Of these 14.47% (*n*=22) of the total handovers were observed during phase three and the same number for phase one of the study. The General ICU accounted for 5.92% (*n*=9) of the total observations in each phase with a total of 11.84% (*n*=18) handovers observed in the general ICU discipline. The neuro surgical discipline accounted for 17.76% (*n*=27) for each phase of the study with a total of 35.52% (*n*=54) handovers observed. A total of 11.84 % (*n*=18) handovers were observed in the transplant unit during both phase three and phase one. This totalled 23.68% (*n*=36) overall in the discipline during the study.

The total number of handovers that were observed during both phase three and phase one accounted for 76. Accumulatively the total was 152 handovers observed during this study.

4.7 RESULTS PHASE THREE

4.7.1 Number and duration of distracters

Table 4.15 indicates the number and duration of distracters observed during the handover period in phase three.

Table 4.15 Number and duration of distracters phase three

Number and duration of distracters phase three				
Distracter	*n*	*%*	Length of time in minutes	Mean time
Social conversation	18	23.7	6.31	3.15
Monitor alarms	12	15.8	2.12	1.06
IV alarms	5	6.6	4.14	2.07
Dr's rounds	2	2.6	1.18	0.59
Others	1	1.3	0.57	0.29

Results from **Table 4.15** shows that a total of 38 distracters were observed during phase three. The most common distracter identified was social conversation (18/76, 23.7%), a period of 6.31 minutes was spent on social conversation with a mean time of (*M*=3.15) minutes. Monitor alarms was the second most common distracter and accounted for (12/76, 15.8%), a total of 2.12 minutes was spent on this distracter with a mean time of (*M*=1.06) minutes. Distracters caused by IV alarms numbered (5/76, 6.6%), 4.14 minutes was spent on this distracter with a mean time of (*M*=2.07) minutes. Doctors' round accounted for (2/76, 2.6%), 1.18 minutes was spent on distracters from Doctor's rounds with a mean time of (*M*=0.59) minutes. Distracters making up a group of others included visits by phlebotomists, physiotherapists, family members, ventilator alarms and x-rays done, accounted for (1/76, 1.3%), that required a period of 0.57 minutes to be spent on these distracters with a mean time of (*M*=0.29) minutes.

Table 4.16 Number and duration of distracters in phase three and phase one

Number and duration of distracters phase three					**Number and duration of distracters phase one**				
Distracter	*n*	%	Length of time in minutes	Mean Time	*n*	%	Length of time in minutes	Mean Time	Total time in minutes
Social conversation	18	23.7	6.31	3.15	37	48.7	25	12.5	31.31
Monitor alarms	12	15.8	2.12	1.06	14	18.4	5.36	2.68	7.48
IV alarms	5	6.6	4.14	2.07	13	17.1	9.25	4.62	13.39
Doctors rounds	2	2.6	1.18	0.59	9	11.8	17	8.5	18.18
Others	1	1.3	0.57	0.29	3	4.0	14	7	14.57
Total	38	50	14.32	7.16	76	100	70.61	35.30	84.93

Table 4.16 indicates that during phase three a total of 38 distracters were observed after implementation of the new handover strategies agreed upon by the group of experts in phase two whereas phase one accounted for 76 distracters where there was no intervention. A lot of time was being spent on distracter. During phase three social conversation accounted for (18/76; 23.7%) with total of 6.31 minutes and a mean time of (*M*=3.15) minutes after implementation of the new handover strategies. In contrast to phase three, phase one had no intervention and social conversation accounted for (37/76; 48.7%) with a total of 25 minutes spent on the distracter with a mean time of (*M*=12.5) minutes. Monitor alarms accounted for (12/76; 15.8%) during phase three with a total of 2.12 minutes spent on distracters from monitor alarms and a mean time of (*M*=1.06) minutes. During phase one monitor alarms accounted for (14/76; 18.4%) with a total of 5.36 minutes spent on monitor alarms with a mean time of (*M*=2.68) minutes. In phase three IV alarms accounted for (5/76; 6.6%) with a total of 4.14 minutes spent on the distracter with a mean time of (*M*=2.07) minutes whereas phase one accounted for (13/76; 17.1%) distracters, 9.25 minutes was spent the distracter from IV alarms with a mean time of (*M*=4.62) minutes. Doctors' rounds accounted for

(2/76; 2.6%) distracters during phase three, a total of 1.18 minutes was spent on the distracter with a mean time of (*M*=0.59) minutes. During phase one Doctor's round accounted for (9/76; 11.8%) distracters with a total amount of 17 minutes spent on Doctors' rounds with a mean time of (*M*=8.5) minutes. A group of others that included visits by phlebotomists, physiotherapists, family members, ventilator alarms and x-rays done accounted for (1/76; 1.3%) distracter during phase three with a total of 0.57 minutes spent on these distracters with a mean time of (*M*=0.290 minutes whereas during phase distracters from this group accounted for (3/76; 4.0%) distracters, a total of 14 minutes was spent during phase one of these distracters with a mean time of (*M*=7) minutes.

The total amount of distracters for phase three accounted for 38 with a total of 14.32 minutes spent on distracters after implementation of the new handover strategies, whereas phase one accounted for 76 distracters with a total of 70.61 minutes spent on distracters with no intervention. The accumulative time spent on distracters in this study accounted for 84.93 minutes. These results therefore indicate that there was a change in the amount of time being spent on distracters in phase three of this study during the handover period after implementation of the new handover strategies agreed upon in phase two.

4.7.2 Association among type of distracters

Social conversations among nurses are often unrelated to the handover. A break in attention will lead to vital information being lost regarding the patients care, placing the patient's safety at risk.

The Chi-square test was used to test for association between the distracters identified during phases one and three. This test shows whether the proportions of the distracter in phase one

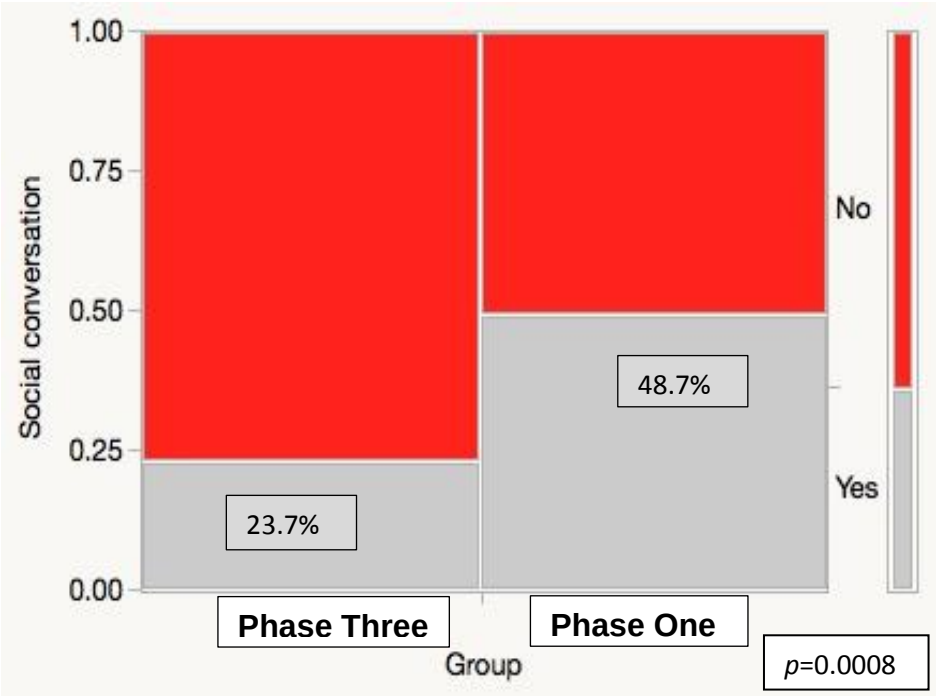
and phase three differ. Phase one and phase three are both independent since groups that were tested differ due to changes in shifts and agency staff. Social conversations, monitor alarms, IV alarms and Doctor's rounds were identified as the main distracters during both phase one and phase three of the study.

- **Social conversation**

Social conversation causes a break in the train of thought diverting the nurses' attention away from the handover. Social conversations among nurses are often unrelated to the handover. A break in attention will lead to vital information being lost regarding the patients care, placing the patient's safety at risk.

Yes indicates the proportion of staff that are engaged in social conversation.

No indicates the proportion of staff that are not engaged in social conversation.



* p values for significance are p=0.05

Figure 4.2 Comparison of Social conversation between phase three and phase one

The mosaic plot displayed in **Figure 4.2** comparing phase one and phase three shows that the mean values for those who were observed engaging in social conversation, identified as "YES", was less in phase three 23.7% during handover than in phase one 48.7%.

According to the results obtained from observations displayed in **Figure 4.2** the mean values for those who did not engage in social conversation, identified as "No" on the mosaic plot, during handover in phase three accounted for 76.3% in comparison with phase one which was 51.3%.

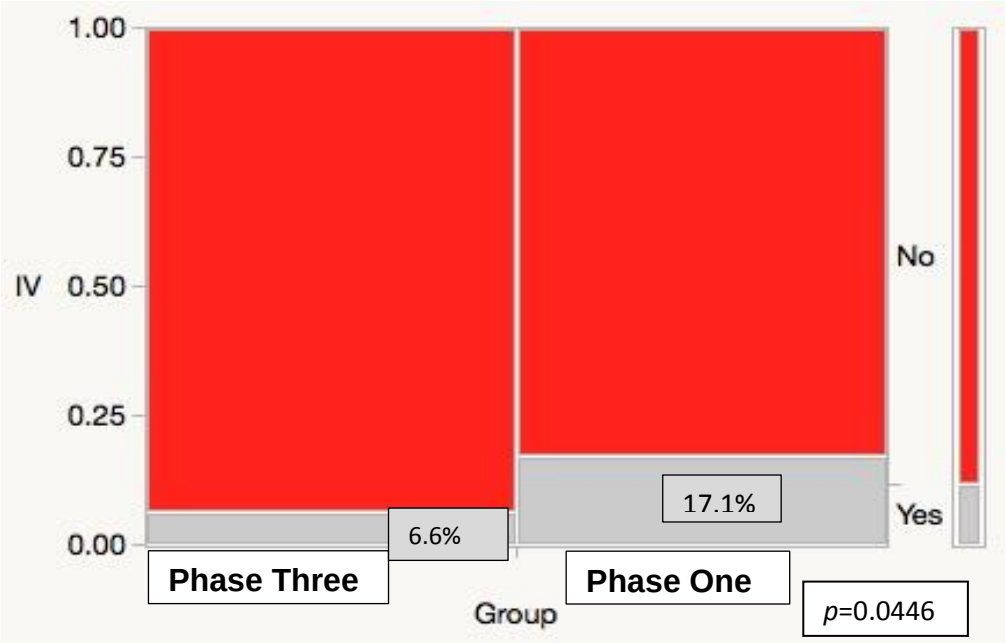
When assessing if a statistically significant association existed between social conversation in phase one and phase three, the chi-square test revealed a *p*-value of $p = 0.0008$ smaller than 0.05 indicating a statistically significant reduction between social conversation in phase three compared to phase one at a 95% level of confidence.

- **IV alarms**

In an ICU intravenous therapy is administered through pumps at a given rate which should remain constant. If the flow rate of the intravenous fluid stops or if there is air in the line the device will trigger an audible alarm.

Yes indicates the proportion of staff that engaged in IV alarms.

No indicates the proportion of staff that did not engaged in IV alarms.



* p values for significance are p=0.05

Figure 4.3 Comparison of distractions by IV alarms between phase three and phase one

The Chi-square test was used to test for association between distractions by IV alarms identified during phase one and phase three. This will show whether the proportions of the distracter in phase one and phase three differ. Phase one and phase three are independent since the groups that were tested differ due to changes in shifts and agency staff.

The mosaic plot comparing phase one and phase three illustrated in **Figure 4.3** shows that IV alarm trigger distractions observed in phase three, identified as "YES", on the mosaic plot was lower 6.6% during handover in phase three, than in phase one 17.1%.

IV alarms that were not triggered identified as "No", on the mosaic plot illustrated in **Figure 4.3** during handover in phase three accounted for 93.4% in comparison with 82.9% in phase one, after implementation of the new handover strategies agreed upon in phase two.

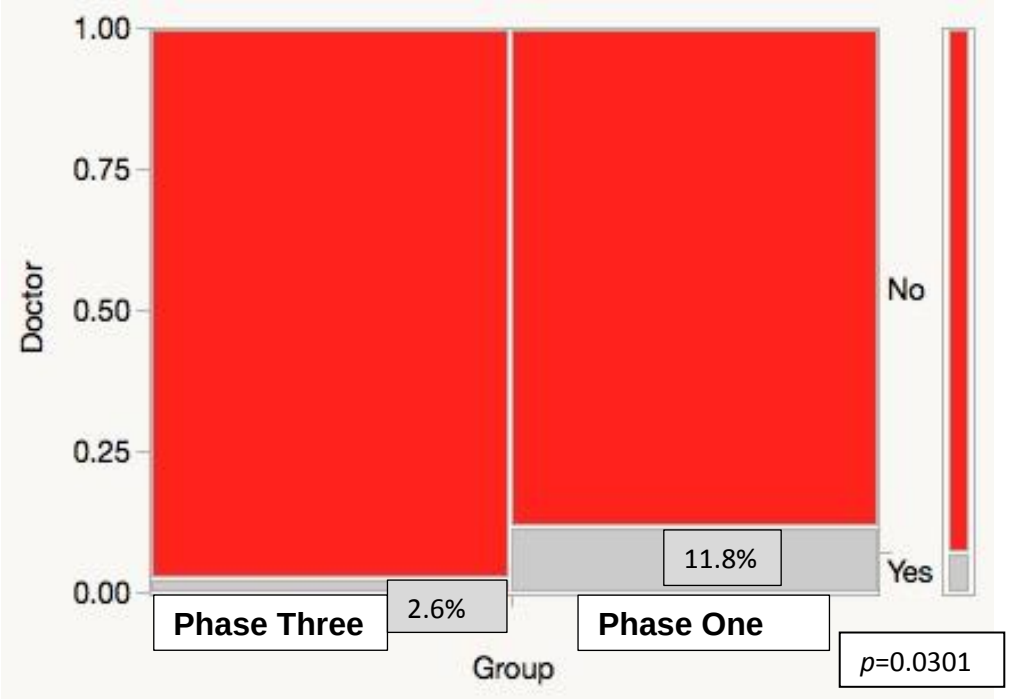
To assess if a statistically significant association existed between IV alarms disruption from phase one and phase three, the chi-square test was conducted. The *p*-value was $p=0.0446$ smaller than 0.05 indicating a significant reduction between IV alarm disruption during phases three compared to phase one at a 95% level of confidence.

- **Doctors Rounds**

Doctor's rounds often distract nurses' attention away from the handover. Breaks in the thought process divert attention away from the task at hand placing patient's safety at risk.

Yes indicates the proportion of staff that are engaged in Doctors' rounds.

No indicates the proportion of staff that are not engaged in Doctors' rounds.



* p values for significance are p=0.05

Figure 4.4 Comparison of Doctors' rounds between phase three and phase one

Doctors' rounds were identified during both phases as one of the distracters. Once again the Chi-square test was used to test for association between Doctor's rounds as a distracter, during phase one and phase three. This test shows whether the proportions of distraction differ during phase one and phase three. Phase one and phase three are independent since the groups that were tested differ due to changes in shifts and agency staff.

The mosaic plot comparing phase one and phase three illustrated in **Figure 4.4** shows that the mean values for Doctor's rounds distracting the handover identified as "Yes", on the mosaic plot was lower in phase three 2.6% than in phase one 11.8%.

The mean values for Doctor's rounds not distracting the handover, identified as "No", on the mosaic plot illustrated in **Figure 4.4** during phase three accounted for 97.4% in comparison with phase one 88.2% after implementation of the new handover strategies agreed upon in phase two.

To assess if a statistically significant association existed between Doctor's rounds from phase one and phase three, the chi-square test was conducted.

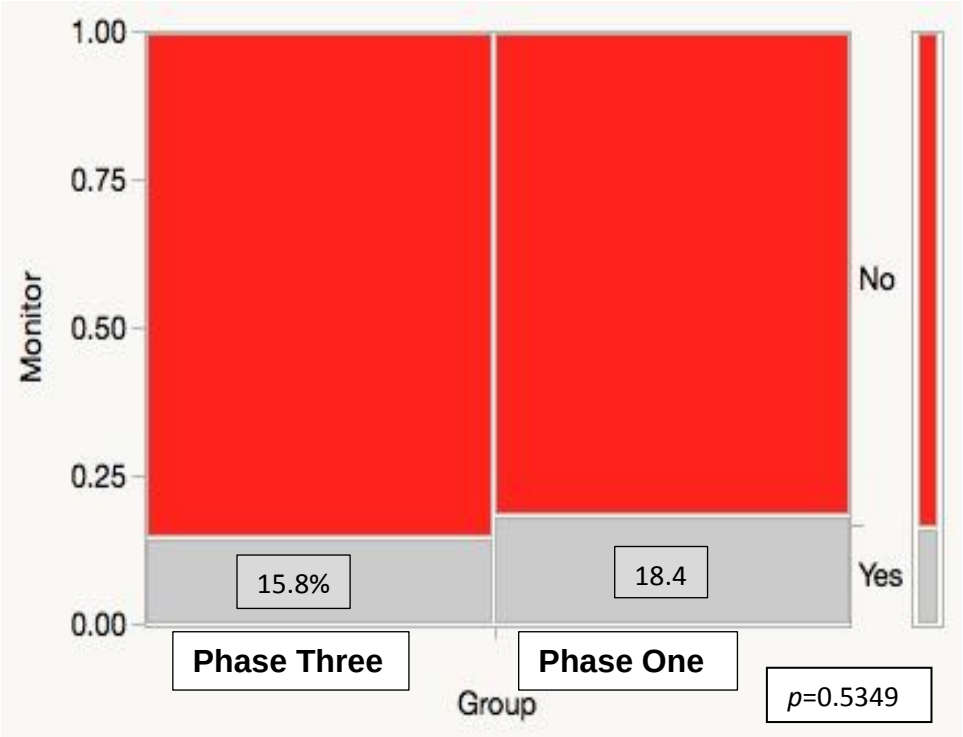
The *p*-value was $p=0.0301$ smaller than 0.05 indicating a significant association between Doctor's rounds during phases three compared to phase one at a 95% level of confidence.

- **Monitor Alarms**

In an ICU monitor alarms is an indication of physiological changes and instability in the patient. Reassessment of the patient should therefore be done as soon as the alarms are triggered and adjusted according to the patient's condition.

Yes indicates the proportion of staff that are engaged in monitor alarms.

No indicates the proportion of staff that are not engaged in monitor alarms.



* p values for significance are p=0.05

Figure 4.5 Comparison of disruptions of monitor alarms between phase three and phase one

Monitor alarms were observed as a distracter during patient handover in phase one and phase three of the study. The Chi-square test was used to test for association between monitor alarms identified in distracting the handover during phase one and phase three. This will show whether the proportions of distractions between phase one and phase three differ.

Phase one and phase three are independent since the groups that were tested differ due to changes in shifts and agency staff.

The mosaic plot comparing phase one and phase three illustrated in **Figure 4.5** shows that the mean values of monitor alarms as a distracter during patient handover, identified as "Yes", on the mosaic plot was lower in phase three 15.8% in comparison with phase one 18.4%.

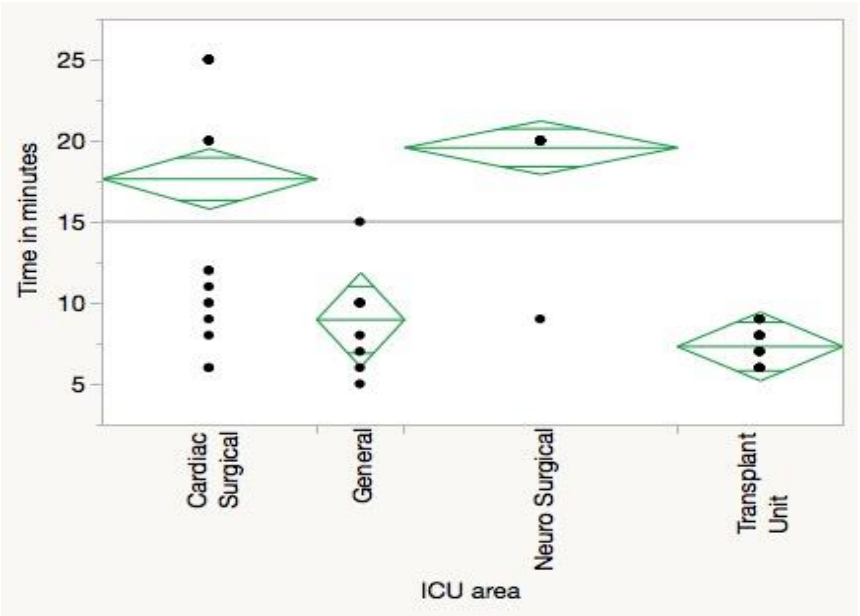
Figure 4.5 illustrates that the means for monitor alarms not distracting the handover identified as "No", on the mosaic plot in phase three accounted for 84.2% in comparison with phase one 81.6% after implementation of the new handover strategies agreed upon in phase two.

To assess if a statistically significant association exist between monitor alarms from phase one and phase three, the chi-square test was conducted.

The *p*-value was $p=0.5349$ which is greater than 0.05 indicating a non-significant reduction between monitor alarms during phases three when compared to phase one at a 95% level of confidence, after implementation of the new handover strategies agreed upon in phase two.

4.7.3 Time spent during handover on distracters by ICU area during phase three

A great amount of time was being spent on distracters during the handover period in the various ICU areas. Time spent on distracters prolongs the handover period. Therefore time is lost for delivery of critical care to the patient. This will result in the loss of vital information regarding the patients care, and may lead to adverse events compromising patient safety.

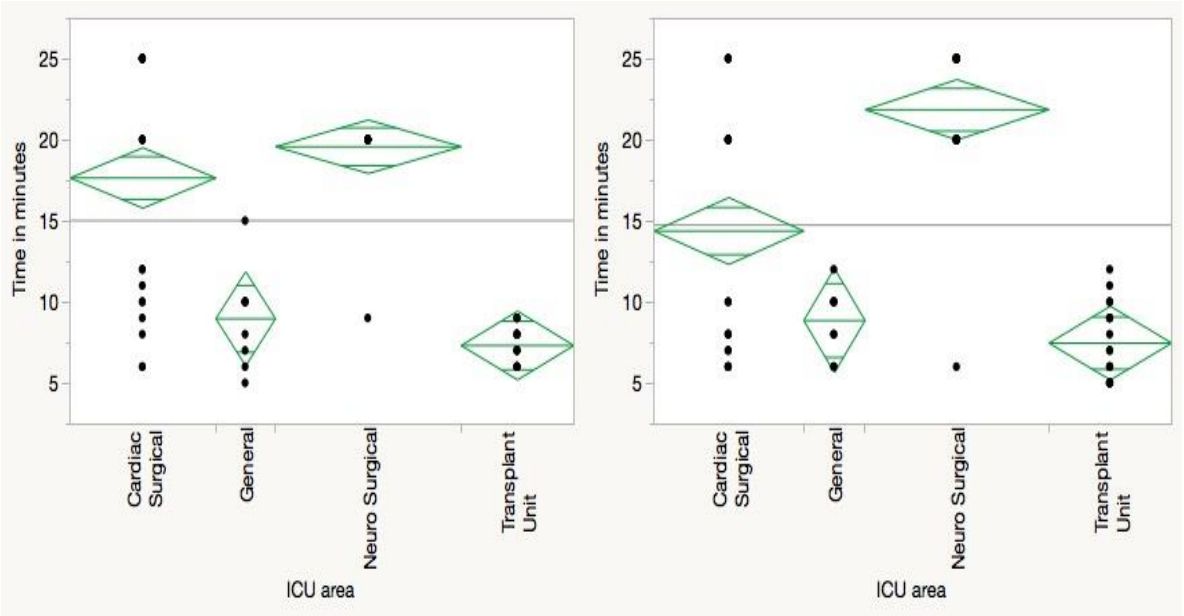


Phase Three

Figure 4.6 Time in minutes spent on distracters by ICU area during phase three

Figure 4.6 show that the mean values of time spent on distracters in phase three of the Cardiac surgical ICU was (*M*=16.0) minutes and Neuro surgical ICUs (*M*=19.6) minutes that were higher in time in minutes than the General ICU (*M*=8.0) and the Transplant unit (*M*=7.3) which had the lowest means.

4.7.4 Comparison of time spent on distracters during handover by ICU area during phase three and phase one



Phase Three **Phase One**

Figure 4.7 Time in minutes spent on distracters by ICU area during phase three and one

A one-way (ANOVA) analysis of variance was conducted to assess differences between the mean values of the different ICUs for time in minutes spent on distracters during phase three after implementation of the new handover strategies agreed upon in phase two and phase one prior the implementation of any changes.

Results illustrated in **Figure 4.7** indicate that the mean values of time spent on distracters in phase three of the Cardiac surgical ICUs (M=16.0) was greater in time than the mean time in phase one for the Cardiac surgical ICUs that had a mean time of (M=14.4). The Neuro surgical ICUs mean value (M=19.6) was less in time in minutes in phase three compared to phase one where the Neuro surgical ICU had mean value in time of (M=21.9) minutes. General ICU (M=8.0) and the Transplant unit (M=7.3) had the lowest mean values in phase three in contrast to phase one where time in minutes spent on distracters was higher in the

General ICU (M=8.9) minutes and the Transplant unit (M=7.5) minutes. The implementation of the new handover strategies in phase three as agreed upon in phase two have therefore contributed in a decrease in time spent on distracters.

The homogeneity of variances is another assumption that had to be observed. The assumption of homogeneity of variance is that the variances within each of the populations or ICU disciplines are equal. The Levene's test can therefore be used to test the assumption. To test if the times spent on distractors between each ICU area in phase three are equal, a Levene's test was calculated. The Levene's F test revealed that the homogeneity of variance assumption was not met $F(3,72) = 29.68$, p= <.0001. The value of the Levene's test reported a p=<.0001 which shows that there is a statistically significant difference in the variances. This is a violation of the homogeneity of variances therefore the Welch test must be used to calculate the variances.

The adjusted Welch's F-test is used to test the fit of the ANOVA model. Therefore a *Welch's F*- test was used. An alpha level of 0.05 was used for all subsequent analyses. A Welch test was computed assuming unequal variances in time in minutes between the ICUs. The one way ANOVA for measurement of means of time spent on distracters in different ICU disciplines during phase three revealed an statistical significance, *Welch's* $F(3,25.91) =146.30$, p= <.0001 meaning that there was a statistically significant difference between the mean values of the distracters in minutes for the different ICU areas. The F-test was statistically significant at a 95% level of confidence with a p-value of p=<.0001.

Post hoc comparisons, using the Games-Howell post hoc test were computed to indicate which specific ICU area groups differed and where specific differences exist. The Games-

Howell test compares all individual group mean values to each other in a pairwise fashion. It adjusts for unequal variances and could therefore indicate variances in time spent on distracters among the different ICU disciplines and where those specific differences exist.

When the assumption of homogeneity of variances standard deviation is violated this post hoc test should be used.

These results listed in **Table 4.17** indicate that the Neuro Surgical and Cardiac Surgical ICUs as differing from the General ICU and Transplant unit ICU area.

Table 4.17 Multiple Comparisons in phase three

Dependent Variable: Time in minutes
Games-Howell

(I) ICU area 2	(J) ICU area 2	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Cardiac Surgical	General	8.682*	1.874	.000	3.58	13.79
	Neuro Surgical	-1.925	1.641	.649	-6.46	2.61
	Transplant Unit	10.329*	1.616	.000	5.84	14.81
General	Cardiac Surgical	-8.682*	1.874	.000	-13.79	-3.58
	Neuro Surgical	-10.607*	1.061	.000	-13.82	-7.40
	Transplant Unit	1.647	1.022	.419	-1.53	4.82
Neuro Surgical	Cardiac Surgical	1.925	1.641	.649	-2.61	6.46
	General	10.607*	1.061	.000	7.40	13.82
	Transplant Unit	12.254*	.477	.000	10.98	13.53
Transplant Unit	Cardiac Surgical	-10.329*	1.616	.000	-14.81	-5.84
	General	-1.647	1.022	.419	-4.82	1.53
	Neuro Surgical	-12.254*	.477	.000	-13.53	-10.98

**. The mean difference is significant at the 0.05 level.*

Phase three

When subjected to multiple comparisons there was a significant difference in time spent on distracters by the different ICU areas during phase three after implementation of the new handover strategies agreed upon by the group of experts in phase two. The results listed in **Table 4.17** indicate that the mean values between time spent on handovers in the Cardiac surgical ICU when compared to General ICU was *M*=8.6 minutes and even higher in

comparison to the Transplant unit with a mean value time of *M*=10.3 minutes. This was a statistical significant amount of time (*p*=.000) indicating that the Cardiac surgical unit spent more time on distracters than the General and Transplant units.

In contrast when comparing the General ICU to Cardiac surgical and Neuro surgical ICUs there was a mean value in time of *M*= -8.6 minutes in comparison with the Cardiac surgical unit and a mean time of *M*= -10.6 minutes when compared to the Neuro Surgical unit. A statistically significant value (*p*=.000) indicated that the General ICU spent less time on distracters when compared with the Cardiac surgical and Neuro Surgical units.

Comparisons in time spent on distracters between Neuro surgical and General ICU was a mean value of *M*=10.6 minutes and even higher when compared with the Transplant unit with a mean time of *M*=12.2 minutes. This indicates a statistically significant difference (*p*=.000) in the time that the Neuro Surgical ICU spent on distracters than the General ICU and Transplant unit.

The Transplant unit when compared to the Cardiac surgical ICU had a mean value of *M*= -10.3 minutes and Neuro Surgical ICU a mean time of *M*= -12.2 minutes. This is statistically significant at (*p*=.000), indicating that the Transplant unit spent less time on distracters during the handover period than the Cardiac surgical and Neuro surgical ICUs.

Therefore we can conclude that the instability of patients following surgical intervention in the Cardiac surgical and Neuro surgical ICUs lead to more distracters than the General ICU and Transplant unit. Patients in Cardiac surgical and Neuro surgical ICUs need intensive monitoring and care. The clinical haemodynamic instability of these patients and additional

invasive devices such as balloon pumps, intracranial pressure monitoring devices, intravenous devices and manipulation of life-sustaining drugs, dictate that more time is being spent on these during the handover period. Accurate handover of clinical information in these patients are therefore vital resulting in longer handover time.

4.7.5 Time spent during handover on distracter comparing phase three to phase one

Time spent on distracters during the handover period not only breaks the flow of the handover, it delays patient's treatment. Nurses have to spend more time re-orientating themselves leading to poor communication and misinterpretation compromising patient safety as vital information regarding patient care may be omitted or even repeated.

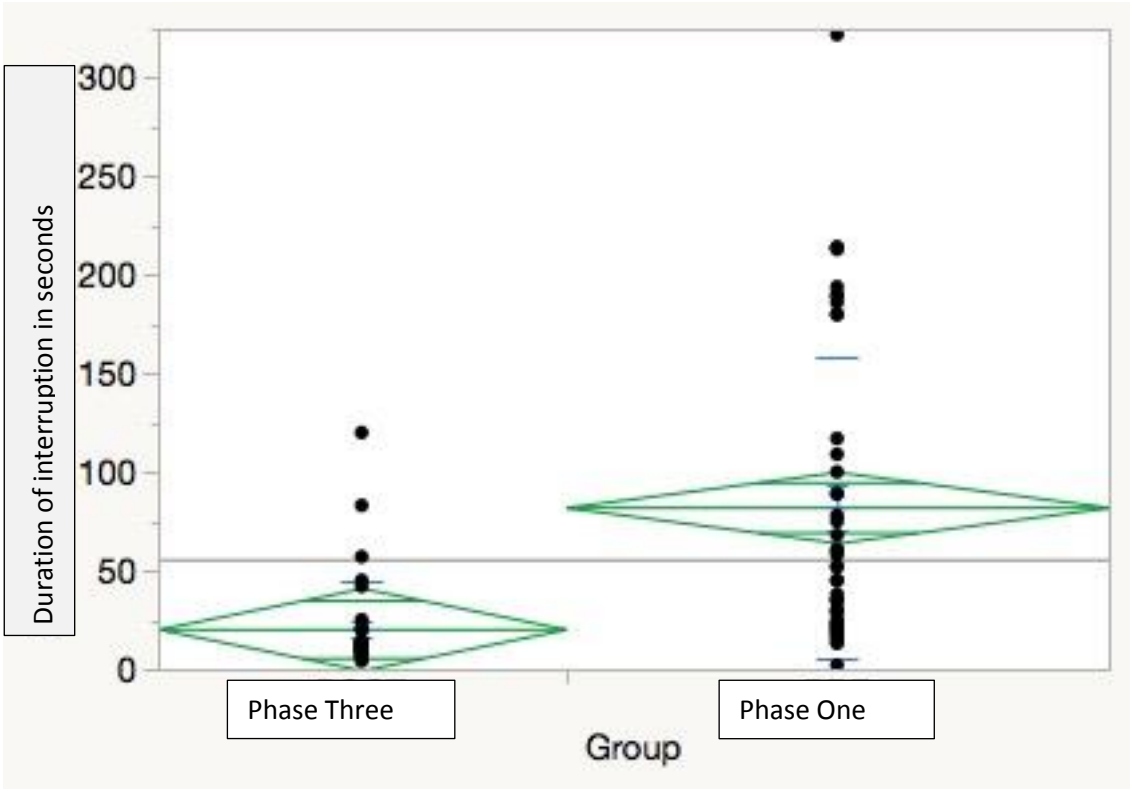


Figure 4.8 Comparison of time spent in seconds on distracter between phases three and one

In order to establish if the new handover strategies agreed upon in phase two had brought about a change after implementation in phase three, a one-way analysis of variance (ANOVA)

was conducted to assess differences between the means of the time spent on distracter during phases three and one.

Results displayed in **Figure 4.8** shows that the mean value for time spent in seconds on distracters for all ICU wards during phase three was M=20.5 (SD±24.3) and in phase one the mean time was M=82.3 (SD±76.3). In addition the assumption of homogeneity of variance was tested by using the Levene's test. The Levene's F test revealed $F(1, 75) = 31.42$, p=<.0001. The p value of the Levene's test report a (p=<.0001) that indicated a statistical significant difference in the variances between phase three and phase one. It showed a violation of the homogeneity of variance, therefore an adjusted Welch F- test was used to test the fit of the ANOVA model. An alpha level of 0.05 was used for all subsequent analyses. A Welch test was computed assuming unequal variance between phase three and phase one. The one way ANOVA for measurement of variance in time spent on a distracter between phase three and phase one revealed a statistical significance, *Welch's* $F(1,54.10) = 25.39$, p= <.0001, meaning that there was a statistically significant difference between the means of time spent on a distracter during phase three compared to phase one. Thus the F- test was statistically significant at a 95% level of confidence with a p-value of p=<.0001, lower than 0.05. This indicates that there is a statistically significant difference between the times spent on a distracter between phase three and phase one.

In order to establish statistical significance for the differences in the means of the distracters between phase three and phase one, a t- test was carried out. A t -test observes the relationship between variables and tests the differences between the mean values. The assumptions that need to be considered include the homogeneity of variances and normality (skewness).

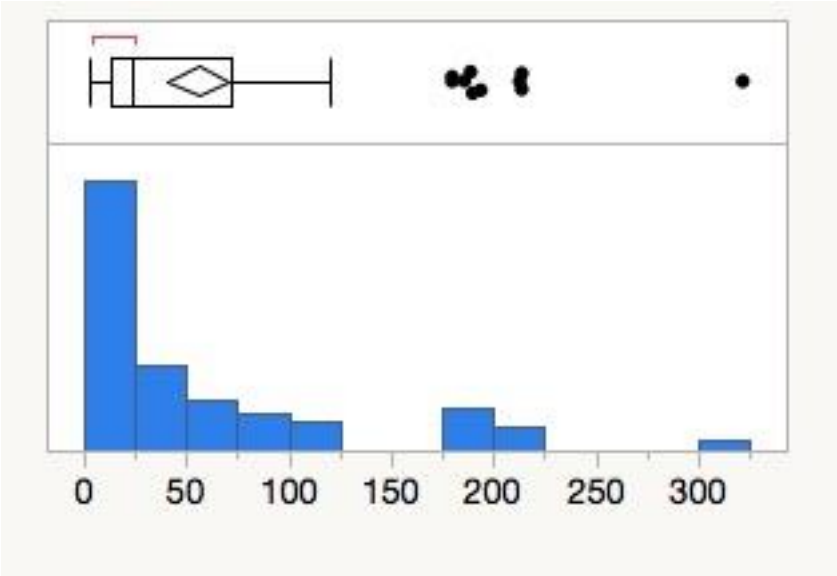


Figure 4.9 Duration of interruption in seconds spent on a distracter

The normal distribution was skewed (skewness 1.86) illustrated in **(Figure 4.9)** and the log transformation was calculated to transform to normality**. (See Figure 4.10)**

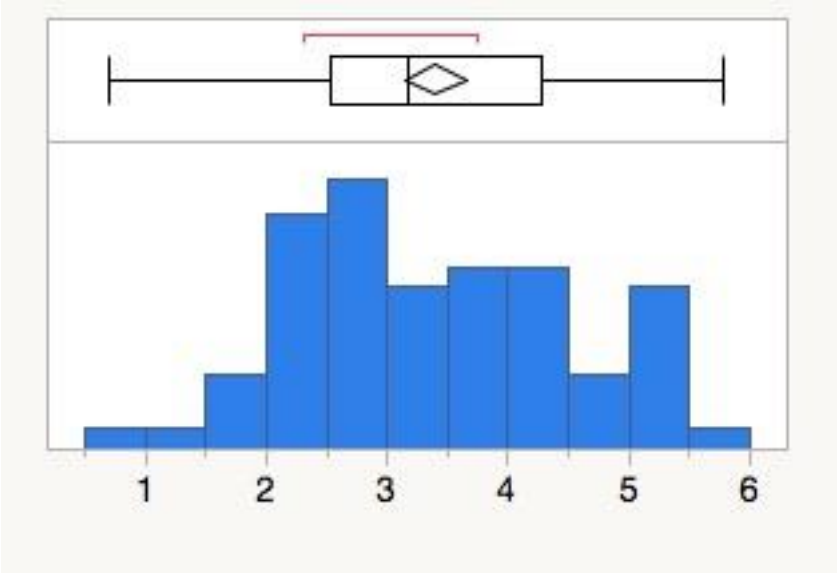


Figure 4.10 Log transformed values of disruption in seconds

The statistical analysis is therefore done using the log transformed values. To assess the equality of variances the Levene's *F* -test reported *F*(1,75) 4.42, *p*= 0.0387 which was higher

than 0.01 indicating equal variances at a 99% level of confidence. The assumption of homogeneity was not violated.

The mean value for time spent in seconds on distracters for all ICU wards during phase three was M=20.5, (SD±24.3) and in phase one the mean value was M=82.3 (SD±76.3). The independent t- test assuming equal variances was computed to test the differences in time spent on distracters during phase three and phase one. An alpha level of 0.05 was used for all subsequent analyses. The independent t- test revealed $t(75) = 1.304$, p=<.0001. The p-value was statistically significant (p=<.0001) less than 0.05 meaning that there was a significant difference between the means of phase three and phase one in time spent on distracters on log disruption in seconds. Thus less time was spent on distracters during phase three when compared to phase one after the implementation of the new handover strategies agreed upon by the group of experts in phase two.

Summary of phase three

- Handovers in phase three were carried out in the different ICUs both face to face and in a group at the patient's bedside.
- Social conversation among nurses interrupting the handover were the most frequent and accounted for (23.7%) followed by monitor alarms (15.8%) IV alarms (6.6%) Doctor's rounds (2.6%) and others (1.3%) which included visits by phlebotomists, physiotherapists, family members, ventilator alarms and x-rays done.
- The mean value for the incidence of social conversation during handover, was lower in phase three (23.7%) than in phase one (48.7%). The p-value was (p=0.0008) indicating a statistically significant reduction between social conversation in phase three compared to phase one at a 95% level of confidence.

- The mean score for time spent on distracters in one unit was (M=19.6).
- The total mean score for time in seconds spent on distracter during phase three was (M=20.5) and in phase one was (M=82.3).

4.8 SUMMARY OF CHAPTER FOUR

This chapter represented the results of the study. Descriptive and inferential statistics were used in the analysis of quantitative results of the study during phase one and phase three.

Results from phase one was quantitative in nature and identified distracters placing patients' safety and continuity of safe patient care at risk.

Phase one was complimented by phase two a qualitative phase which was exploratory in nature. Phase two made use of a qualitative component in the form of a focus group and open ended questioning based on results that emerged during phase one. The group of experts that participated in the focus group shared their views and feelings regarding the emerging distracters identified in phase one. This gave a rich in-depth understanding of the distracters and created a platform from which the experts could attempt to introduce changes in their own units. This group of experts collaborated and collectively agreed on strategies they thought they could implement in their units in order to limit the amount of distracters during the handover period. The group of experts agreed to implement the new strategies over a period of two months. The researcher returned after the two month period to observe if the new strategies implemented had any effect on the distracters during the handover period.

Phase two was follow by phase three. Phase three, a quantitative phase, used the same structured observation checklist from phase one to re-evaluate the new handover strategies implemented. The results obtained from phase three, showed a difference in the amount of

time spent on distracters during phase three when compared to phase one, after implementation of the new handover strategies agreed upon in phase two.

Chapter five will discuss the results and offer recommendations. Limitations will be commented on.

CHAPTER FIVE

DISCUSSION, RECOMMENDATIONS, LIMITATIONS AND CONCLUSIONS.

5.1 INTRODUCTION

This chapter is the final chapter of this study and will present a discussion of the results as well as limitations of this study. Recommendations of the study are based on findings and are followed by conclusions.

Effective communication during patient handover plays a pivotal role in ensuring patient safety and the continuity of safe patient care. Information given during the handover period forms the building blocks on which nursing care is planned for the next shift. Communication should therefore be relevant to the patient's diagnosis.

Any form of interruptions could cause a break in concentration diverting the nurses' attention away from the handover. A break in concentration can lead to the loss of vital information regarding care placing the patient's safety at risk.

5.2 SUMMARY OF THE STUDY

Interruptions contributes to barriers in effective handover resulting in delayed treatment, medication errors and poor decision making placing patients' safety at risk. This study sought to investigate and explore the type and frequency of distracters placing patients' safety and the continuity of safe patient care at risk. Informing the staff and containing the distracters would have a positive outcome for these critically ill patients.

The study followed a mixed method design with sequential observational, descriptive and participatory phases. It employed a before and after study intervention model to obtain the results. One method of data collection was not enough to address the research problem and questions. A mixed method research design was therefore used. A combination of quantitative and qualitative data gives a better understanding, whereas one method stands alone (Creswell, 2014). This study followed three sequential phases. Quantitative data was collected in phase one and phase three by means of a structured observation checklist. Phase two followed a qualitative approach and made use of a focus group. The aim of this study was to optimise the nursing handover in the intensive care unit by identifying and managing distracters which may interfere with the handover process, placing patients' safety and continuity of safe patient care at risk. In addition to the principal aims this study was directed by the set objectives for each phase.

Aim and objectives of sequential phases:

Phase one – quantitative phase

The aim of phase one was to optimise safe patient handover by identifying potential distracters and their frequency that could interfere with the handover process.

The objective for phase one was:

- To identify the type and frequency of distracters during nursing handover.

Phase two – qualitative phase

The aim for phase two was to collaborate with participants to come up with their own thoughts and ideas on strategies they would be able to implement in their units, to bring about a change in the handover process thereby improving patient safety and the continuity of safe patient care.

The objective for phase two was:

- To implement changes in handover practice as agreed upon by the participants in the intensive care units after collaboration with colleagues and the researcher.

Phase three – quantitative phase

The aim of phase three was to assess if the implemented changes agreed upon in phase two were effective in limiting the amount of distracters resulting in improved patient safety and handover.

The objective for phase three was:

- To evaluate the effect of the implemented changes on the nursing handover.

5.3 DISCUSSION OF RESULTS AND FINDINGS

Objective One

As its first objective this study looked at the type and frequency of distracters that could interrupt the handover period. The structured observation checklist developed by Spooner *et al*., (2015) was used to identify these distracters.

Four significant distracters of concern were identified from the results obtained in phase one. These have been identified as social conversation, monitor alarms, IV alarms, and Doctors rounds. A fifth distracter made up the group labelled others and included visits by various members of the treating team.

The four main areas identified need attention as they may place patients' safety and the continuity of safe patient care at risk. Social conversation does not only distract the nurses' attention away from the handover, it also has a physical and psychological impact on the nurse herself. It increases the nurses stress levels and anxiety due to prolonged handover

periods caused by the distracter. Therefore nurses may feel rushed to complete the handover with less accuracy resulting in delayed and even omitted treatment in the patient with potential medical risks, increased hospital stay and cost to the patient.

Alarms from monitors and intravenous devices are known to cause a distraction diverting nurses' attention away from the handover. When monitors alarm nurses tend to interrupt the handover to attend to the alarms. It is important to note that monitor alarms would be an indication of physiological changes and instability in the already compromised critically ill patient. Nurses would therefore stop the handover to reassess their patients and attend to alarms.

Intravenous pump alarms may be an indication of an completion of the iv fluid, occlusion or air in the line and can place the patient's health and safety at risk as patients may be receive life-sustaining drugs. Therefore nurses would interrupt the handover as they see it as a first priority. This overstimulation of the auditory system by alarming devices subconsciously increases levels of anxiety in nurses. Patients become more anxious and worried due to the noise, leading to physiological changes in heart rate and blood pressure, placing their health at risk.

Doctors' rounds during the handover period can be seen as distracters. The nurse will stop the handover to attend to the Doctors questions and orders that sometimes may be unrelated to that particular patient. It not only delays treatment in the patient but nurses would have to reorientation themselves to what was said before the distracter. Therefore vital information regarding the patient may be lost placing the patient's safety at risk. Treatment may be repeated or omitted by mistake compromising the patient's health and the continuity of safe patient care.

These four areas need attention, because statistics have shown them to create interruptions at the handover

5.3.1 Overview of Distracters

During 76 observations in phase one there was a 100% incidence of distractions during the handover. Using the structured observation checklist, four main distracters were identified: social conversation, monitor alarms, IV alarms and Doctors rounds. This was similar to the findings of other researchers (Kowitlawakul *et al*., 2015; Manser and Foster, 2011; Spooner *et al*., 2015). The most common distracter in this study was social conversation followed by monitor alarms, IV alarms and Doctors rounds.

Social conversation occurred in (48.7%) of the handovers in phase one. This distracter accounted for more than twice as many interruptions as the next most common distracter. This is in line with other researchers. Spooner *et al*., (2015) found that the most frequent source of interruption was conversation (29%) from nurses and doctors, whereas Kowitlawakul *et al*., (2015) reported an incidence of (46.7%) in interruptions through conversation among people. Social conversation interrupting the handover period was often unrelated to the handover. Studies conducted by Kalisch and Aebersold (2010); Kerr *et al*., (2014); Kowitlawakul *et al*., (2015) and Spooner *et al.*, (2015) found similarities in risk factors associated with social conversation interrupting the handover period. They were all in agreement that these risk factors are associated with poor performance as a result of cognitive failure, lapses in memory and increased risk of medical errors compromising patient safety and care.

Cognitive failure may results in:

Poor communication

Inability to recognize clinical changes in the critical ill patient

Loss of vital information during the handover period

Prolonged handover time as nurses have to revisit nursing notes to complete the handover

Monitor alarms were the second most common distracter in phase one at (18.4%). This result is totally opposite to Kowitlawakul *et al*., (2015) whose results found monitor alarm not to be distracting at all during the handover period and reported (0%) incidence. Whilst monitor alarms in this study was a considerably lower rated distracter than the conversations, it remained a concern. This noise pollution has been shown to increase physiological changes in heart rate, blood pressure and anxiety levels in both nurses and patients. Iyendo *et al*., (2016) concur with this whilst Mark *et al*., (2008) believe alarms should be seen as a stressor, leading to increased agitation, anxiety and altering memory which in turn leads to feelings of increase work pressure in the staff.

Alarms from intravenous pumps distract the handover period since the pump will continue alarming until attended to. This distracter accounted for slightly less interruptions than the monitors at (17.1%). This was similar to results found by Spooner *et al*., (2015) where intravenous pump alarms accounted for (17%) of distracters. Studies conducted by Currie (2002) and Manser and Foster (2011) both acknowledge that intravenous pumps are frequent distracters.

Phase one also identified doctors' rounds as distracters (11.8%) during the handover period. They were often unrelated to the patient. Halm (2013) shows distracters from doctors' rounds to be disruptive during the handover period. It causes a break in the handover diverting nurses' attention away from completing the handover and delaying patient care. Spooner *et al.*, (2015) also found doctors to be source of distracters during the handover period. In contrast to this study Spooner *et al.*, (2015) found doctors to be one of the most frequent distracter at (29%).

Social conversation

Social conversation was noticeably the most frequent distracter and accounted for nearly half of the distracters (48.7%). It was also noted that the conversations were mainly private conversations and were not related to the patient or the care of the patient. Risk factors associated with social conversation include poor communication of instructions as nurses do not remember what was said before the interruption. Cohen, Hilligos and Kajdacsy-Bella Amaral, (2012) confirm that breakdown in communication may compromise patient safety because the sequence of events and the patient response is lost thus the quality of nursing care delivered is interrupted.

Kalisch and Aebersold, (2010); Kerr *et al.*, (2014); Kowitlawakul *et al.*, (2015) and Spooner *et al.*, (2015) confirm this as they are all in agreement that it breaks down effective communication resulting in failure to complete the initial task placing patients at a higher risk for medical errors compromising safe patient safety.

The style of handover may have contributed to the ease with which social conversations were initiated. Bedside handovers offer the opportunity of larger numbers being present at handover Radell *et al*., (2011) as well as Scovell, (2010) consider this a preferred method.

Many researchers (Buckley, 2007; Hunter New England Health 2009; Kowitlawakul *et al.*, 2015; Manser and Foster, 2011 and New South Wales Health, 2009) believe that to ensure a safe and effective handover, guidelines or protocols such as ISBAR should be used for handover. This was considered to be helpful in minimising the unwanted conversations.

Monitor Alarms and Intravenous Therapy Alarms

Environmental noise cannot be avoided in an ICU. Currie, (2002); Fontaine *et al*., (2001); Halm, (2013); Manser and Foster, (2011) and Vincent, (2013) described how environmental noise should be considered a hazard as the monitors are particularly disruptive. The cardiac monitor was responsible for (18.4%) of distracters and IV therapy alarms for (17.1%). As these both fall into the environmental noise category, they will be considered together.

The noisiest is without doubt the cardiac monitor because of the tight alarm settings required in most ICU patients. This is closely followed by the IV therapy alarms as this alarm is triggered by changing of the patient's position or arm movements at times. This noise from the monitor and IV alarms is detrimental to both staff and patients. Wenham and Pittard, (2009) describe how the sympathetic nervous system is overstimulated by environmental noise producing feelings of anxiety and fear in those who hear it. This applies to both staff and patients even though the latter may be sedated. Memory is affected and this may impact on patient care. Iyendo *et al.*, (2016) confirm that increasing agitation, anxiety and altering memory are all a result of environmental stressors. These authors believe that the stressors lead to increase work pressure, physical and psychological exhaustion and ultimately burnout

syndrome. Some authors (Colligan and Bass, 2012; McGillis Hall *et al*., 2010; Timietto *et al*., 2012) have suggested that noise can have a profound effect on the recognition and administration of prescribed drugs, a dangerous risk in an ICU environment.

Patients in the ICU do not escape these risks of noise. Iyendo *et al*., (2016); Maidl, Leske and Garcia, (2014) and Nguyen *et al*., (2012) described negative effects of noise on patients as physiological and psychological and are associated with elevated blood pressure, increased heart rate, sleep disruptions, pain and difficulty in weaning mechanically ventilated patients due to increased sedation requirements. This literature has suggested that excessive noise reduces the body's ability to heal.

Doctors' rounds

The fourth distracter was the doctors' rounds (11.8%). They may often be unrelated to the patient. One risk factor associated with doctors' rounds is that nurses now feel rushed to complete the handover to attend to the doctor and the handover is therefore done with less accuracy. Vital information may be lost compromising patient safety and care (Mark *et al*., 2008; Westbrook *et al*., 2010). Halm, (2013) is of the opinion that doctors requesting information during handover divert the nurses' attention away from the handover, compromising patient safety and care.

Common risk

Constant disruption during the transfer of the ICU patient from one nurse to the next results in a prolonged handover (Potter *et al*., 2005). Literature confirms that prolonged periods of handover will cause anxiety and frustration among members of staff. Common risks found throughout literature is that members of staff would therefore increase the speed at which they

work because they feel pressed to make up for time lost Mark *et al*., (2008) and Westbrook *et al*., (2010) leading to an increase in mistakes resulting in medical errors and delayed treatment to the cost of the patient's safety.

Objective Two

Objective two was met by the focus group interaction in phase two. Nine ICU qualified expert nurses who were senior staff and leaders in their respective ICUs were invited to participate in this focus group. A focus group offered the opportunity to give feedback detailing the distracters that resulted from phase one to these experts in a non-threatening environment. As leaders they were ideally situated to steer the staff in the ICUs through changes. Scully, (2015) and Stefancyk, Hancock and Meadows, (2013) describe leaders as change coaches who have the ability to shape the culture in an environment through guidance, facilitation and inspiration. This applied to the experts who could lead change resulting in safe patient centred care.

After discussing the probable cause of the distracters, the focus group members identified categories and sub categories of situations that in their opinion contributed to the distracters. The group then considered the strategies that could be introduced in an attempt to manage distracters. These strategies were identified and processes to manage the causes were considered. Ultimately two plans of action resulted and each expert was given the opportunity to select one to implement in their unit.

Leaders have the ability to germinate confidence and changes in staff contributions. Changes are more successful when there is a degree of ownership (Scully, 2015; Stefancyk *et al*., 2013).

A large number of studies (Clark, 2013; Colligan and Baas, 2012; Fore *et al*., 2013; Kreckler, *et al*., 2008; Li Syw, Magrabi and Coiera, 2012; McGillis Hall *et al*., 2010; Raban and Westbrook, 2013; Rivera-Rodriguiez and Karsch, 2010 and Tomieto *et al*., 2012) have addressed strategies to minimise interruptions distracting handover.

They included:

A designated area free from interruptions:

These areas contributed to enhanced cognitive focus. Complex tasks were found to be executed with more accuracy. Nurses felt save and not pressed for time in completing tasks within a limited time period. This resulted in a reduction of adverse events and medication errors. Documents were more accurate and kept up to date. Less time was spent completion of nursing tasks. Stress and anxiety among members of staff was also found to be reduced resulting in improved job satisfaction.

In-service training:

Establishment of in-service training committees utilizing knowledgeable members of staff created a change in the learning culture. It created a platform for identifying individual needs. More attentions could be placed on minimising interruptions during handover that lead to better handover skills as a result of improved communication. Interpersonal training skills, conflict management, assertiveness training and stress management could be beneficial in enhancing self-esteem among members of staff leading resulting in improved professional performance.

Management of activities and interruptions:

Management of patient care procedures and prioritising of nursing activities has the potential of limiting the amount of distracters. Managed activities could lead to smaller numbers of interruptions during the handover period. Improve cognitive function and reduce anxiety and frustration. Not only does it have the potential to decrease handover time, but may also reduce the risk for medication errors and adverse events.

The use of support tools during handover

Standardised guidelines during handover such as (SBAR, ISBAR and ISOBAR) have proven to be successful in the transfer of key information regarding patients care. It is found to be usefully in areas of time constrains such as the ICU environment. It not only improves communication, but organises the information clearly and focus on the problem at hand.

Implementation of the suggested strategies in these studies were found to be successful in reducing the amount of interruptions through education, effective communication and collaboration among leaders and team members modifying behaviour in taking ownership of their actions.

Objective Three

The last objective sought to evaluate the effect of the implemented changes to the handover. A comparison between the distracters before and after the implementation was carried out by means of descriptive and inferential statistics.

A sample of (n=76) observations were carried out in phase three. The same four distracters emerged during the handover however the frequency had decreased. Three of the distracters decreased significantly.

Social conversations among nurses interrupting the handover were once again the most frequent distracter however they accounted for 23.7% rather than 48.7% (p=0.0008). This decrease of more than half could be expected to contribute greatly towards improved handovers. A reduction was seen in the ICUs where the option of a floating nurse was selected. In this study a floating nurse is seen as an outgoing nurse who has been allocated prior to the commencement of handover to specific tasks in an attempt to limit unnecessary distracters that may occur.

The floating nurse would therefore be responsible for:

Checking of infusions, preventing them from alarming

Attend to monitor and beside alarms

Assist with Doctors rounds and

Attend to family members

This was believed to play a key role in the reduction of social conversation during the handover period.

Intravenous alarms were the second distracter that decreased significantly from 17.1% to 6.6%, (p =0.0446). The presence of a floating nurse on the floor during the handover period made a difference in attending to IV alarms. The handover was not stopped by the nurse handing over and continued uninterrupted.

Doctors' rounds distracting the handover were reduced from 11.8% to 2.6%, (p=0.0301) after implementation of the new handover strategies. This was found in the ICUs that had chosen a

floating nurse on the floor. It had a positive impact in reduction of distracters caused by Doctors seeking information regarding patients. The floating nurse could attend to Doctors requests without interrupting members of staff carrying out the handover.

Monitor alarms still continued to be one of the distracters identified. One of the strategies chosen by three ICUs was to reset monitor alarms before and after the handover period to limit the amount of monitor alarms triggered during the handover period, distracting the handover. This study revealed a non-significant reduction of 2.6%, (p=0.5349) in the amount of distracters caused by alarms being triggered in phase three.

Critically ill patients' ever-changing physical condition and instability however required tight setting of alarm parameters and thus these alarms continued to be triggered during handover. Interruption of the handover to attend to the monitor alarms thus continued. In-service training and the allocation of a nurse to assist in the management of these alarms could be of value in minimising their frequency.

All of the objectives of this study were thus achieved.

5.4 LIMITATIONS OF THE STUDY

The study was conducted in eight ICUs from five hospitals of one private sector hospital group and limited to two specific provinces. These results therefore cannot be generalised. Different hospital groups and public hospitals may have different results particularly if the staffing structure and ratio differ to those of this study.

Limitations to this study also included that only the researcher collected data during observation. This study did not compare day to night time handover and no demographic data has been collected from the nurses who participated in the study.

The Hawthorne effect could have been a limitation, because nurses were observed during the handover period. It is therefore possible that nurses could have changed their behaviour during the handover period as they became aware of the researcher (Fernald *et al.,* 2012; Haessler, 2014; McCambridge, Witton, Elbourne, 2014). The researcher is however known to the staff and is present at handover from time to time. She did not observe any specific change in behaviour, although it remains a possibility.

Language was identified as a limitation in the study. English as a second language was spoken by seven of the experts that attended the focus group. Only two experts in the focus group were native English speakers. It was difficult for some of the experts to express their true feelings and some of the meanings may have been lost due to poor English vocabulary.

5.5 RECOMMENDATIONS

The ICU environment remains unpredictable due to the critically ill patients ever changing needs. Distracters are therefore unavoidable in this challenging environment. Effective communication and cooperation among all members of staff are therefore needed in managing and limiting distracters that could possibly place patients' safety and the continuity of safe patient care at risk. The researcher has made recommendations based on the research findings.

Recommendation for nursing management

Assignment of leaders and clarification of roles should be done in ICU with every change of shift. The presence of a Unit Manger or senior member of staff as a leader during the handover period does not only reduce anxiety and fear, it improves team dynamics, mutual respect and guides members of staff in the smooth transitions of handover. It ensures that the

handover takes place in a timeous manner, improves communications and the nurses attending the handover know what is expected of them.

Management should collaborate on ways to retain more experienced, knowledgeable skilled members of staff. Experienced nurses are more intuitive to patients changing needs. Staffing should be addressed to ensure that it meets the requirements of the units. Continuous professional development of leadership skills should be encouraged in senior members of staff. Advanced clinical programs on management and leadership skills may augment expertise in the ICUs.

Recommendation for nursing practice

English should be used as per policy during handover of all patients. Role clarification is vital. Group handover at the patient's bedside where one member of staff is assigned to do the handover with a group of staff members attending the handover has shown to be less disruptive.

A skilled member of staff trained in critical care nursing should be allocated to specific nursing task and identified on the work allocation book before handover. This nurse will take on the role of attending to the distracter such as a monitor and intravenous device alarms and assisting doctors and family members when needed allowing the handover to continue with minimal distracters. This could improve effective communication during the handover period and minimise distracters diverting nurses' attention away from the task at hand, thus shortening handover time improving patient safety and the continuity of safe patient care.

A forum could be created in which all members of staff could be given the opportunity to share their views and feelings regarding minimising distracters during the handover period.

Strategies identified at these forums should be developed into best practices to raise awareness on the improvement of safe patient handover.

Handover strategies should be re-evaluated and findings shared with all members of staff for the effect on patient safety.

Nurse educators should be involved in teaching and education in the use of handover guidelines. It is vital for all members of staff to be familiar with handover guidelines such as ISBAR and ISOBAR and it should be available at the patient's bedside for use by nursing staff. Familiarity in the use of handover guidelines will enable nurses to improve their knowledge and skills in the delivery of safe patient handover.

Recommendation for nursing research

Although distracters are unavoidable in the critical care environment, further investigation is needed in identifying strategies to limit distracters during the handover period. Experiences and feeling of all staff members involved in handover should be explored for new pathways to handover. Further research that includes the qualifications of nurses and acuity level of patients could be of value. Experiences and current handover practices and policies in units should be evaluated and revised where needed.

What this study adds.

Internationally this study confirmed what other International studies have identified with regards to the type and frequency of distracters. It also confirms that through the implementation of relevant strategies the frequency of distracters can be reduced.

This study created a greater awareness of the type and frequency of distracters during the handover period within the ICUs that participated in the study. The implementation of strategies to limiting these distracters which place patients' safety at risk particularly in a South African Private sector group was noted to improve the existing situation.

This is specifically of great significance in the South African context as the researcher is not aware of any previous South African studies that have addressed this topic. Distracters may cause harm to the patient as they lead to potential risks of medication errors and delayed treatment due to ineffective communication. Therefore the findings and recommendations could prove valuable to encourage other units to implement strategies and further explore this topic on a national level.

5.6 CONCLUSION

The safety of patients remains at risk during the handover period as a result of distracters diverting nurses' attention away from the handover. The study aimed at optimising the nursing handover in the ICU by managing distracters.

This study identified the nature and frequency of distracters during bedside handover thus meeting the first objective. Risk factors that were associated with the distracters were identified from literature (Kalisch and Aebersold, 2010; Kerr *et al.*, 2014; Kowitlawakul *et al*., 2015; Spooner *et al*., 2015).

This study sought changes in handover practices after collaboration with a group of experts on strategies they would be able to implement and manage in an attempt to limit the amount of distracters during the handover period. The group of experts collectively agreed on a date upon when the researcher would return to their ICUs to carry out a second observation.

The second observation showed a reduction in the amount of distracters throughout all disciplines in the ICUs that participated in this study, when compared to those in the first observation. Insignificant changes occurred in distractions from monitor alarms due to the instability of patients. The overall results indicated a positive result in reducing the amount of distracters observed during the handover period in an attempt to optimise the handover practice and thus enable nurses to deliver safe patient handover and care.

Involvement of the group of experts in the focus group elevated a level of awareness of the type and frequency of distracters in the workplace affecting decision making and work ethic among nurses. This group of experts came to the realisation that effective communication, knowledge sharing and cooperation among all members of staff are key in limiting the type and frequency of distracters placing patients' safety at risk.

There were differences in handover styles, and one style was shown to have a positive effect in limiting the amount of distracters during the handover period. Findings based on this study have shown that effective leadership and communication led to improved cooperation and a sense of awareness among all members of staff that enabled them to implement strategies in limiting the amount of distracters.

Change is never easy. The implementation of a new handover style might be met with resistance but nurses should be encouraged to implement bedside handover that would improve the standard of patient care and safety thus optimising the nursing handover in the ICU my managing distracters.

This study has met all the objectives thus the purpose has been met.

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APPENDIX A

R14/49 Miss Chalet van der Merwe

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M160650

NAME: (Principal Investigator)	Miss Chalet van der Merwe
DEPARTMENT:	Nursing Education Mediclinic - Morningside, Sandton, Vereeniging and Highveld and Wits Donald Gordon Medical Centre
PROJECT TITLE:	Optimising Nursing Handover in the Intensive Care Unit by Managing Distracters
DATE CONSIDERED:	24/06/2016
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Andrea Hayward

APPROVED BY: Professor P Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 05/08/2016

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 conditions under which I am/we are authorized 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 the application 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 reviewed in June and will therefore be due in the month of June each year.

Principal Investigator Signature Date 16/08/2016

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX B

Miss C.A. van der Merwe
P.O. Box 6240
CRESTA
2118
29 March 2016

The Hospital Manager
Mediclinic Sandton
Cnr Main road & Peter Place
BRYANSTON
2021

Dear Madam,

APPLICATION FOR PERMISSION TO CONDUCT A STUDY

Hello my name is Chalet van der Merwe. I am a postgraduate student in the Department of Nursing Education at the University of the Witwatersrand. I wish to apply for permission to conduct research in order to carry out a study at your institution. This is for the purpose of meeting the requirements for the Master's degree in Nursing Science. This study aims to investigate the type and frequency of distracters during bedside handover in the Intensive Care Units (ICU's) putting patient's safety at risk.

The findings from this study will aim at increasing the knowledge of nursing staff in managing distracters effectively and improving patient safety during bedside handover.

The study is a mixed method design and will make use of structured observation and a focus group discussion in collecting information. Participation in the study is voluntary and anonymous. Information given will be recorded, transcribed verbatim and kept confidential and anonymous according to the requirements of the Ethics Committee (Medical) of the University of the Witwatersrand.

The discussion will be centred on some of the pertinent points that have become apparent during a previous phase of this study through the participants experience

with regards to distracters during bedside handover. The participants will compromise of nursing staff working in the Critical Care Unit (ICU).

The study is being controlled and supervised by the Department of Nursing Education at the University of the Witwatersrand. If you have any complaint or query, about the study you are welcome to contact either myself or the following.

Researcher

C.A. van der Merwe +27828547641 chalet.vandermerwe@mediclinic.co.za

Supervisor:

Mrs A. Hayward +27114884271 andrea.hayward2@wits.ac.za

Human Research Ethics Committee (Medical)

Prof. P Cleaton Jones +27117172301 peter.cleaton-jones1@wits.ac.za

Administrative Officers

Ms Z Ndlovu +27117172700 zanele.ndlovu@wits.ac.za

Mr Rhulani Mkanasi +27117172656 Rhulani.mkansi@wits.ac.za

Mr Lebo Moeng +27117171252 Lebo.moeng@wits.ac.za

Yours Sincerely

Chalet van der Merwe

APPENDIX C

Miss C.A. van der Merwe
P.O. Box 6240
CRESTA
2118
29 March 2016

The Nursing Manager
Mediclinic Sandton
Cnr Main road & Peter Place
BRYANSTON
2021

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Researcher

C.A. van der Merwe +27828547641 chalet.vandermerwe@mediclinic.co.za

Supervisor:

Mrs A. Hayward +27114884271 andrea.hayward2@wits.ac.za

Human Research Ethics Committee (Medical)

Prof. P Cleaton Jones +27117172301 peter.cleaton-jones1@wits.ac.za

Administrative Officers

Ms Z Ndlovu +27117172700 zanele.ndlovu@wits.ac.za

Mr Rhulani Mkanasi +27117172656 Rhulani.mkansi@wits.ac.za

Mr Lebo Moeng +27117171252 Lebo.moeng@wits.ac.za

Yours Sincerely

Chalet van der Merwe

APPENDIX D

Miss C.A. van der Merwe
P.O. Box 6240
CRESTA
2118
29 March 2016

Mr. Dewald de Lange
Employee Relations Manager
Human Resources
Mediclinic (Pty) Ltd
PO Box 456
Stellenbosch
7599
South Africa

Dear Sir,

APPLICATION FOR PERMISSION TO CONDUCT A STUDY

Hello my name is Chalet van der Merwe. I am a postgraduate student in the Department of Nursing Education at the University of the Witwatersrand. I wish to apply for permission to conduct research in order to carry out a study at your institution. This is for the purpose of meeting the requirements for the Master's degree in Nursing Science. This study aims to investigate the type and frequency of distracters during bedside handover in the Intensive Care Units (ICU's) putting patient's safety at risk.

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The study is a mixed method design and will make use of structured observation and a focus group discussion in collecting information. Participation in the study is voluntary and anonymous. Information given will be recorded, transcribed verbatim and kept confidential and anonymous according to the requirements of the Ethics Committee (Medical) of the University of the Witwatersrand.

The discussion will be centred on some of the pertinent points that have become apparent during a previous phase of this study through the participants experience

with regards to distracters during bedside handover. The participants will compromise of nursing staff working in the Critical Care Unit (ICU).

The study is being controlled and supervised by the Department of Nursing Education at the University of the Witwatersrand. If you have any complaint or query, about the study you are welcome to contact either myself or the following.

Researcher

C.A. van der Merwe +27828547641 chalet.vandermerwe@mediclinic.co.za

Supervisor:

Mrs A. Hayward +27114884271 andrea.hayward2@wits.ac.za

Human Research Ethics Committee (Medical)

Prof. P Cleaton Jones +27117172301 peter.cleaton-jones1@wits.ac.za

Administrative Officers

Ms Z Ndlovu +27117172700 zanele.ndlovu@wits.ac.za

Mr Rhulani Mkanasi +27117172656 Rhulani.mkansi@wits.ac.za

Mr Lebo Moeng +27117171252 Lebo.moeng@wits.ac.za

Yours Sincerely

Chalet van der Merwe

APPENDIX E

MEDICLINIC

RESEARCH APPLICATION – CHALET VAN DER MERWE

Date: 1 August 2016

FOR APPROVAL

G VAN WYK
HR Executive

NOTES

• Locality	:	Mediclinic Learning and Development
• Employee	:	Yes
• Value of Study	:	Confirmed
• Topic	:	Optimising nursing handover in the intensive care unit by managing distracters
• Impact	:	Five hospitals (94 ICU beds); five registered nurses (Focus group)
• Supported by Hospital	:	Supported by Ann van Zyl, Nursing Managers (Sandton, WDGMC, Highveld, Morningside and Vereeniging)

APPENDIX F

INFORMATION FOR THE PATRICIPANT WORKING IN THE CRITICAL CARE UNIT

Title of the study: OPTIMISING NURSING HANDOVER IN THE INTENSIVE CARE UNIT BY MANAGING DISTRACTERS

Greetings: Hello

Introduction:

My name is Chalet van der Merwe, and I am a postgraduate student in the Department of Nursing Education at the University of the Witwatersrand. I am currently studying for my Master's Degree. Research is just the process to learn the answer to a question. In this study I would like to learn more about the type and frequency of distracters during bedside handover in the Intensive Care Units (ICU's) putting patient's safety at risk.

Invitation to participate:

I would like to invite you to participate in the following study which is considering optimising nursing handover in the intensive care unit by managing distracters.

In recent years there has been a greater awareness of distracters during bedside handover. The complex nature of the clinical environment in the Intensive Care Units, place patients in a particularly vulnerable state and therefore distracters during bedside handover may lead to adverse patient events, compromising patient's safety.

The significance of the study is that the findings could be used to improve patient's safety and according to literature it may possibly shorten patient stay. Identifying the distracters will allow nurses to put measures in place to decrease or prevent the amount of distractions that currently interfere with the handover. It is important to investigate the type and frequency of distracters during bedside handover in the Intensive Care Unit (ICU), so that handover practices can be improved and thus enable nurses to deliver appropriate handover that will result in safe patient care.

In participating and sharing your own experience of what you perceive to be distracters during bedside handover you will be assisting me in compiling information aiming at increasing the knowledge of nursing staff in managing distracters effectively and improving patient safety during bedside handover.

The findings from this study will aim at increasing the knowledge of nursing staff in managing distracters effectively and improving patient safety during bedside handover.

What is involved in participating in the study?

Study design:

The ethical considerations in this study will be more about the rights of the participants.

Informed consent will be obtained in writing from every participant by the researcher to ensure that the ethical aspect of this study is taken into consideration.
Participating in this researcher will be completely voluntary. This means that the participants can choose whether they want to participate in the study or not.

In this study the right to self-determination means that all participants will have the right to withdraw from the study at any time, should they wish to do so and will not be prejudiced in anyway .

The study is a mixed method design and will make use of structured observation and a focus group discussion in collecting information.
Data collection will be done in three sequential phases.
A week will be spent in each unit. Both day and night shift handovers will be included. A total of nine handovers each shall be observed in each unit during phase 1 and phase 3.

Phase 1:

This phase will apply structured observation using a checklist to establish distracters during handover. Numbers will be assigned to beds and the researcher will select the numbers randomly to obtain a sample. Consent will be obtained from nursing participants handing over. The researcher will only observer the handover process using a check list used in a similar study and will therefore not influence any behaviour during the handover process. The instrument covers the source of distracters, such as conversational and procedural interruptions as well as the reason and duration of each interruption measured in time. Behaviour other than that on the checklist will be ignored. These checklists will be coded by the researcher for analysis purposes for phase one and phase three of this study.

Phase 2:

During phase 2, participants will be invited by the researcher to participate in a focus group. The focus group will include a group of five to seven participants including a representative from each hospital participating in this research study. Representatives included in this phase are all trained in critical care nursing and consist of clinical facilitators, unit managers and shift leaders who will collaborate in order to establish strategies to manage and decrease distracters.

No information will be gathered without their consent or knowledge.
This meeting will be recorded and permission to do so will be obtained in writing.

In this study the researcher will aim to protect the anonymity and maintain the confidentiality of all participants of data collected during the study. This will be done by giving each participant a code number.

A qualified experienced researcher will assist with the research process by advising the researcher and assistance will be provided during data analysis. The study will be conducted with the utmost sensitivity to all participants and their views.

The discussion will be centred on some of the pertinent points that have become apparent during phase1 of this study through the participants experience with regards to distracters during bedside handover. A collective agreement on the date of implementation of the new strategies should be reached during the meeting and will be communicated by the focus group to all staff in the units

Information given will be recorded, transcribed verbatim and kept confidential and anonymous according to the requirements of the Ethics Committee (Medical) of the University of the Witwatersrand.

Phase 3:

Phase three will evaluate the new handover procedure agreed upon in phase two.
The new handover procedure will be evaluated once implementation has occurred on the agreed date using structured observation. Participants from phase one will evaluated on new handover procedure in phase three. The same checklist from phase one will be used in phase three.

Numbers will be assigned to beds and the researcher will select these numbers randomly to obtain a sample. The researcher will only observer the handover process using the same checklist from phase one and will therefore not influence any behaviour during the handover process. The instrument covers the source of distracters, such as conversational and procedural interruptions as well as the reason and duration of each interruption measured in time. Behaviour other than that on the checklist will be ignored. These checklists will be coded by the researcher for analysis purposes for phase one and phase three of this study. The participants may or may not be the same as in phase one depending on their shifts worked.

Risks/Benefits for participating in the study:

There will be no risk to you in participating in this study. You may however feel uncomfortable during the observation process.
There will be no reimbursement in the form of payment to you in participating in this study.

Participation:

During Phase one and Phase three consent will be obtained in writing by the researcher from nursing participants handing over. The researcher will only observer the handover process using a check list used in a similar study and will therefore not influence any behaviour during the handover process.

During phase 2, participants will be invited by the researcher to participate in a focus group. The focus group will include a group of five to seven participants including a representative from each hospital participating in this research study. Representatives included in this phase are all trained in critical care nursing and consist of clinical facilitators, unit managers and

shift leaders who will collaborate in order to establish strategies to manage and decrease distracters.

No information will be gathered without their consent or knowledge.
This meeting will be recorded and permission to do so will be obtained in writing.

Participating in this researcher will be completely voluntary.
In this study all participants will have the right to withdraw from the study at any time, should they wish to do so without repercussions or penalty. Your participation is purely voluntary.

Confidentiality/Anonymity:

Consent will be obtained from nursing participants handing over during phase one and three of the study. The researchers will only observer the handover process.

The focus group meeting in phase two will be recorded. Permission to do so will be obtained in writing from each participant.

In this study the researcher will aim to protect the anonymity and maintain confidentiality of al participants of data collected during the study. This will be done by giving each participant a code number.

Your name will not be linked to either recording or transcribed data and will only be accessible to the research team even after reporting or publishing the research.

The study is being controlled and supervised by the Department of Nursing Education at the University of the Witwatersrand.

Contact details:

Permission to conduct this study has been obtained from the Human Research Ethics Committee (Medical) University of the Witwatersrand, Johannesburg.

If you have any complaint or query, about the study you are welcome to contact either myself or the following.

Researcher

C.A. van der Merwe +27828547641 chalet.vandermerwe@mediclinic.co.za

Supervisor:

Mrs A. Hayward +27114884271 andrea.hayward2@wits.ac.za

Human Research Ethics Committee (Medical)

Prof. P Cleaton Jones +27117172301 peter.cleaton-jones1@wits.ac.za

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Mr Rhulani Mkanasi +27117172656 Rhulani.mkansi@wits.ac.za

Mr Lebo Moeng +27117171252 Lebo.moeng@wits.ac.za

Yours Sincerely

Chalet van der Merwe

APPENDIX G

Permission from the participant

OPTIMIZING NURSING HANDOVER IN THE INTENSIVE CARE UNIT BY MANAGING DISTRACTERS

I agree to participate in the study. I have read the proposed method of data collection and understand that I will be able to make alterations during the interview process, should I not agree with the interpretation. I also understand that the researcher will maintain my privacy.

I know that the Human Research, Ethics and publications Committee of the faculty of Health Science, University of the Witwatersrand has approved the study and I am aware that the results will be used for scientific purposes and will be published.

I hereby agree to participate in the study.

…….

Name of participant

…… ……..

Signature Date

APPENDIX H

Permission from the participant.

OPTIMIZING NURSING HANDOVER IN THE INTENSIVE CARE UNIT BY MANAGING DISTRACTERS

CONSENT FORM FOR RECORDING A CONVERSTIONAL INTERVIEW

I consent to the researcher recording the interview and understand that my name will not appear in any documentation.

…….

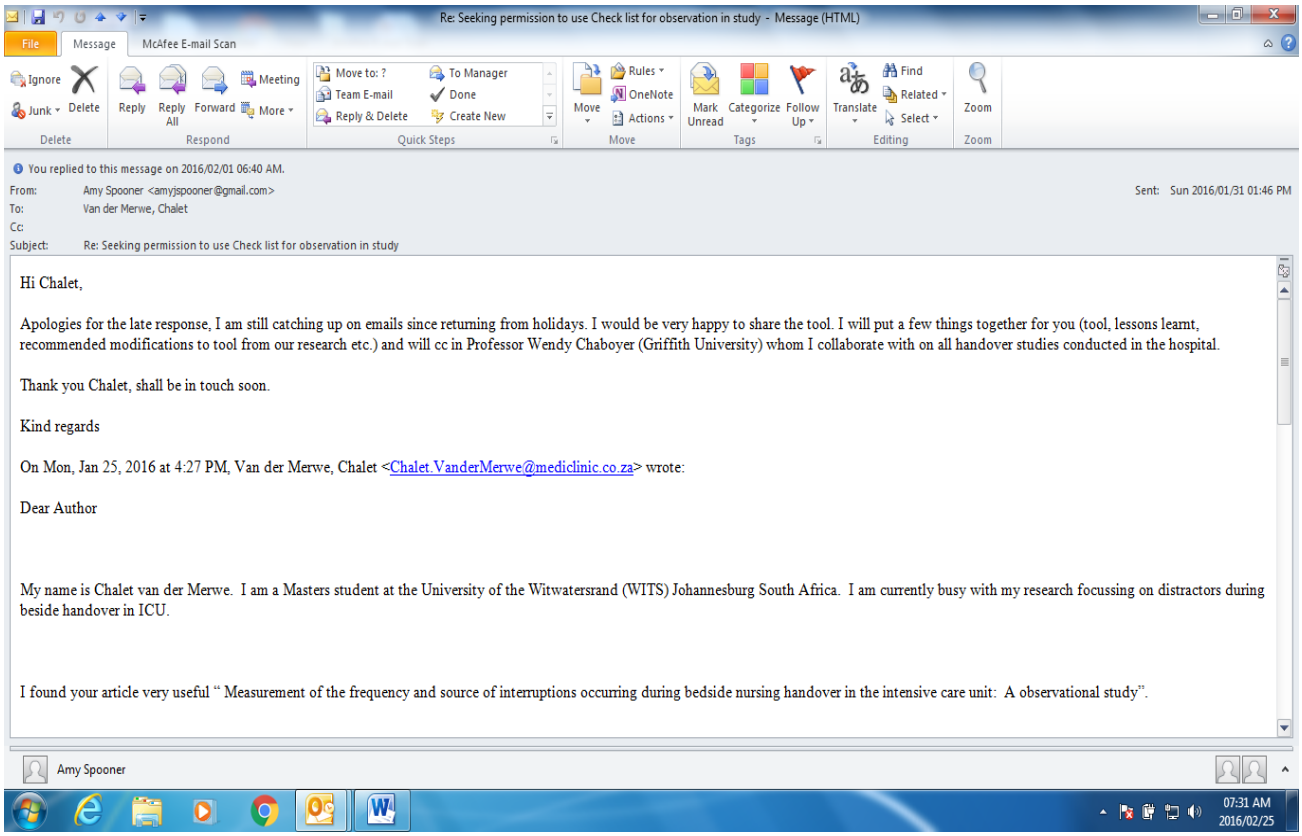
Name of participant

…….. …….

Signature Date

APPENDIX I

PERMISSION TO USE CHECK LIST FOR OBSERVATION FROM AUTHOR



Re: Seeking permission to use Check list for observation in study - Message (HTML)

File | Message | McAfee E-mail Scan

Ignore | Delete | Junk | Reply | Reply All | Forward | Meeting | More | Move to: ? | To Manager | Team E-mail | Done | Reply & Delete | Create New | Move | Rules | OneNote | Actions | Mark Unread | Categorize | Follow Up | Translate | Find | Related | Select | Zoom

Delete | Respond | Quick Steps | Move | Tags | Editing | Zoom

You replied to this message on 2016/02/01 06:40 AM.

From: Amy Spooner <amyjspooner@gmail.com>
Sent: Sun 2016/01/31 01:46 PM
To: Van der Merwe, Chalet
Cc:
Subject: Re: Seeking permission to use Check list for observation in study

Hi Chalet,

Apologies for the late response, I am still catching up on emails since returning from holidays. I would be very happy to share the tool. I will put a few things together for you (tool, lessons learnt, recommended modifications to tool from our research etc.) and will cc in Professor Wendy Chaboyer (Griffith University) whom I collaborate with on all handover studies conducted in the hospital.

Thank you Chalet, shall be in touch soon.

Kind regards

On Mon, Jan 25, 2016 at 4:27 PM, Van der Merwe, Chalet <Chalet.VanderMerwe@mediclinic.co.za> wrote:

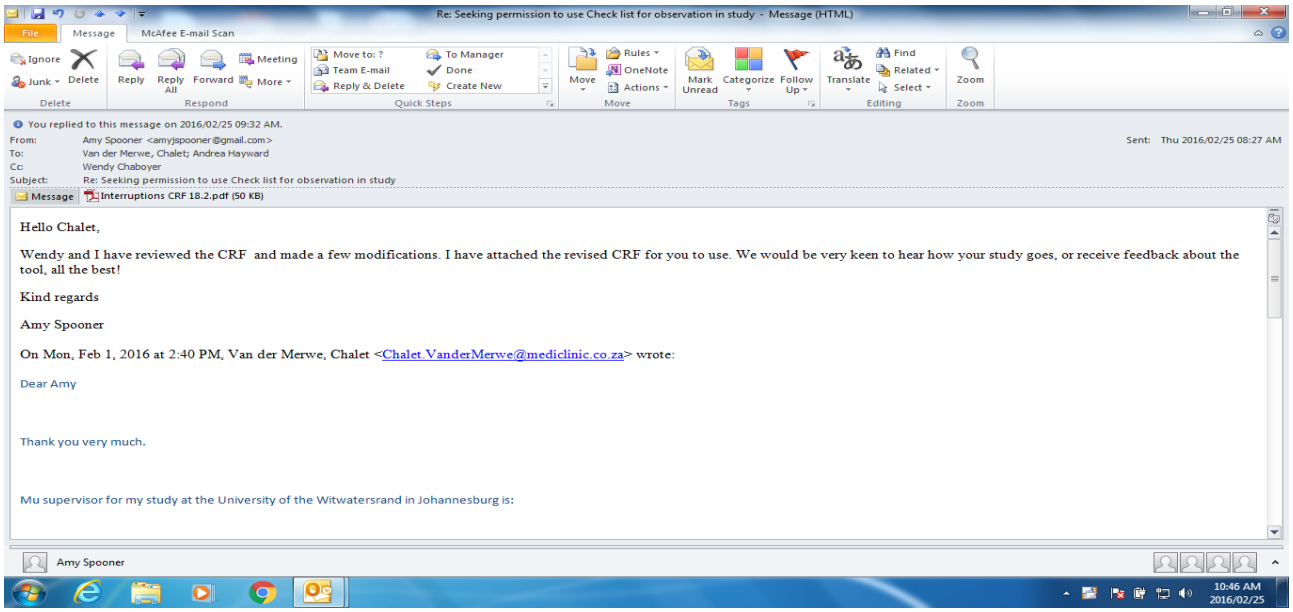
Dear Author

My name is Chalet van der Merwe. I am a Masters student at the University of the Witwatersrand (WITS) Johannesburg South Africa. I am currently busy with my research focussing on distractors during beside handover in ICU.

I found your article very useful " Measurement of the frequency and source of interruptions occurring during bedside nursing handover in the intensive care unit: A observational study".

Amy Spooner

07:31 AM
2016/02/25



Re: Seeking permission to use Check list for observation in study - Message (HTML)

File | Message | McAfee E-mail Scan

Ignore | Delete | Junk | Reply | Reply All | Forward | Meeting | More | Move to: ? | To Manager | Team E-mail | Done | Reply & Delete | Create New | Move | Rules | OneNote | Actions | Mark Unread | Categorize | Follow Up | Translate | Find | Related | Select | Zoom

Delete | Respond | Quick Steps | Move | Tags | Editing | Zoom

You replied to this message on 2016/02/25 09:32 AM.

From: Amy Spooner <amyjspooner@gmail.com>
Sent: Thu 2016/02/25 08:27 AM
To: Van der Merwe, Chalet; Andrea Hayward
Cc: Wendy Chaboyer
Subject: Re: Seeking permission to use Check list for observation in study
Message | Interruptions CRF 18.2.pdf (50 KB)

Hello Chalet,

Wendy and I have reviewed the CRF and made a few modifications. I have attached the revised CRF for you to use. We would be very keen to hear how your study goes, or receive feedback about the tool, all the best!

Kind regards

Amy Spooner

On Mon, Feb 1, 2016 at 2:40 PM, Van der Merwe, Chalet <Chalet.VanderMerwe@mediclinic.co.za> wrote:

Dear Amy

Thank you very much.

Mu supervisor for my study at the University of the Witwatersrand in Johannesburg is:

Amy Spooner

10:46 AM
2016/02/25

ICU BEDSIDE NURSING HANDOVER OBSERVATION – INTERRUPTIONS

DEMOGRAPHICS		
Date:	**Observation number:**	
ICU area:	**Shift:**	**Total number of patients handed over:**
Start time:	**Finish time:**	**Total time (mins):**
Patient Group: ☐ Cardiac surgical ☐ General ☐ Orthopaedic	**Oncoming RN experience:** 1. Years nursing: 2. RN level:	**Outgoing RN experience:** 1. Years nursing: 2. RN level:

INTERRUPTIONS			
No	**Source of interruption** **Conversational** – conversations unrelated to handover (Nurse, doctor, family, physiotherapist), **Procedural** – equipment alarming/interfering with handover (dialysis alarming, infusion pump alarming, pager)	**Reason** (nurse saying goodbye, doctor requested an update about patient, doctor wanted the nurse to order an x-ray, infusion ran through & pump alarmed)	**Duration of each interruption (mins)**
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Interruption defined as a break in the performance of an activity.

Field Notes

_____
_____
_____
_____
_____
_____

Observed handover
V1 18.2.16

APPENDIX K

TRANSCRIPTION

Researcher: *" How do you feel when alarms interrupt the handover?"*

(PAR08) *" I think it is a common thing, while you are busy handing over I am… it is, Umm…,I am not going to lie and say it does not happen. Alarms are going off and somebody must stop and look at the alarms. Now you must stop thinking, Where was I? the quality* [of the handover] *is already distorted."*

(PAR03) *"Absolutely! I agree with what the other participant said. Alarms are constantly ringing. It is almost if I can say unavoidable at times… but it is the beak of the training of thought* [train of thought] *you know and …That is a big thing!"*

(PAR07) "*It take a lot of time to attend to alarms. It breaks concentration. To get them* [nurses] *back on board is going to take a them some time and that is why in my Opinion the handover takes too long."*

(PAR02) " *For me there is nothing worse to attend to bedside alarms infusion pumps ring Alarms were never set you must stop handover. It is a lot of noise in the unit, it breaks your attentions. We expect them* [nurses] *to still carry on attend to the alarms until handover is finished."*

Researcher: *" What in your experience are your biggest challenges when it comes to distracters during the handover period?"*

(PAR02) *" I think especially in our unit the Doctor starts ding round from 06:30 am so There is a lot of activity, x-ray's, the lab technicians are busy at the patients Beside umm… you know, the physiotherapist is already busy in the unit as well, so there is a lot of activity which is quite disruptive."*

(PAR09) *"Yes! I agree with that. They do sometimes come and do the x-ray especially if they are running late. It causes interference, because while busy with handover you have to stop and help with x-ray."*

(PAR08) *" At 7:15 am the Doctor is already busy at bedside so if the handover was not done quickly enough then you need to stop and them somebody need to go and do rounds. Yes this bothers us!"*

(PAR01) *"We have telephones next to the patient's bedside. It disrupt the whole team handover now everyone looks at me. What am I taking about?"*

(PAR03) "*I think just that interruption, first of the phone call, but obviously you can't stop that but then if you say no I am busy with handover, already it is a negative vibe!. I just …, I don't know ……. takes the focus away."*

(PAR05) *"Phone calls cause a lot of interruptions. It is the family; it is other units or you know it is someone else looking for staff, it breaks the flow of handover.*

(PAR07) *"Phone calls are a lot it disrupts the handover. Now I must go answer. I am just my time.*

(PAR02) *"This is the worst time for us in our unit. It is that handover period the visitors* [family] *are coming. If they* [visitors] *already there at handover it makes us anxious. Now they want my attention too and it is handover."*

(PAR01) *"Visiting hours is* [are] *anytime. It can be as early as 06:45 am* [handover]. *The visitors* [family] *all of a sudden wants to see the Doctor, so they also stay and also contribute to a lot of disruption because the wife will ask this …, and the family ask* [asks] *that…, so it is a lot of disruption during handover."*

(PAR08) *" If there are visitors* [family] *outside you get distracted, you get irritable when distracted and no not listen properly."*

Researcher: Why do you thick distracter happen during the handover period?

(PAR02) *"Your non ventilated patients, they might be on all their inotropes and that type of things, but they are still active busy on their laptops or on their cell phones. that causes major interruptions as well because they are now moving, they are fidgeting and taking of their sat* [saturation] probe."

(PAR03) *"We don't see that ICU-ICU patients we had previously… you know the on that have been paralysed and sedated and things, so it is more awake sedation these days that we are promoting. Usually our sedation vacation starts at about 06:00 am in the morning so that the Doctor come on their rounds can observe so that is the time the patient can get restless and active you know the patient wakes up all of those things so your alarms might have been set correctly, but suddenly the patient is awake,*[and] *it's handover you know how it goes."*

(PAR04) *" I agree it is not the patient lying still you know they are active. That is one thing and if you think we also got extended visiting times, so that plays a big role.*

Researcher: *"How do you feel when social conversation among staff members interrupt the handover?*

(PAR02) *"Women like to talk. You will never take it away from the. I think it is that long lost fiend they haven't seen for the las two days type of thing."*

(PAR01) *"Sometimes it* [talking] *really gets out of hand… you must say let's go!"*

(PAR03) *" I see handover as a training session. I see something I start talking, because the whole group is there. So if something's trigger your alarms it is also like a supervisory time for me because I will say, guys the line are not done. I am doing my audit as well. So yes…, lots of disruptions come in from talking."*

(PAR01) *"Sometimes the patients themselves start especially these long-term patients … you know she is the one that greets you by name. Then she starts talking and it's*

handover. It is the patient so you do not want to be rude.

(PAR02) *" It should not be a social party you know. You have to bring them* [nurses] *back to the conversation on handover. You are in control of that handover. You have to bring boundaries on handover."*

(PAR06) *"I want to agree with the other participants. To get them back to on board to the conversation at bedside takes some time. You know… handover …. It takes a lot of time and then they* [nurses] *rush."*

(PAR08) *"I think we have learned, we call the people* [nurses] *to order and this is the thing we do. We do correct each other as we go on to make things easier. Otherwise they talk* [about] *other things having their own conversation. So we correct each other".*

Researcher: *"How does it impact on your patients' safety and working environment?"*

(PAR08) *"You get irritable when distracted… it changes the mood of the team. What was I saying? So it can affect the quality of handover you are going to give to the next person,* [nurse] *because now you must stop and think…, I must reprimand the people* [nurses] *who is* [are] *interrupting and making noise. The quality is already distorted".*

(PAR01) *"I am just wasting my time!* [slamming hand on table in frustration]. *I am also disrupting the whole team handover. Already they* [nurses] *are also anxious. The vibe* [mood] *is already up!"*

(PAR04) *"We agree. You are eating into my handover time. I am also anxious now. The negative mood takes the focus away when distracted. Where am I now?* [confusion] *Now we have to go back and look for information. It…it's frustrating!"*