Barriers affecting the implementation of the World Health Organization Surgical Safety Checklist by staff in a Private hospital in the Cape Metropole

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Thesis presented in partial fulfilment of the requirements
for the degree of Master of Nursing Science
in the Faculty of Medicine and Health Sciences
Stellenbosch University

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April 2019

DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third-party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: April 2019

ABSTRACT

Adverse events or near misses in the operating room (OR) is the result of negligence, medical malpractice and management that compromise patient safety which may result in wrong patient, wrong procedure and wrong site/side surgery.

The World Health Organisation developed the Safe Surgical Checklist in 2008 as a systematic approach towards the improvement of peri-operative patient safety and reduces the risk of harm. The reliability of this process when implemented correctly has been widely published as invaluable. However, the researcher of this study, observed in clinical practice that adherence to the protocol is frequently inconsistent and may obstruct its efficacy. Thus, the aim of this study was to explore the OR staff's perception of the implementation and efficacy of the checklist used in one private hospital in the *Cape Metropolitan district of South Africa*.

A non-experimental, descriptive, cross-sectional quantitative approach using a case study design was applied. A self-administered structured questionnaire was used to collect data. Validity and reliability of the tool was assured by means of published research (Chronbach 0.70), a pilot study and consultation with nursing experts and a statistician. The total population was N=125 and included surgeons, anaesthetists and OR staff specifically involved in the surgical procedure. A response rate of 53% was achieved.

Ethical approval was obtained from the Health Research Ethics Committee of the University of Stellenbosch and the institution's ethical review board. Informed written consent was acquired from the participants.

Data was analysed descriptively by the statistician and is presented in frequencies and tables. No inferential statistic calculations were performed as advised by the statistician.

The analysis highlighted revealed that improper use of the SSC, a lack of training and a lack of management involvement may limit the benefits of the surgical safety checklist.

In summary it is recommended to encourage continuous staff awareness campaigns to enhance the effective implementation of the SSC and promote a culture of safety among the surgical team.

OPSOMMING

Ongewenste gebeurtenis in die operasiesaal kan toegeskryf word as die nalatige en wanpraktyk van gesondheidswerkers met ’n negatiewe effek op pasiëntveiligheid. Hierdie gedrag kan lei tot permanente ongeskikheid en verlengende verblyf van pasiënte in die hospitaal. Hierdie onverwagte gebeurtenisse is skadelik vir enige gesondheidsorganisasie. In 2008 het die Wêreld Gesondheidsorganisasie ’n chirurgiese kontrolelys ontwikkel en geïmplimenteer om peri-operatiewe pasiëntveiligheid en skadelike gebeurtenisse te verminder en te voorkom.

Die doel van hierdie studie was om die hindernisse te ondersoek wat die implementering van die chirurgiese veiligheidskontrole-lys in die operasiesaal in ’n privaathospitaal in die Wes-Kaapse Metropool te verhoed.

Nie-eksperimentele beskrywende kwantitatiewe navorsingsontwerp was geselekteer om die doelwitte van hierdie studie te berek. ’n Self-geadministreerde vraelys was gebruik om die data in te samel. Die vraelys wat gebruik word in hierdie studie was voorheen in gebruik waarvan ’n alpha-telling van 0.7 ’n aanvaarbare vlak van interne konsekwentheid aangedui is. Die metodologie van die vraelys was getoets deur ’n loods-studie. Kundiges was geraadpleeg om die geldigheid van die instrument te verseker. Die totale populasie van N=125 sluit in: verpleegkundiges, teater tegnici, chiruge, en narkotiseurs wat in ’n operasiesaal van ’n privaathospital in die Kaapstad Metropooldistrik, Suid-Afrika werk, is genooi om aan die studie deel te neem. Terugvoer van 53% was verkry.

Etiese goedkeuring is vooraf verkry van die Gesondheids Navorsingsetiek-komitee aan Stellenbosch Universiteit sowel as van die etiese raad van die privaathospitaal. Ingeligte, geskrewe toestemming is van die deelnemers verkry.

Die data is geanaliseer deur die statistikus en is aangebied in frekwensietabelle. Die bepaling van inferensiële statistieke was nie aanbeveel deur die statistikus nie.

Die analise van die resultate het onbehoorlike gebruik, onvoldoende opleiding en bestuursbetrokenheid geïdentifiseer as potensiële pasientveiligheidsrisiko`s beskou. Die aanbevelings na afloop van hierdie studie sluit in deurlopende professionele opleiding aan teaterpersoneel met die klem op die effektiewe implementering van die chirurgiese vraelys.

ACKNOWLEDGEMENTS

I would like to express my sincere thanks to:

- I would like to give Thanks to Our Lord God Almighty for His everlasting love. His hand of protection over my life and His Mercy and Grace.
- My supervisor, Ms Mary Cohen for her patience, guidance and support. I cannot express my gratitude towards all your support. Thank you for all your encouragement and inspiration throughout this process.
- My family for being patient, their respect and understanding.
- The participants who willingly agreed to partake in this project
- My former colleagues for your help and support specially Ms Dollby Vinzon for always responding in times of need to rescue a desperate situation
- Ms Nermie Belnas and her husband for their encouragement and friendship

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

ABBREVIATIONS

WHO	World Health Organization
SSC	Surgical Safety Checklist
WHO	World Health Organization Surgical Safety Checklist
OR	Operating room
SPSS	Statistical Packages for Social Science
HREC	Health Research Ethics Committee
CDC	Center for Disease Control
PRNs	Registered Professional Nurses
ENs	Registered Enrolled Nurses
ENAs	Registered Enrolled Nurse Assistants
OTP	Operating Theatre Practitioners
SPSS	Statistical Packages for Social Science
HREC	Health Research Ethics Committee
JCAHO	Joint Commission on Accreditation of Healthcare Organization
SMaX	Sign Mark a X
AAOS	American Academy of Orthopaedic Surgeons
AHS	Alberta Health Services
ICUs	Intensive Care Units
MHA	Michigan Health and Hospital Association
DALY	Disability-Adjusted-Life-Year
TOP	Time Out Phase

CHAPTER 1
FOUNDATION OF THE STUDY

1.1 INTRODUCTION

This chapter describes the scientific foundation of the study, the rationale, problem statement, research aim, objectives, research methodology and conceptual framework.

1.2 RATIONALE

Excluding the patient's presenting complaint for treatment by a healthcare provider, an adverse event or near miss is defined as an unwanted, undesirable or unusually unanticipated event or injury resulting from medical care and management. The outcome for the patient may result in both a protracted hospital stay and disability on discharge or both (Joint Commission International Accreditation, 2017: 337).

For example, in a study in Cape Town and Gauteng, South Africa, it was reported that among the case files reviewed an unintended retention of a swab resulted in the patient requiring a permanent colostomy and a patient has permanent nerve damage following surgery on the incorrect spinal level (Williams, 2018:71; Samlal, 2018:59). Beukes (2016:41) found that in tertiary hospitals in Cape Town the knowledge of counting practices amongst nurses varied and that nurses indicated on the questionnaire that they were reluctant to notify the surgeon of a swab discrepancy.

A study in 2012 with 3231 participants it was reported in the 44th Brazilian Congress of Orthopaedics and Traumatology that 40.8 % have experienced wrong site or wrong patient surgery and 25.6% reported miscommunication were the cause of the error. In 2014, Brazil reported approximately 8,000 surgical related incidents (Santana, Rodrigues & Evangelista, 2016:6).

In 2008, the World Health Organisation (WHO) introduced the SSC for utilisation in the Operating Room. The 19-point checklist was developed to highlight accepted practices and to expand teamwork and communication in the OR (WHO, 2009: 73). The WHO estimates that 500 000 lives can be saved worldwide through the implementation of the SSC in the OR The use of a Surgical Safety Checklist (SSC) has become a universal instrument to aid patient safety in Operating Rooms (Gagliardi, Straus, Shojania & Urbach, 2014:1). The implementation of an SSC in Operating Rooms is focused on preventable adverse events that may occur during or as an effect of a surgical procedure (Gagliardi *et al*., 2014:1)

O'Connor, Reddin, O'Sullivan, O'Duffy and Keogh (2013:2) report that OR personnel have identified that the WHO SSC has a positive influence on the peri-operative safety culture (O'Connor, *et al*., 2013:2). Despite the positive reaction of peri-operative personnel as reported by O'Connor, the practical implementation has been found to be less than universal and decays over time. Hurtado, Jimenez, Penalonzo, Villatoro, de Izquierdo and Cifuentes (2012:2) identified unfamiliarity and embarrassment, hierarchy, timing of the checks, duplication with existing processes, lack of communication and modification of the checklist as some barriers that can prevent the correct implementation of the WHO SSC.

The researcher has identified in the research setting that peri-operative personnel exhibit poor adherence to the WHO SSC and that some surgical team members complete the SSC without following the process (performing *Sign In*, *Time Out* or *Sign Out*).

1.3 PROBLEM STATEMENT

Poor compliance compromises patient safety in the peri-operative setting and can lead to adverse events and litigation. The WHO SSC is a systematic approach towards reducing the risk and harm to the peri-operative patient. Individual peri-operative personnel who are reluctant to change their attitude towards the WHO SSC may obstruct the effectiveness of it. Furthermore, the researcher observed that some surgeons and anaesthetists are not enthusiastic about the implementation of the SSC in the OR and consider the use of the SSC as time consuming since many of the SSC items are perceived to be repetitive by them. They complain that the use of the SSC adds to the general workload and they feel it does not add any value to patient's safety.

1.4 RESEARCH QUESTION

The research question represents the concept to be examined and forms the foundation of the research study. The research question formulated for this study is: What are the barriers affecting the adherence to the WHO SSC by surgical staff in the OR complex in one private hospital in the Cape Metropolitan district of South Africa?

1.5 RESEARCH AIM

This research study aimed to explore and describe the barriers affecting the adherence to the WHO SSC by surgical staff in the OR complex in one private hospital in the Cape Metropolitan district of South Africa.

1.6 RESEARCH OBJECTIVES

- To describe the participant's attitude concerning hospital norms on the use of SSC

- To describe the participants perceived impact of the SSC on safety and teamwork
- To determine the participant's opinion on the support of the SSC from specific groups within the OR
- To describe the participants intent to initiate the checklist
- To establish the participants perceived barriers and experienced during the use of the SSC

1.7 CONCEPTUAL FRAMEWORK

Bandura`s social cognitive theory intends to transform or adjust human attitude to ensure optimal results and it can be used in any condition where behavioural change is required (George, 2011:554). The key components to this theory are a three-way interaction between behaviour, cognition, other personal factors and environmental influences while functioning interactively as determinants of each other (Bandura, 1986:23). Successful achievement depends on both skills and self-control for efficacy and the ability to use them meritoriously (Bandura, 1986:391). Self-efficacy is the ability to judge an individual`s capability to achieve his goals.

According to Bandura (1986:391), individuals regulate their behaviour on the perception of other people or the environment to achieve their goals. Figure 1.1 below graphically portrays the interactive influence of the cognitive, behavioural and the personal/environmental influences.

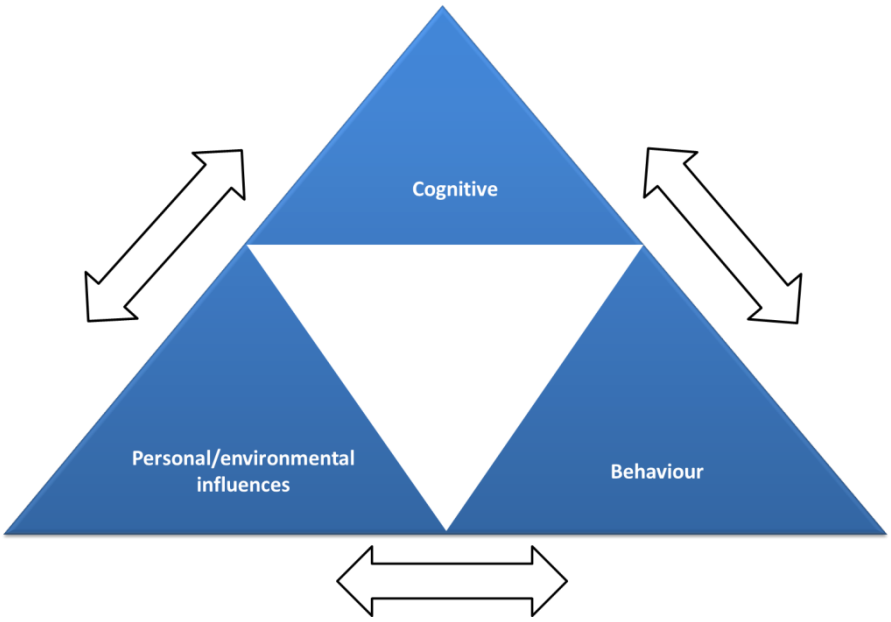

Figure 0.1: Graphic illustration of conceptual map

1.8 RESEARCH METHODOLOGY

Methodology refers to the specific manner of knowing about a reality (Brink, Van Der Walt & Van Rensburg, 2010:22). In the following section a short overview of the research design and method is presented.

1.8.1 Research design

A research design is a structured plan or blueprint that directs the methodology of a research study (Burns & Grove, 2011:547). A non-experimental, descriptive, cross-sectional quantitative approach using a case study design was applied and data was collecting using the O'Connor questionnaire (O'Connor *et al*., 2013:2). Descriptive quantitative studies are structured, and are used to determine the extent of the problem and to describe a phenomenon. (De Vos *et al*., 2009:63). Descriptive designs are used since they provide a picture of what is happening in a specific situation and may be applied to develop theories and identify gaps in practice (Burns & Grove, 2011:256). A single-case study is described by Polit and Beck (2017:476) as an appropriate design when the aim of the study is to explore a typical case for the understanding or enlightenment of a phenomenon. Furthermore, the setting is a representative OR complex (case) within the private hospital group that has many OR complexes in other branches and the findings may be revelatory.

1.8.2 Study setting

The research was conducted in the Operating Room (OR) complex of one private hospital in the Cape Metropolitan district of South Africa. The OR complex consists of 10 general surgical rooms, 3 cardiac operating rooms and 3 catheterisation laboratories. The surgical procedures performed in the research setting range from complex to minor surgery, namely orthopaedic, neurosurgery, cardiac, thoracic, vascular, general, plastic, urology, ear nose and throat, gynaecology, ophthalmology and obstetrics. The OR provides elective and emergency surgical services.

1.8.3 Population

A population is defined as all the inhabitants or elements most suitable to be considered for a research project and who meet the inclusion requirements for inclusion in the study (Burns & Grove, 2007:40; Grove *et al*., 2015:46). In this study, the target population was all the nursing and clinical staff members who are involved in diagnostic or surgical procedures in the OR. In the research setting the nursing staff are internationally or locally recruited registered nurses, registered enrolled nurses, registered enrolled nurse assistants and operating theatre practitioners with a minimum of two years OR experience. They are all registered with the South African Nursing Council, the judicial body for nursing in South Africa.

The surgeons, surgical assistants and anaesthetists are not employed by the institution. They are in private practice and use the facility to provide surgical care to their patients. They are all registered with the Health Professions Council of South Africa as general practitioners, specialist surgeons and anaesthetists.

1.8.3.1 Sampling

Burns and Grove (2007:324) describe sampling as a process relating to the selection of a fraction of individuals or a subgroup (Brink *et al*., 2010:124) that represent a population. For the case study approach, the entire population (N=125) employed in the OR was afforded the opportunity to participate in the study. The hospital itself was purposively and conveniently sampled for its range of surgical procedures and for the large nursing staff establishment employed in the OR.

1.8.3.1 Inclusion Criteria

The hospital selected for this case study, is a branch of a for profit private hospital enterprise situated in the Cape Town Metropole district of South Africa. The inclusion criteria were all registered professional nurses (RPNs), registered enrolled nurses (ENs), registered enrolled nurse assistants (ENAs) and operating theatre practitioners (OTP), surgeons and anaesthetists involved in direct surgical care activities in the OR.

1.8.3.2 Exclusion Criteria

Recovery room nurses in the study setting were excluded since they do not participate in the SCC prior to surgery. OTP trainees and newly hired nursing staff who were still in an orientation program over the data collection period were also excluded.

1.8.4 Instrumentation

A questionnaire is referred to by De Vos *et al*. (2012:186) as a set tool presenting questions and other elements to gather information on a specific topic.

For this study, a self-administered paper and pencil questionnaire developed by O'Connor *et al*. (2013:2), (Appendix 1) was used to gather data. The questionnaire contains two sections. The original questionnaire has three sections and gathered demographic and professional data in the last section(C). For this study, it was deemed more appropriate to present the demographic section first, to reduce possible attrition further on. Therefore, Sections A and B consists of close-ended declarative statements measured on a six-point Likert scale ranging from "strongly disagree" to "don't know" to measure the respondents' attitudes concerning hospital norms on the use of the checklist, the impact of the checklist on safety and teamwork,

the support of the checklist from specific professional groups, the intent to initiate the checklist and barriers experienced during the use of the checklist.

1.8.5 Pilot study

Burns and Grove (2011:49) describe a pilot study as a dry run version of the proposed study, applied under similar circumstances. It is implemented to facilitate the methodology and help to determine reliability and validity. Furthermore, Brink *et al*. (2006:166), describe the main purpose of a pilot study is to test and assess the feasibility of the questionnaire.

The pilot study was conducted in the cardiac catheterisation laboratory in the same hospital as the main study. After consulting with a statistician, a convenient sample was used and all the personnel present (n=8) on the day of the study was selected. The purpose of the pilot study was to ensure that the questions in the measuring tool were clear and understandable to the participants.

The researcher met personally with the pilot study participants to explain the purpose of the study and the data collection instrument. Following the meeting with the participants, written consent was obtained and the questionnaires distributed. The participants indicate that the questionnaire took 20 minutes to complete. They found the questions on the instrument understandable and the format acceptable. The participants did not request or suggest any further clarification to be included in the questionnaire. Following data collection, the pilot study data was excluded from the main study.

1.8.6 Validity and Reliability

Validity of an instrument establishes the degree to which it is able to measure the attribute or a concept accurately (Grove, Burns & Gray, 2013:393). LoBiondo-Wood and Haber, (2010:286) refers to reliability as the aptitude of an evaluation tool to produce consistent results each time it is applied in similar scenarios**.**

The Chronbach alpha score of 0.7 was reported by O'Connor *et al*. (2013:3) which indicates an acceptable level of internal consistency and therefore reliability. Validity in this study was increased through the pilot study, the clinical knowledge and experience of the researcher and consultation with the supervisor and biostatistician.

Face validity is subject to judgment and indicates whether the instrument measures the concepts its intended to measure. Face validity is considered the least scientific measure of validity; however, it is important to the participants and could potentially hinder the completion of the questionnaire (Grove, Burns &Gray, 2013:394).

The questionnaire was previously used in a similar study O`Connor *et al*. (2013:3), and appeared to measure the intended data (Chronbach alpha 0.7).

Content validity is described by Creswell, Ebersohn and Eloff *et al*. (2011:217) as a measure of standardisation that the constructs in the study, e.g. support in this study, are measured by the related items or in this study, the declarative statements. The content validity in the O'Connor questionnaire has been reported in literature. In addition, the pilot test in this study confirmed the content validity which was corroborated by OR room nursing experts.

1.8.7 Data collection

Following ethical approval from Human Research Ethics Committee of Stellenbosch University (reference S17/04/075, Appendix 1) and from the research setting authorities (Appendix 2), an introduction to the study's aim and objectives was presented at a department meeting before data collection commenced. A self-administered hard copy (paper and pencil) self-completing questionnaire was selected for data collection (Appendix 4). The gathering of opinions from participants who are knowledgeable on a particular phenomenon and in this research setting have practical experience of it, can be facilitated by a questionnaire (Delport, 2005:166). Data were collected (30th July 2018-24 August 2018) at the participant's place of employment and night, day and weekend shifts were approached to participate. The researcher personally distributed and collected the documents. The information leaflet, consent form and questionnaire were distributed to all participants during a department meeting (Appendix 3).

Two self-sealing opaque and blank envelopes were provided for the consent form and questionnaire to ensure anonymity and confidentiality of the participants. The participants were instructed to not place any identifiers on the documents or envelopes. Following completion, they were requested to deposit them in the two separate and clearly marked locked boxes which were provided to secure the consent forms and questionnaires. The containers were placed in the in front of the manager's office. Only the researcher was able to open the boxes. A reminder to the participants was posted on the notice board one week after distribution of the documents and a follow up reminder at the beginning of the fourth week.

1.8.8 Data analysis

Data analysis is the process of sorting, arranging and summarising raw data (Burns, Grove & Gray, 2012:691). De Vos *et al*., (2012:249) describe quantitative data analysis as a technique by which data is captured to a numerical system and then statistically analysed. The researcher was assisted by two statisticians: Mr I Karanga in the initial phase of planning the

analysis during the development of the proposal and following data collection by Mr. M. McCaul of the Stellenbosch University's Centre for Statistical Consultation. The raw data was statistically analysed by means of MS Office Excel spread sheet with variables entered horizontally and the participants' number in the vertical columns. This is the accepted procedure to collate the raw data prior to analysis with IBM SPSS25 software.

It was planned in the proposal stage that descriptive and inferential analyses would be conducted for this study with a p-value of $p < 0.05$ which represented the statistical difference between the study variables using a 95% confidence level.

1.9 ETHICAL CONSIDERATIONS

Ethical considerations refer to the protection and rights of individuals during participation in a research study (Burns & Grove, 2007:203). Permission to conduct the study was granted by the Human Research Ethics Committee of the University of Stellenbosch (reference S17/04/075, Appendix 1). Written approval was obtained from the chairman of the ethics committee of the research setting where the study was performed (Appendix 2).

1.9.1 Informed consent

Brink *et al*. (2006:32), refer to autonomy as the right of a participant to voluntary choose to partake in a research study. Informed consent implies that the researcher has conveyed information to the prospective participants who have a clear understanding of the information and what their role is in the research project (Burns & Grove, 2009:201). Informed consent was obtained from all participants who returned questionnaires and consent forms (Appendix 3). The researcher had arranged a meeting with all potential nursing participants and personally met with the surgeons and anaesthetists to explain the study objectives prior to obtaining informed consent. Emphasis was placed on voluntary participation and the right to withdraw at any point during the study without any penalty.

1.9.2 Respect for persons: right to privacy, anonymity and confidentiality

Each participant has the right to privacy, anonymity, respect and confidentiality. A log was kept of the number of questionnaires and consent forms distributed. The participants were instructed to not write any identifiers on the questionnaires in order to protect their anonymity and privacy. Furthermore, two self-sealed envelopes were provided in which to separately place the questionnaire and consent forms. In addition, two sealed boxes were provided for the participants to deposit the completed documents. Only the researcher had access to the locks of these boxes.

Confidentiality of the participants was ensured through allowing them to complete the questionnaire during their free time. The information was only available to the researcher, the supervisor and the statistician. The anonymity of the hospital was protected by not mentioning the name or using any official documents. The surveys will be stored in a locked cabinet for 5 years as will the data analysis on a password protected computer file to which only the researcher has access.

1.10 DEFINITIONS

Adverse events: An injury caused by medical care and management (rather than underlying disease) that leads to prolonged hospitalisation, disability at the time of discharge or both. It may be described as an unwanted, undesirable, or unusually unanticipated event, e.g. the death of a patient that falls (Joint Commission International Accreditation, 2017: 337).

Surgeons, surgical assistants and anaesthesiologists: In the private sector in South Africa, the surgeons, surgical assistants and anaesthetists are registered with the Health Professions Council of South Africa. In order to register they are required to have completed training in an accredited institution.

Perioperative Nursing: refers to all nursing care that is provided during the entire surgical process, including the preoperative, intraoperative and postoperative phase (Nettina, 2014:102). Requirements for practice as a perioperative nurse as per their contract in the study setting are: a graduate from an Accredited School of Nursing with a Diploma or Bachelor degree of Science in Nursing; a valid South African Nursing Council licence to practice and a minimum of two years continues practice in the perioperative specialty.

Operating theatre practitioners: are staff members who function as scrub, circulating or anaesthetic assistants and who are not registered as nursing or medical practitioners with the South African Nursing Council. They are employed in the South African private and state-owned hospitals due to the shortage of specialist trained professional registered OR nurses.

Surgical team members: are all operating room staff directly involved in peri-operative patient care and who are involved in the checklist process.

1.11 DURATION OF THE STUDY

Data collection for the pilot and main study took place 30 July 2018 - 24 August 2018.

1.12 CHAPTER OUTLINE

Chapter 1: Foundation of the Study

Chapter 2: A detailed report on the relevant literature

Chapter 3: A comprehensive description of the research methodology

Chapter 4: Data analysis and interpretation

Chapter 5: The conclusions and limitations of the study

1.13 SUMMARY

This chapter presented the introduction and rationale for the research study. The aim, objectives, research methodology, ethical considerations and conceptual frameworks us for the study was outlined. Chapter 2 will discuss the literature related to patient safety in the OR.

1.14 CONCLUSION

Surgical team members worldwide have become more aware of the benefits of the WHO SSC in the OR. However, numerous publications indicate that there are objective and subjective barriers contributing to the lack of implementation and compliance with the protocol. The WHO SSC is a useful, cost-effective instrument that has been proven to reduce patient harm before, during and after surgery. Effective implementation and meticulous adherence to the WHO SSC by all surgical team members can improve overall patient safety in ORs.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

The WHO reported in 2016, that more than 1,790 organisations worldwide have adopted the use of the SSC (Woodman, 2016:2). Numerous publications over the past decade have focused on and highlighted the effectiveness of the WHO SSC on reducing surgical errors. Conversely, effective implementation is highly reported as is not being an easy process and the WHO has identified several barriers during this process. The implementation process of the WHO SSC requires active leadership, purposeful enrolment, widespread discussion and training; multidisciplinary communication, coaching, continuous feedback and audits.

Several characteristics are involved in patient safety. These characteristics can be categorised into three groups: wrong site surgery, wrong patient surgery and wrong procedure. Wrong Site Surgery is when a scheduled surgical procedure is carried out on the wrong part of the body (side or site). Wrong Patient Surgery is when a surgical procedure is conducted on the wrong patient. Wrong Procedure arises when a different procedure than the scheduled for the patient is performed.

The WHO SSC objectives arise from situations that compromise patient safety. The phases of the WHO SSC replicate safety events and the non-compliance to these events increases patient's safety risks and potential adverse events. It is described as the most relevant tool to be utilised in an operating room setting as it guides the surgical team members to manage complex situations. Furthermore, it supports the surgical team member's recall of critical information required during surgery and provides the opportunity to revisit events and positively influence work performance.

However, the day to day implementation of the process is challenging.

2.2 ELECTING AND REVIEWING THE LITERATURE

The literature review in a research project is an assessment of the prevailing academic evidence and methodology accessible about an identified research problem (Burns & Grove, 2007:135).

The purpose of the literature review in this study was to:

- examine national and international standards for peri-operative safety;
- establish evidence base guidelines with respect to the use of surgical safety check lists;

- explore the factors that impede or promote the use of the SSC;
- explore mechanisms to improve the use of the SSC;
- review medico-legal research reports on the consequences of poor patient safety processes in the operating room.

A literature search was conducted on electronic databases such as Cumulative Index Nursing and Allied Health Literature (CINAHL), PubMed, Google Scholar and the University of Stellenbosch Online Library for articles and research reports identifying peri-operative safety challenges and consequences of poor patient care, including interventions developed and widely tested to safe guard patients in the OR. Literature not older than 10 years was reviewed for this research.

2.3 ORIGIN OF THE SURGICAL SAFETY CHECKLIST

The introduction of checklists started in 1930`s and were first used in aviation to address human errors as more complex aircrafts were developed. When checklists are used in health care, they highlight four significant aspects of safety: correct side/site, identification of the patient, safe anaesthesia, airway and respiratory management, prevention of healthcare-associated infections and effective teamwork (Borchard, Schwappach, Barbir & Bezzola, 2012:925).

A Surgical Safety Checklist is a useful quality tool to remind surgical team members of critical events before surgery (Epiu, Tindimwebwa, Mijumbi, Ndarugirie, Twagirumgabe, Lugazia, Dubowitz & Chokwe, 2016:2). Today, checklists are commonly used in high risk industries worldwide. They can be implemented in a variety of formats and may consist of “read and do” activities, for example: checking the functioning of equipment. They may be utilised to verify that events have been completed, or to guide activities for verification and feedback. Industries have laid the foundation for checklist development and that they should ideally be a one-page document and the language easily understood. Furthermore, the activities should range between five to nine checks (Walker, Reshamwalla & Wilson, 2012:48).

In 2003, the Joint Commission on Accreditation of Healthcare Organisation (JCAHO) adopted universal protocol guidelines for the prevention of wrong site, wrong procedure and wrong person surgery (Van Schoten *et al*., 2014:1).

Prior to the initiation of the WHO surgical safety recommendations, the Joint Commission on Accreditation for hospital Organisations presented the pre-operative verification as a critical step in surgery. In 2007, the WHO initiated a program ‘Safe Surgery Saves Lives’; to improve surgical care and to reduce surgical adverse events (Eschum & Eschum, 2013:13). Following

this, in 2008, the WHO introduced the SSC for utilisation in the OR (WHO, 2008) and listed the SSC as the Second Global Patient Safety Challenge “Safe Surgery Save Lives” company. The SSC includes the minimal degree of surgical care that should be applied in all operating room (OR) settings (Panesar, Noble, Mirza, Patel, Mann, Emerton, Cleary, Sheikh &Bhandari, 2011:2). The nineteen-point checklist was developed to highlight accepted practices to expand teamwork and communication in the OR. The WHO estimated that 500,000 lives can be saved worldwide through the implementation of the SSC in the OR.

In 2009, the WHO reported a decline of 30% in post-operative complication and 50% of mortality rates in all surgical procedures (Van Schoten, Kop, de Block, Spreenwenberg, Groenewegen & Wagner, 2014:1). Haugen, Muregesh, Haaverstad, Eide and Søfteland (2013:2) reported that many studies have indicated similar results in adverse events following the implementation of the WHO SSC.

In 2009, the JCAHO implemented the universal protocol as a National Patient Safety Goal (Ragusa *et al*., 2016:e308). One year after the implementation of the Universal Protocol the JCAHO reported a decrease in wrong site surgery.

The successful implementation of the SSC is based on the effective modification to fit the standard OR setting (Eschum & Eschum, 2013:13). Institutional leadership should be committed and actively involved in the implementation process for patient safety. Personnel in the OR should have the knowledge and understanding of how the SSC works and how it should be applied in the clinical setting (Hurtado *et al*., 2012:3).

When formulating a check list, the developers should consider the content, timing, trial the prototype, gather feedback after testing and evaluate the findings. It should be relevant and focused on potential safety concerns that may go unnoticed, which could have devastating results. A checklist decreases the dependence on human memory and decreases the opportunity of omitting critical events (Walker *et al*., 2012:48) that could compromise patient safety and the surgical outcome. It improves team culture, teamwork, team communication and enhances alertness among team members.

Checklist adoption requires vigilant implementation to ensure their effective use (Walker, Reshamwalla & Wilson, 2015:45), especially in the light of healthcare processes becoming more complex and advanced.

2.4 INTERNATIONAL RESEARCH ON SSC COMPLIANCE

In 2001, the North American Spine Society initiated the “Sign Mark a X” (SMaX) guidelines for signing and marking the appropriate level of the spine (Ragusa *et al*., 2016:e308). Orthopaedic

surgeons have a 25% chance of performing wrong site surgery during their careers. This was reported by the American Academy of Orthopaedic Surgeons (AAOS) in 1998. Following this report, the AAOS initiated a campaign whereby the Orthopaedic surgeons have to sign the surgical site before the procedure (Ragusa, Bitterman, Auerbach & Healy, 2016:e307).

Since the WHO SSC was implemented in 2009, many studies have focused on the compliance of staff toward the SSC. Researchers have reviewed compliance rates of the SSC and found that no study has reported a compliance rate of 100% (Patel, Ahmed, Guru, Khan, Marsh, Khan & Dasgupta., 2014:1321). In a study conducted by Kearns, Uppal, Bonner, Robertson, Daniel and McGrady (2011:818), staff compliance was evaluated one year after the implementation of the WHO SSC. They found that pre and post-operative compliance of the checklist has marginally improved from 61.2% and 67.6% to 79.7% and 84.7% respectively, but not 100%.

A retrospective study by Fudickar, Hörle, Wiltfang and Berthold (2012:698) found a 12% drop in the frequency of the implementation of the WHO SSC after one year of use. The *Sign Out* and Time Out sections were found to be 10% incomplete and the *Sign Out* 25% incomplete. They reported that only 18% of all items on the WHO SSC were communicated among the surgical team.

2.4.1 Canada

In 2009, the Alberta Health Services (AHS), a health authority in Canada adopted and implemented a modified version of the WHO SSC across Alberta. The 3- component checklist has a “briefing” before induction of anaesthesia, a “time out” before skin incision and a “debriefing” before the patient leaves the OR. The participation of the OR nurse, anaesthesiologist and attending surgeons are required during all these phases (Dharampal, Cameron, Dixon, Ghali & Quan, 2016:269). The users of the AHS SSC found that the SSC was more formal and comprehensively structured. Healthcare providers using the AHS SSC expressed that the checklist has not added to their practice but has merely standardised it (Quan *et al*., 2016:271).

2.4.2 North and South America

A study conducted by Hurtado, Jimenex, Penalonzo, Villatoro, Izquierdo and CiFuentes in Guatemala (2012:4), found that the checklist is inconsistently used in both public and private institutions.

In the hospitals in Colorado, an observational study for quality improvement during September 2012 and April 2013 revealed that 90% of hospitals were utilising the Colorado SSC in the OR

(Biffl, Gallagher, Pieracci & Beremen, 2015:4). The researchers found that most of the SSC was incomplete.

A positive example of an effective checklist used in healthcare is from the Johns Hopkins University school of Medicine that is used in their intensive care units (ICUs). The focus of the checklist was to reduce bloodstream infections related to central line insertion. The focal point of the checklist interventions was recommended by the Center for Disease Control (CDC) and included five evidence-based interventions that have maximum effect and minimum obstacles to implementation. Hand-washing, use of personal protective equipment during insertion of central lines, skin preparation and unnecessary removal of catheters are some of the interventions imposed by the CDC (Walker *et al*., 2015: 45).

Following the successful implementation of the Johns Hopkins checklist, the process was adopted by the Michigan Health and Hospital Association (MHA) Keystone Center. This project was then introduced as a state-wise safety initiative in all hospital ICU departments. Again, the results were positive showing a reduction in bloodstream-related infections (Walker *et al*., 2015:49).

2.4.2.1 Texas

Papaconstantinou, Jo, Recnik, Smythe and Wehbejanek (2013:306) reported a successful implementation of the Scott and White SCC (S&W SSC) that was developed in 2009 and implemented a year later September 2010 in a 500 bedded tertiary care hospital, the Scot & White Memorial Hospital in Texas. The checklist was developed to focus on patient quality and safety (Papaconstantinou *et al*., 2013:301). They observed a remarkable improvement in the *Time Out* phase, team dynamics and including the establishment and clarity of patient needs. The surgical team members indicated that the perception and effective communication are barriers that exist during the use of the SSC (Papaconstantinou *et al*., 2013:306). Significantly team members are aware of the benefits of the SSC, however, they raised concerns regarding the effect on OR efficiency. The effectiveness of the checklist is determined by adequate training and education of the surgical team members which should result in achieving the benefits (Papaconstantinou *et al*., 2013:306).

Following an audit report of 100% compliance from the hospital, Levy, Senter and Hawkins *et al.,* (2012:1) reported subsequently in an observational study of paediatric surgery in the same Texas hospital that other elements of the checklist were omitted which compromised the fidelity of the team members.

2.4.2.2 Brazil

Maziero *et a*l, (2015:18) noticed in a southern Brazilian teaching hospital a significant compliance rate to the checklist. However, verification before induction of anaesthesia was performed in solo and non-verbally. The WHO recommends that all verification processes should be verbal and team members should respond audibly and verbalise any concerns. Maziero, Silva, Mantovani and Cruz (2015) evaluated the adherence to the checklist in a South Brazilian teaching hospital through an observational study. They observed that critical events such as patient introduction, *Time Out* and surgical count were not carried out in most procedures. The participants neglected to verbally verify all steps as recommended by the WHO SSC despite the documentation of the steps occurring without actual verification.

2.4.3 Europe

2.4.3.1 Netherlands

Between November 2011 and December 2012 *Time Out* process (TOP) was introduced in 18 Dutch hospitals to identify and clarify uncertainties amongst surgical team members and reduce wrong site surgery. A TOP is a pause just before the start of the procedure. It consists of verifying the correct patient, the correct procedure and the correct side/site of surgery. All these elements are equally important to prevent adverse events in the OR (Van Schoten, Kop, de Block, Spreeuwenberg, Groenewegen & Wagner,2014:3).

Biffl *et al*. (2015:4), established in the Netherlands, where the SSC is mandatory by the Dutch Health Care Inspectorate, that only 39% of cases had a complete checklist. Biffl *et al*. (2015:5) revealed that compliance varied across the ten selected hospitals. They indicate that literature reported mixed results whether smaller hospitals or large hospitals achieve better results. This study did not reveal any difference in compliance between the 5 low volume and 5 high volume hospitals. The *Time Out* and the pre-anaesthesia verification did not differ significantly. Consistently addressed items were the verification of the patient, the procedure and the surgical site (Biffl *et al.*, 2015:6). Furthermore, it was observed that compliance with some elements of the SSC differed between surgical specialties. Other research studies have confirmed these findings. The general surgery was found to be less compliant with the SSC. Orthopaedic surgeons also revealed a low compliance rate. On the other hand, components of the SSC affecting nursing did not reveal any variations (Biffl *et al.*, 2015:6).

2.4.3.2 Spain

Maziero *et al*. (2015:18) reported in a Spanish study that 80% utilisation of the WHO SSC occurred. However, the documentation of unconfirmed items questioned the reliability of these

documents. These unreliable (false) documents can have potential legal and ethical consequences that could incriminate the entire surgical team.

2.4.3.3 Norway

A randomised control trial conducted by Haugen *et al*. (2013:814) in Norway identified significant differences between two groups of participants. One group was positive towards the implementation of a checklist whereas the other group had mixed emotions. They advocate that implementation of a checklist should start with a positive team who are ready to adopt new interventions (Haugen *et al*., 2013:814).

2.4.4 United Kingdom (UK)

A study conducted in the Princess Royal Maternity Unit, United Kingdom, by Kearns, Uppal, Bonner, Robertson, Daniel and McGrady (2011:818) reported that staff compliance was evaluated one year after the implementation of the WHO SSC. The pre- and post-operative compliance of the checklist had improved from 61.2% and 67.6% to 79.7% and 84.7% respectively. This was corroborated in a retrospective study by Fudickar, Hörle, Wiltfang and Bein (2012:698) who found that in the United Kingdom, a 12% drop in the frequency of the implementation of the WHO SSC one year after the implementation of the SSC. Following this Haugen *et al*., (2013:814) found similar results also reported in the UK study when a 95% implementation of the SSC was observed with only a 73% compliance rate.

2.4.5 Ireland

In an Irish hospital a study was conducted by O`Connor *et al*., (2013:6) where the human factors within surgical team members were examined. Crucial aspects were identified for improvement such as support by management and continuous education and training.

2.4.6 Australia

Tang, Ranmuthugalat and Cunningham (2014:153) note that the compliance rate in four studies conducted in Australia on the completion of the checklist varies from 2% for *Sign In* to 99% for the *Sign Out* phase. They indicated that effective implementation and time are the two contributing factors for non-compliance. Tang *et al*. (2013:153) noted that time and effort well invested in the implementation phase will improve adherence.

Tang *et al*. (2014:153) noted from previous literature that a high incident rate was associated with checklist non-compliance and a completion and compliance rate depends on effective implementation. Furthermore, effective implementation depends on influential leadership, motivating staff participation and continuous education of staff that use the checklist (Tang *et al*., 2014:153)

An infection control program utilising a checklist was reported in a study by Walker *et al*. (2012:45) as being successful since it was strongly supported by management who emphasised staff education, routine surveillance reporting and evaluation of infections, provision of equipment, a focus on teamwork and motivating a safety climate (Walker *et al*., 2012:45).The study showed an improvement in policy adherence and a positive effect in reducing catheter-related bloodstream infections. The study also concluded that nurses found the checklist useful and were able to guide physicians in adhering to the policies and protocols and that it improved teamwork among the physicians and nurses.

2.4.7 Africa

The WHO SSC has been tested globally and results show that it is predominantly effective in low income countries with the highest decrease in complications (74.3%) was reported among these countries (Vivekanantham *et al*., 2013:3). Previously In low income countries surgery has been seen as a financially ineffective intrusion compared to the gross domestic product.

Developing countries report ten times higher incidents of surgical mortalities than developed countries and a thousand more deaths related to anaesthesia. These indicators clearly exhibited the need to improve safer surgery. However, adopting checklists from developed countries may not yield all the benefits (Vivekanantham, Ravvindran, Shanmugarajah, Maruthappu & Shalhoub, 2013:1).

2.4.7.1 South Africa

The researcher was unable to locate studies on this topic that were conducted in private hospitals.

In Cape Town, South African a study was conducted in tertiary hospitals by, Koopman (2018:56) who found that the nurses merely completed the checklist without full participation by the peri-operative team. This was corroborated by 61% of anaesthetists who reported that sections of the checklist were sometimes not completed. What these sections where was not reported in the study. It was also found that 88% of the participants found the procedure and added responsibility time-consuming. In KwaZulu-Natal, Verwey and Gopalan (2018:341) conducted a similar study in two major tertiary hospitals, where similar findings were reported to that of Koopman. They reported that significant differences exist between groups of professionals on the importance and commitment to the process. Once more it was found that anaesthetists and nursing staff saw the value of the SSC.

2.4.7.2 Sierra Leone

A study done in Sierra Leone evaluating cost per Disability-Adjusted-Life-Year (DALY) indicated that the DALY cost $32.78, which was favourable in comparison with non-surgical interventions (Vivekanantham *et al*., 2013:1). The working conditions of surgeons in developing countries expose them to higher medical risks. For example, they perform more surgical procedures or they need to perform surgeries in disciplines in which they are unfamiliar. These settings are alarming and calls for implementation of safety measures (Vivekanantham *et al*., 2013:3).

Vivekanantham *et al*. (2013:3) noted in their study, that two of the four hospitals in low income settings have proved safety in surgical site infections and total SSC compliance rate in comparison with only one of the four hospitals in high income settings. These results highlighted that the WHO SSC has a significant impact on surgical safety in developing countries.

2.4.7.3 Uganda, Kenya, Tanzania, Rwanda and Burundi

A cross-sectional study in five main referral hospitals in East Africa (Uganda, Kenya, Tanzania, Rwanda and Burundi) evaluating 85 anaesthetists showed that 25% regularly use the pre-anaesthetic checklist. The anaesthetists reported the main reason for non-compliance was the unavailability of the checklist, the reliability and the length of the checklist

Apart from the cost barrier in developing countries, only a minor percentage of the population has access to surgical care. Epiu *et al*. (2016:3) note that due to this, resources are more effectively distributed for other management activities. Aside from the surgical benefits in these countries, safety standards should be introduced to improve the health of the nations. Moreover, healthcare budgetary constraints in developing countries reflect the difference in measures needed to ensure safe surgery. With this in mind the WHO recommended that the SSC should be more aggressively implemented in these countries than in developed countries.

A multi-disciplinary team approach has reported a higher success rate than an individually led implementation of the SSC (Borchard *et al*., 2012:929). The authors reported that staff empowerment to “speak up” when they are in doubt of any patient safety issues should be encouraged. These concerns are essential aspects for teamwork and leadership (Borchard *et al*., 2012:929). Interviews with the team members elicited that time constraints were the most common reason for non-compliance with the checklist protocol.

Providing a rationale and highlighting the institutional values while clearly identifying team member's roles and responsibilities, explains why the implementation of a checklist is critical. Explaining the "why" is essential for triggering eagerness and it motivates the entire surgical team (Borchard *et al*., 2012:925).

Literature has identified that active participation and a culture change is a major concern when implementing a checklist in the OR. Checklists were initiated to improve systems and to motivate changes in the culture of OR team members. An effective culture of safety promotes teamwork and team communication by entrusting responsibilities of patient safety to all team members and avoids hierarchical systems while enhancing work satisfaction. Additionally, checklists assist team members to determine their function during surgery (Borchard *et al.,* 2012:925).

2.5 Potential barriers and value of the checklist

2.5.1 Cultural and structural barriers

A safety Culture allows individuals to identify and report unpleasant system failures to eliminate errors. Papaconstantinou *et al*. (2013:207) identified the existence of cultural and structural barriers affecting the implementation of a quality initiative program. Communication gaps between surgeons, nurses and anaesthetists and duplication of items on the checklist was another barrier in their study.

Checklists are well known to anaesthetists as they are used daily to check their anaesthetic machines. Other patient care units are also familiar with safety checklist, for example, intensive care units and catheterisation laboratories. Evidence suggests that a simple and well-designed checklist used effectively can enhance patient benefits (Epiu, Tindimwebwa, Mijumbi, Ndaruginine, Twagirumugabe, Lugazia, Dubowitz & Chokwe, 2016:3).

2.5.2 Teamwork and communication

Joint Commission on Accreditation of Healthcare Organisations (JCAHO) reported that 70% of sentinel events in obstetrics occur due to failure in teamwork and effective communication. Hurtado, Jimenez, Penalonzo, Villatoro, de Izquierdo and Cifuentes (2012:2) identified unfamiliarity and embarrassment, hierarchy, timing of the checks, duplication with existing processes, lack of communication and modification of the checklist as some barriers that can prevent the correct implementation of the WHO SSC.

Therefore, the focus to reduce errors and sentinel events should be based on individual training including hands-on workshops, drills, protocol development guidelines and checklists, education and the use of information technology

2.5.3 The value of checklist briefings

As previously mentioned, a checklist is a helpful tool to identify and correct preventable errors before problems arise and therefore standardising practices are essential in reducing adverse events. The WHO recommends all health care organisations adopt and modify the checklists to meet their standards of patient care. The checklist should be as comprehensive as possible yet short and clear (Epiu *et al*., 2016:3,4) and training, coaching and a change in safety culture with routine audits and regular feedback, can boost the effective implementation of a checklist.

Literature describes checklists briefing as a method to promote behavioural changes in surgical team members by focusing on communication which is measured in addition to patient safety performance. The personal introduction section of the surgical checklist during the briefing is mostly being omitted as the team members believe they are known to all members. The committee on Quality of Health Care in America noted that when a standardised process is in place and communicated to all team members, errors and mistakes can easily be identified before it causes injury.

Stabel *et al*, (in Mcdowell & McComb, 2013:6) noted that safety check briefings contributed to improved patient safety and omission of the *Time Out* resulted in 72% of wrong site surgery. These events may have a devastating impact on the patient, the healthcare organisation and the individuals involve. Healthcare professionals are encouraged to identify and report potential and actual errors. These reporting systems should be supported by management to encourage learning and prevent similar events from recurring (Samlal, 2018:32). Humans learn through their past mistakes, however adverse events and near misses are under reported because of liability concerns and the consequences (Williams, 2018:13).

Researchers found after educating surgical team members on the checklist briefing process that surgical complication rates decreased to 7.0% and organisations saved hundreds of thousands of dollars per year.

2.6 THE SSC PROCESS

The Surgical Safety Checklist (SSC) consists of three sections namely: *Sign In*, *Time Out* and *Sign Out*. These phases consist of elements that must be confirmed before moving to the next stage.

2.6.1 Sign In phase

During the *Sign In* phase, the surgical team identifies and confirms the patient identification, surgical site, anaesthesia concerns, allergy status and anticipated blood loss.

2.6.2 Time Out Phase (*TOP*)

Research has proven that errors can be avoided when pre-operative briefing is included just before the skin incision or start of the surgical procedure. This should occur during *TOP* and consists of introducing the names and roles of the team members, patient profile, anticipated critical events or potential concerns are reviewed, the planned surgery disclosed, confirmation of sterility and antibiotic administration, confirmation of the availability of radiology/imaging and other diagnostic tests. The presence of all required equipment and materials is audibly confirmed.

2.6.3 Sign Out Phase

The last phase of the WHO SSC is *Sign Out*. This phase takes place just before the patient leaves the OR. During this phase the team confirms the completion of the instruments and swab count, the name of the procedure performed, correct labels on specimens and preserving liquid, the post-operative care unit to which the patient will be transferred.

2.7 SUMMARY

Chapter 2 summarised the reviews on published literature, which includes the efficacy and implementation challenges of surgical safety checklists internationally. The next chapter will focus on the research methodology that was applied to determine the perioperative staff knowledge and attitude towards the implementation of the surgical safety checklist in a private hospital in the Cape Metropolitan district of South Africa.

2.8 CONCLUSION

Several studies indicate that the effective implementation of the SSC can reduce post-operative complications and mortality. Globally, the SSC has been implemented in many healthcare facilities and the effect on patient safety has had remarkable results. Furthermore, in South African tertiary hospitals it has been found that commitment to the process is incomplete by most members of the peri-operative team. Despite these results the implementation of the SSC remains a challenge. A large number of studies advised institutions to improve the use of the SSC and that it requires theatre staff to work together. Effective implementation improves teamwork, reduces the risk of patient harm and establishes a culture of safety among surgical team members.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 INTRODUCTION

Chapter one and two described the background of the study and comprehensive literature review. This chapter will provide a detailed description of the methodology that was followed to reach the study objectives.

Burns and Grove (2011:253) describe research methodology as a blue print of the technique implemented by a researcher to collect and analyse the data. A quantitative, descriptive cross-sectional approach using the O'Connor questionnaire was used to investigate the barriers affecting the adherence to the WHO SSC by surgical staff in a case study of one OR complex in a private hospital in the Cape Metropolitan district of South Africa.

3.2 RESEARCH DESIGN

A research design is a structured plan or blueprint that directs the methodology of a research study (Burns & Grove, 2011:547; De Vos, Strydom, Fouche & Delport, 2011:109). A non-experimental, descriptive, cross-sectional quantitative approach using a case study design was applied and data was collecting using the O'Connor questionnaire (O'Connor, *et al*., 2013:2). A single-case study is described by Polit and Beck (2017:476) as an appropriate design when it aims to explore a typical case study for the understanding or enlightenment of a phenomenon.

Burns and Grove (2007:38) states that the researcher`s knowledge of the problem statement and study purpose can determine the research design. A descriptive quantitative study is structured, and is applied to establish the extent of the problem or to describe a phenomenon, to address gaps in practice and to develop policies (De Vos *et al*., 2009:63).

The most appropriate and feasible design selected for this study was that of a non-experimental, descriptive, cross-sectional single-case study (Lo-Biondo Wood &Haber, 2014:121). Case studies can be quantitative, qualitative and a combination of the both (Lo-Biondo Wood & Haber, 2014:120) and may be conducted at one point in time or may examine trends over time i.e. a longitudinal study.

A single-case study is an appropriate choice in this research setting because according to Polit and Beck (2017:476), the setting is a representative OR complex (case) within the private hospital group that has many OR complexes in other branches and may be revelatory. Although case studies in overall cannot be generalised to the wider population, the findings

from a single-case study may instigate replication of the study throughout all the branches within this private hospital group.

3.3 STUDY SETTING

The OR complex in one private hospital in the *Cape Metropolitan district of South Africa* was selected for this study. The complex has 10 operating rooms for general surgery including 2 for cardiac surgery and 3 catheterisation laboratories. The surgical procedures performed in the research setting range from complex to minor surgery, namely orthopaedic, neurosurgery, cardiac, thoracic, vascular, general, plastic, urology, ear nose and throat, gynaecology, ophthalmology and obstetrics. The OR complex therefore provides elective and emergency surgical services.

3.4 POPULATION AND SAMPLING

A population is defined as all the inhabitants or elements most suitable to be considered for a research project and who meet the inclusion requirements for inclusion in the study (Burns & Grove, 2007:40; Grove *et al*., 2015:46). In this study, the target population was all the nursing and clinical staff members who are involved in diagnostic or surgical procedures in the OR. In the research setting the nursing staff are internationally or locally recruited registered nurses, registered enrolled nurses, registered enrolled nurse assistants and operating theatre practitioners with a minimum of two years OR experience. They are all registered with the South African Nursing Council, the judicial body for nursing in South Africa.

The surgeons, surgical assistants and anaesthetists are not employed by the institution. They are in private practice and use the facility to provide surgical care to their patients. They are all registered with the Health Professions Council of South Africa as general practitioners, specialist surgeons and anaesthetists.

All surgical team members, who met the criteria, were included in this study and who are therefore involved in the checklist. As recommended by Strydom (2005:195) when the population of a proposed study setting is small, it is advisable to target the entire population. This was corroborated by the first statistician that the entire population who met the inclusion criteria should be selected.

Therefore, by approaching the entire population, each staff member had an equal opportunity to participate in this study. The total population was (N=125) staff members working in the OR complex in one private hospital in the *Cape Metropolitan district of South Africa*.

3.4.1 Sampling

Burns and Grove (2007:324) describe sampling as a process relating to the selection of a fraction of individuals or a subgroup (Brink *et al*., 2010:124) that represent a population. The hospital itself was purposively and conveniently selected for its range of surgical procedures and for the large nursing staff establishment employed in the complex. The data were collected over four weeks from 30 July 2018-24 August 2018including day, night and weekend shift staff. Staff on annual leave or sick leave during the data collection period did not participate in the study.

Not all selected participants agreed to participate in this study. Seventy-two participants (N=72) agreed to participate, however, only thirty-eight (N=38) completed the consent forms and returned their questionnaires.

3.4.2 Inclusion criteria

The hospital selected for this case study, is a branch of a for profit private hospital enterprise situated in the Cape Town Metropole district of South Africa. The inclusion criteria were all registered professional nurses (RPNs), registered enrolled nurses (ENs), registered enrolled nurse assistants (ENAs) and operating theatre practitioners (OTP), surgeons and anaesthetists involved in direct surgical care activities in the OR.

3.4.3 Exclusion criteria

Recovery room nurses in the study setting were excluded since they do not participate in the SCC prior to surgery. OTP trainees and newly hired nursing staff who were still in an orientation program over the data collection period were also excluded.

3.5 INSTRUMENTATION

A questionnaire is referred to by De Vos *et al*. (2011:186) as a set tool presenting questions and other elements to gather information on a specific topic.

A self-administered questionnaire developed by O'Connor, Reddin, O'Sullivan, O'Duffy, Keogh and Ivan (2013:2) (Appendix 4) was used to gather data. The questionnaire consists of a 6-point Likert Scale ranging from "strongly disagree" to "don't know" to measure the respondents' attitudes concerning hospital norms on the use of the checklist; the impact of the checklist on safety and teamwork; the support of the checklist from specific groups; the intent to initiate the checklist and the barriers experienced during the use of the checklist.

The questionnaire for this study was freely available on the internet. With the consultation of a biostatistician and the supervisor, the format of the questionnaire was slightly changed to

meet the objective of the study. The reliability and internal consistency were established by O'Connor *et al*. (2013:2) and the Chronbach alpha coefficient score was 0.7 which indicates reliability.

3.6 PILOT STUDY

Burns and Grove (2011:49) describe a pilot study as a dry run version of the proposed study, applied under similar circumstances. It is implemented to facilitate the methodology and help to determine reliability and validity. Furthermore, Brink *et al.* (2006:166) describe the main purpose of a pilot study is to test and assess the feasibility of the questionnaire.

The pilot study was conducted in the cardiac catheterisation laboratory in the same hospital as the main study. After consulting with a statistician, a convenient sample was used and all the personnel present (n=8) on the day of the study was selected. The purpose of the pilot study was to ensure that the questions in the measuring tool were clear and understandable to the participants.

The researcher met personally with the pilot study participants to explain the purpose of the study and the data collection instrument. Following the meeting with the participants, written consent was obtained and the questionnaires distributed. The participants indicate that the questionnaire took 20 minutes to complete. They found the questions on the instrument understandable and the format acceptable. The participants did not request or suggest any further clarification to be included in the questionnaire. The data obtained from the pilot study is excluded from the main study.

3.7 VALIDITY AND RELIABILITY

Validity of an instrument establishes the degree to which it is able to measure the attribute or a concept accurately (Grove, Burns & Gray, 2013:393). Content validity represents the adequacy of the variables in the questionnaire (Delport, 2005:160-161). OR nursing experts were consulted with respect to the validity of the questionnaire and agreed that the items were relevant and valid to the proposed study setting. Furthermore, validity was increased through the pilot study, the clinical knowledge and experience of the researcher and consultation with the supervisor and biostatistician.

3.7.1 Reliability

LoBiondo-Wood and Haber, (2010:286) refers to reliability as the aptitude of an evaluation tool to produce consistent results each time it is applied in similar scenarios**.** The instrument was previously used by O`Connor *et al*. (2013:3) and the Chronbach alpha coefficient test was applied to test the internal consistency of each subscale of the instrument and the alpha score

of 0.7 was computed. This indicates an acceptable level of internal consistency as was found for each of the 5 subscales as follows: normality (0.70); impact on teamwork and safety (0.84); support (0.73) and initiation (0.87). For the subscale of "barriers" the statistic was the lowest (0.56).

Furthermore, for the present study, the pilot phase was found acceptable in that the estimated time to complete of approximately 30 minutes was deemed feasible by the participants and no recommendations were made to alter it in any way.

3.7.1.1 Face validity

Face validity is subject to judgment and indicates whether the instrument measures the concepts its intended to measure. Face validity is considered the least scientific measure of validity; however, it is important to the participants and could potentially hinder the completion of the questionnaire (Grove, Burns & Gray, 2013:394).

The questionnaire was previously used in a similar study O`Connor *et al*. (2013:3) and appeared to measure the intended data (Chronbach alpha 0.7).

3.7.1.2 Content validity

Content validity is described by Creswell, Ebersohn and Eloff *et al*. (2011:217), as a measure of standardisation that the constructs in the study, e.g. support in this study, are measured by the related items or in this study, the declarative statements. The content validity in the O'Connor questionnaire has been reported in literature. In addition, the pilot test in this study confirmed the content validity which was corroborated by OR nursing experts.

3.8 DATA COLLECTION

Following ethical approval from Stellenbosch University and from the research setting authorities an introduction to the study's aim and objectives was presented at a department meeting before data collection commenced. As described, the participants were handed two self-sealing envelopes, one for the consent form and one for the questionnaire. They were requested to seal the envelopes after completing the documents and to place them in the two separately marked boxes: one for the consent and one for the survey in order to protect their anonymity and privacy. Data were collected over four weeks3 0th July 2018 - 24th August 2018. The researcher personally distributed and collected the documents at the selected institute.

3.9 DATA ANALYSIS

Data analysis is the process of sorting, arranging and summarising raw data (Burns, Grove & Gray, 2012:691). De Vos *et al*. (2012:249), describe quantitative data analysis as a technique by which data is captured to a numerical system and then statistically analysed. Descriptive statistics are a method commonly uses in quantitative research studies. This method is used to report the distribution of the sample over multiple variables, through frequencies, measures of central tendency and measure of dispersion (De Vos *et al*., 2012:250).

In this study, the researcher was assisted by two statisticians of the Stellenbosch University's Centre for Statistical Consultation: Mr I Karanga in the initial phase of the development of the proposal and the planning of the analysis. It was planned in the proposal stage that descriptive and inferential analyses would be conducted for this study with a p-value of $p < 0.05$ which represented the statistical difference between the study variables using a 95% confidence level.

Following data collection Mr. M. McCaul was delegated to assist in the analysis.

The raw data was statistically analysed by means of MS Office Excel spread sheet with variables entered horizontally and the participants' number in the vertical column. This is the accepted procedure to collate the raw data prior to analysis with IBM SPSS25 software.

The statistician advised that since no sampling power analysis had been recommended during the proposal development stage, the results of inferential testing after data collection would be, firstly, unethical and secondly the findings would be skewed. Thus, only descriptive analysis was performed.

3.10 ETHICAL CONSIDERATIONS

Ethical considerations refer to the protection and rights of individuals during participation in a research study (Burns & Grove, 2007:203). Ethical approval from the Stellenbosch University Human Research Ethics Committee (HREC) of the Faculty of Medicine and Health Sciences (Ethical approval number S17/04/075; Appendix 1) and the institution where the study was conducted, was granted (Appendix 2).

3.10.1 Informed consent

Brink *et al.* (2006:32) refer to autonomy as the right of a participant to voluntary choose to partake in a research study. Consent is considered as valid and informed when participants were fully explained the extent of the research study and whom on understanding of the information provide consent to participate in the study (Burns & Grove, 2007:216-217). The

researcher had arranged a meeting with all potential nursing participants and personally met with the surgeons and anaesthetists to explain the study objectives prior to obtaining informed consent. Emphasis was placed on voluntary participation and the right to withdraw at any point during the study without any penalty.

3.10.2 Respect for persons: right to privacy, anonymity and confidentiality

Each participant has the right to privacy, anonymity, respect and confidentiality. A log was kept of the number of questionnaires and consent forms distributed but the participant's names were not included on the questionnaires in order to ensure their anonymity and privacy. Furthermore, two self-sealed envelopes were provided in which to separately place the questionnaire and consent forms. In addition, two sealed boxes were provided for the participants to deposit the completed documents. Only the researcher had access to the locks of these boxes.

Confidentiality of the participants was ensured through allowing them to complete the questionnaire during their free time. The information was only available to the researcher, the supervisor and the statistician. The anonymity of the hospital was protected by not mentioning the name or using any official documents. The surveys including the raw data and analysis will be stored in a locked cabinet for 5 years as will the data analysis on a password protected computer file to which only the researcher has access.

3.11 SUMMARY

A detailed description of the research methodology that was implemented to investigate the barriers affecting the adherence to the WHO SSC by surgical staff in the OR complex of one private hospital in the *Cape Metropolitan district of South Africa* was described, followed by the data collection and analysis processes. In chapter four, the results of the data analysis are discussed.

3.12 CONCLUSION

A non-experimental descriptive cross-sectional survey with a single-case study approach was selected for the purpose of this study utilising the O'Connor questionnaire. The sample consisted of the total population working in the research setting on night day and weekend shift and who met the inclusion criteria (N=125). A self-administered questionnaire collected the data. Ethical approval from the HREC and the selected institution was obtained to conduct the study. Participants were ensured of their rights to participate or not without penalty. Their anonymity and that of the research setting was guaranteed.

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 INTRODUCTION

This chapter presents the analysis and interpretation of the data collected during the research study. De Vos *et al*. (2012:248) describe data analysis as a method in the research process that organises, analyses and presents the raw data into meaningful results.

This research study aimed to explore and describe the barriers affecting the adherence to the WHO SSC by surgical staff in the OR complex of a private hospital in the Cape Metropolitan district of South Africa

4.2 DATA ANALYSIS

4.2.1 Data preparation

Each questionnaire was numbered to the capturing process of the raw data on an Excel spreadsheet. The columns of the spreadsheet contained the variables pre-coded on the questionnaire and the rows represented each respondent (Kruger, De Vos, Fouché & Venter, 2005:221). The individual responses from each questionnaire were personally entered by the researcher and checked twice to guarantee accuracy. In the event of missing data, the cell on the spreadsheet was left blank. Although Burns and Grove (2007:403) indicates that incomplete questionnaires should be excluded, the incomplete questionnaires in this study were included since the sample was limited and the data obtained was sufficient for analysis.

Following the capturing of the data, the completed spreadsheet was submitted to a qualified statistician, Mr. M. McCaul for analysis on STATISTICA 25 (IBM).

4.2.2 Descriptive statistics

Descriptive analysis refers to the procedure to describe and summarise the data (Sullivan-Bolyai & Bova, 2010:310). The measures to describe the data include means and standard deviations for continuous data and frequency distributions for categorical and ordinal data. As a measure of central tendency, the mean is the mathematical average of all the scores in this survey (Brink, Van der Walt & Van Rensburg, 2006:177). Standard deviation is a measure of variability and refers to the variation of the scores in relation to the mean score (Brink *et al*., 2006:178). Descriptive statistics are presented in this report in the form of tables and bar graphs.

4.3 QUESTIONNAIRE RESPONSE RATE

The total population of the study consisted of N=72 participants. The pilot study consisted of n=8 participants. Therefore, the study's population was N=80 participants.

In this study, the questionnaire response rate was calculated by dividing the number of returned questionnaires (n=38) by the number of the study population (N=72) revealing a response rate of 52.77%. This response rate is acceptable for a self-administered questionnaire which was enhanced by the personal delivery of the questionnaires as described by Delport (2005:168).

Table0.1: The study population and response rate

	Study population (N)	Number of questionnaires returned (n)	Response rate (%)
TOTAL	N=72	n=38	52.77

4.4 SECTION A: STAFF ATTITUDES, BELIEVES AND SUPPORT TOWARDS THE IMPLEMENTATION OF THE CHECKLIST

Table 4.2 shows the findings with regards to the respondent's knowledge of the differences between the original WHO Surgical checklist and the modified version that is used in their organisation. A large proportion of respondents (n=13/37.14%) indicated that they do not know if there is any difference between the WHO SSC and the modified version in their organisation. The researcher assume that the participants may never been exposed to the original WHO SSC.

Table 0.2: Difference between the current SC and the WHO SC

Variable	In the department where I work...	Strongly Agree		Do not know	
		n	%	n	%
1-6	There is little difference between the current SC and the WHOSC.	9	25.71	13	37.14

4.4.2 Variables 7-12: The complete checklist is used for every procedure in every theatre

The majority of the participants n=21(55.26%) strongly agreed that the complete checklist was used for every surgical procedure performed in theatre, while n=2(5%) indicated that they did not know if the SSC is used in all surgical procedures. This is a concern as previous studies

have proved that full compliance to the effective use of the surgical safety checklist reduces surgical errors (Aveling *et al*., 2013:2; O'Connor *et al.,* 2013:3).

Table 0.3: The complete checklist is used for every procedure in every theatre

Variable	In the department where I work...	Strongly Agree		Do not know	
		n	%	n	%
7-12	The complete checklist is used for every procedure in every theatre.	21	55.26	2	5.26

4.4.3 Variables13-18: The complete checklist is used for every procedure in which I am involved in theatre

As depicted in the table below, the majority of the participants n=22(59.46%) strongly agreed that the checklist was used for every surgical procedure they were involved in. A concern is that n=6(16.22%) indicated that they disagree slightly with this statement.

Table 0.4: The complete checklist is used for every procedure in which I am involved in theatre

Variable	In the department where I work...	Strongly Agree		Disagree slightly	
		n	%	n	%
13-18	The complete checklist is used for every procedure in which I am involved in theatre	22	59.46	6	16.22

4.4.4 Variables 19-24: When the checklist is being carried out, everyone in the theatre stops what they are doing and listens until it is completed

Results show that n=12(31.58%) of the participants agreed slightly that when the checklist is being carried out, everyone in the OR stops what they are doing and listens until it is completed and n=11(28.95%) agreed strongly as shown in table 4.5.

Table 0.5: When the checklist is being carried out, everyone in the theatre stops what they are doing and listens until it is completed

Variable	In the department where I work...	Agree slightly		Strongly agree	
		n	%	n	%
19-24	When the checklist is being carried out, everyone in the theatre stops what they are doing and listens until it is completed	12	31.58	11	28.95

4.4.5 Variables 25-30: Sometimes sections of the checklist are not completed

Table 4.6 shows that n=12(21.58%) participants agree slightly and n=11(28.95%) agree strongly that some sections of the checklist are not completed.

Table 0.6: Sometimes sections of the checklist are not completed

Variable	In the department where I work...	Agree slightly		Strongly agree	
		n	%	n	%
25-30	Sometimes sections of the checklist are not completed	12	21.58	11	28.95

4.4.6 Variables 31-36: The individual who signs the checklist personally ensures that the relevant steps have been completed

According to table 4.7, 47% of the respondents (n=18) strongly agreed that the person who signs the checklist ensures that the relevant steps have been completed. Of concern is that 7.89% (n=3) strongly disagreed or did not know.

Table 0.7: The individual who signs the checklist personally ensures that the relevant steps have been completed

Variable	In the department where I work...	Strongly Agree		Disagree Strongly	
		n	%	n	%
31-36	The individual who signs the checklist personally ensures that the relevant steps have been completed	18	47.37	3	7.89

4.4.7 Variables 37-42: I believe that failing to use the checklist is poor professional practice.

Most reponses n=18(47.37%) strongly agreed that failing to use the checklist is poor professional practice. Of concern, however,is that n=6(15.79%) respondents slightly agreed and n=5(13.6%) slightly disagreed.

Table 0.8: I believe that failing to use the checklist is poor professional practice.

Variable	In the department where I work...	Strongly agree		Slightly agree		Slightly disagree	
		n	%	n	%	n	%
37-42	I believe that failing to use the checklist is poor professional practice.	18	47.37	6	15.79	5	13.6

4.4.8 Variables 43-48: I believe using the checklist reduces the likelihood of human error.

The majority of respondants of almost 82%(n=31/81.58%) strongly agreed thatusing the checklist reduces the likelihood of human error. However, almost 8% indicated they are not in full agreement (n=3/7.89%).

Table 0.9: I believe using the checklist reduces the likelihood of human error

Variable	In the department where I work...	Strongly Agree		Slightly agree	
		n	%	n	%
43- 48	I believe using the checklist reduces the likelihood of human error.	31	81.58	3	7.89

4.4.9 Variables 49-54: I believe using the checklist improves patient safety.

Results show that n=31(81.58%) respondants agree strongly that using the checklist improves patient safety in the operating theatre, however n=3(7.89%) slightly agree.

This results show that the participants n=3(7.89%) are all senior nurses with work experience between 7 and 32 years in the OR. An expert nurse is describe as a person with three to five years clinical experience within a specific work environment (Benner, 2001:31).These results mirror the previous statement which can be construed that in the research setting not all members of the theatre team understand the importance of the checklist.

Table 0.10: I believe using the checklist improves patient safety

Variable	In the department where I work...	Strongly Agree		Slightly agree	
		n	%	n	%
49-54	I believe using the checklist improves patient safety.	31	81.58	3	7.89

4.4.10 Variables 55-60: I believe using the checklist improves teamwork in theatre

Most responses n=27(75.%) strongly agreed followed by almost 14% slightly agreeing (n=5/13.89%).Three respondents (n=3/8.33) disagreed strongly that using the checklist improves teamwork in OR. The participants (n=27) who indicated they strongly agree that the checklist improve teamwork have indicated work experiences from 3 to 25 years.

Table 0.11: I believe using the checklist improves teamwork in theatre.

Variable	In the department where I work...	Strongly agree		Slightly agree		Strongly disagree	
		n	%	n	%	n	%
55-60	I believe using the checklist improves team work in theatre.	27	75	5	13.89	3	8.33

4.4.11 Variables 61-66: I believe that the checklist should be mandatory for every case.

Respondants n=25(67.57%) strongly agreedthat the checklist should be mandatory for every case followed by n=7(18.92%) who slightly agreed and n=2(5.41%) who strongly disagreed.

Table 0.12. I believe that the checklist should be mandatory for every case.

Variable	In the department where I work...	Strongly agree		Slightly agree		Strongly disagree	
		n	%	n	%	n	%
61-66	I believe that the checklist should be mandatory for every case	25	67.57	7	18.92	2	5.41

4.4.12 Variables 67-72: Surgical personnel support the use of the checklist.

Almost half of the respondents (n=18/48.64%) agreed strongly that the surgical personnel support the use of the checklist, followed by n=11(29.73%) who agreed slightly and n=4 (10.81%) who disagreed strongly.

Table 0.13: Surgical personnel support the use of the checklist.

Variable	In the department where I work...	Strongly agree		Slightly agree		Strongly disagree	
		n	%	n	%	n	%
67-72	Surgical personnel support the use of the checklist	18	48.64	11	29.73	4	10.81

4.4.13 Variables 73-78: Anaesthetic personnel support the use of the checklist.

The majority of responses n=20(54.05%) agreed strongly that anaesthetic personnel support the use of the checklist followed by n=9 (24.32%) who slightly agreed.

Table 0.14: Anaesthetic personnel support the use of the checklist

Variable	In the department where I work...	Strongly Agree		Slightly agree	
		n	%	n	%
73-78	Anaesthetic personnel support the use of the checklist	20	54	9	24

4.4.14 Variables 79-84: Nursing staff supports the use of the checklist

The majority of the responses n=23(62.16%) agreed strongly followed by n=6(16.22%) who slightly agreed that nursing staff supports the checklist**.**

Table 0.15: Nursing staff supports the use of the checklist

Variable	In the department where I work...	Strongly Agree		Slightly agree	
		n	%	n	%
79-84	**Nursing staff supports the use of the checklist**	23	62.16	6	16.22

4.4.15 Variables 85-90: Senior theatre personnel support the use of the checklist

Results show that n=26(70.27%) agreed strongly that senior OR personnel support the use of the checklist, yet almost 19%(n=7/18.92%) merely slightly agreed.

Table 0.16: Senior theatre personnel support the use of the checklist

Variable	In the department where I work...	Strongly Agree		Slightly agree	
		n	%	n	%
85-90	Senior theatre personnel support the use of the checklist	26	70.27	7	18.92

4.4.16 Variables 91-96: Junior theatre personnel support the use of the checklist

Results show that less than half of the respondents (n=15/41.67) agreed strongly closely followed by n=12(33.33%) who agreed slightly that junior OR personnel support the use of the checklist.

Table 0.17: Junior theatre personnel support the use of the checklist

Variable	In the department where I work...	Strongly Agree		Slightly agree	
		n	%	n	%
91-96	Junior theatre personnel support the use of the checklist	15	41	12	33

4.4.17 Variables 108-114: Management supports the use of the checklist

The majority of respondents n=30(81.08%) strongly agreed with this statement. Yet some (n=2/5.41%) indicated that they do not know if management supports the use of the checklist.

Table 0.18: Management support the use of the checklist

Variable	In the department where I work...	Strongly Agree		Don't know	
		n	%	n	%
97-102	Management support the use of the checklist	30	81.08	2	5.41

4.4.18 Variables 103-108: I have initiated the use of the checklist in the past.

Less than half of the respondents (n=15/41.67%) indicated that they had initiated the use of the checklist. Twenty-five percent agreed (n=9/25%) agreed slightly that they had initiated the use of the checklist in the past.

Table 0.19: I have initiated the use of the checklist in the past

Variable	In the department where I work...	Strongly Agree		Slightly Agree	
		n	%	n	%
103-108	I have initiated the use of the checklist in the past.	15	41.67	9	25

4.4.19 Variables 109-114: I intend to use the checklist in the future.

Slightly over half of the respondents definitely intend to use the checklist in the future (n=21/57%). However, almost 17%(n=6/16.67%) chose the option of "neutral". The same percentage disagreed slightly to initiate the use of the checklist in the future.

Table 0.20: I intend to use the checklist in the future.

Variable	In the department where I work...	Strongly agree		Neutral		Slightly disagree	
		n	%	n	%	n	%
109-114	I intend to use the checklist in the future	21	58.33	6	16.67	6	16.67

4.5 SECTION B: PARTICIPANTS RESPONSES ON THE POTENTIAL PROBLEMS TO THE CORRECT USE OF THE WHO SCC.

4.5.1 Variables 115-120: The requirement for signatures

Table 4.21 shows that few respondents (n=11/31.43%) strongly agreed that a signature may be a problem to the correct use of the WHO SCC. Almost 26% (n=9/25.71%) slightly agreed, yet 20% marked the “neutral” option (n=7/20.00%).

Table 0.21: The requirement for signatures

Variable	In my opinion the potential problem to the correct use of the WHO SSC may be	Strongly agree		Neutral		Slightly disagree	
		n	%	n	%	n	%
115-120	The requirement for signatures	11	31.43	7	20	9	25.71

4.5.2 Variables121-126: Lack of assertiveness of staff

Results shown in table 4.22 that less than half of the respondents (n=14/40%) only slightly agreed that lack of assertiveness may impede the correct use of the SSC. Approximately 35% (n=12/34.29%) agree strongly that a lack of assertiveness is a potential problem to the correct use of the WHO SSC.

Table 0.22: Lack of assertiveness of staff

Variable	In my opinion the potential problem to the correct use of the WHO SSC may be:	Strongly agree		Slightly disagree	
		N	%	n	%
121-126	Lack of assertiveness of staff	12	34.29	14	40

4.5.3 Variables127-132: Lack of time

Lack of time is commonly cited in the literature on the use of the SCC (Eshun & Eshun, 2013:19). However, in this survey as shown in table 4.42 around 34% (n=12/34.29%) slightly agreed that time may be a problem. However, twenty-three percent (n=8/22.86%) strongly agreed that a lack of time is a potential problem to the correct use of the WHO SSC.

Table 0.23: Lack of time

Variable	In my opinion the potential problem to the correct use of the WHO SSC may be:	Strongly agree		Slightly agree	
		N	%	n	%
127-132	Lack of time	8	22.86	12	34.29

4.5.4 Variables133-138: Lack of training

Few participants slightly agreed that a lack of training may be a potential problem (n=13/37.14%) followed by n=7 (20%) who strongly agreed that a lack of training is a potential problem to the correct use of the WHO SSC. In this study the researcher has identified that the participants who indicated that the lack of training is a potential problem are all senior members of the surgical team (Surgeons, Anaesthetist and Professional registered Nurses and registered Enrolled Nurse Assistants), who have with more than 10 year's work experience respectively.

Table 0.24: Lack of training

Variable	In my opinion the potential problem to the correct use of the WHO SSC may be:	Strongly agree		Slightly agree	
		N	%	n	%
133-138	Lack of training	7	20	13	37.14

4.5.5 Variables139-144: The lack of an electronic version of the checklist that could be completed on the theatre computer system

Table 4.25 indicate that respondents n=10(28.57%) disagree strongly that the lack of an electronic version of the checklist is a potential problem to the correct use of the WHO SSC. In the research setting electronic records are not available and therefore all documentation is still handwritten.

Table 0.25: Lack of electronic checklist

Variable	In my opinion the potential problem to the correct use of the WHO SSC may be:	Strongly disagree	
		n	%
139-144	Lack of electronic checklist	10	28

4.6 SECTION C: BIOGRAPHICAL AND PROFESSIONAL DATA

4.6.1 Variables145-148: Job (role) performed in theatre (n=38/86.84%)

Table 4.26 shows that the majority of respondents (n=63.64%) were Nurses. This finding is consistent with other studies who found that Nurses support the use of the SSC (O'Connor *et al.*, 2013:3; Hurtado *et al.*,2013; Eshun & Eshun, 2013:30)

Table 0.26: Job (role)

Variable	Role	n	%
145	Surgeon	4	12.12
146	Anaesthetist	4	12.12
147	Nurse	21	63.64
148	OTP	4	12.12
TOTAL		**33**	**100**

4.6.2 Variables149-150: Grades of Doctors (n=5/100%)

The response rate by the doctors to this question was n=5/100%. Table 4.27indicates that four consultants (n=4/80%) and one assistant surgeon (n=1/20%) responded.

Table 0.27: Grades of Doctors

Variable	Category	n	%
149	Consultant	4	80
150	Assistant surgeon	1	20
TOTAL		**5**	**100**

4.6.3 Variable 151: Grades of Nurses (n=21/100%)

As depicted in Table 4.28, the majority of responses to this aspect of the questionnaire were completed by registered professional nurses (n=12/48%), enrolled nurses (n=6/24%) and lastly by the two operating theatre practitioners.

Table 0.28: Grades of Nurses

Variable	Category	n	%
01	Registered professional nurse	12	48
02	Enrolled nurse	6	24
03	Enrolled nurse assistant	5	20
04	Operating theatre practitioner	2	8
TOTAL		**25**	**100**

4.6.4 Variables152: Years of experience

Table 4.29 indicates that the majority of respondents have work experience of more than 20 years (n=14/41.18%) followed by n=6 (17.65%) with experience of 16-20 years.

Table 0.29: Years of experience

Variable	Category	n	%
01	1-5	5	14.71
02	6-10	5	14.71
03	11-15	4	11.76
04	16-20	6	17.65
05	20 Above	14	41.18
Total		**34**	**100**

4.6.5 Variables153: Basic training country (n=34/100%)

The majority of the participants n=33 (97.06%) were trained in South Africa

Table 0.30: Country of basic training

Variable	n	%
INDIA	1	2.94
RSA	33	97.06
TOTAL	**34**	**100**

4.7 SUMMARY

In this chapter the collected data from the questionnaire were statistically analysed, summarised and interpreted. The collected data was presented in tables, corresponding with the aim and objectives of this study.

4.8 CONCLUSION

The research question and objectives on the barriers affecting the implementation of the WHO SSC in the OR complex of one private hospital was investigated and successfully answered. The next chapter will present a detailed report, including a description of the study aim, limitations of the study, recommendation for future studies and the conclusion of the study findings.

CHAPTER 5
DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In this research study the aim was to explore and describe the barriers affecting the adherence to the WHO SSC by surgical staff working in the OR complex one private hospital in the Cape Metropolitan district of South Africa. In this chapter the conclusion on the findings are discussed as reported in chapter four responding to the objectives of the study and supported by literature. Recommendations for future studies and the limitations of this study are presented.

5.2 DISCUSSION

In this chapter a detailed discussion is presented of the results based on the conceptual framework and the study objectives to:

- To describe the participant's attitude concerning hospital norms on the use of SSC
- To describe the participants perceived impact of the SSC on safety and teamwork
- To determine the participant's opinion on the support of the SSC from specific groups within the OR
- To describe the participants intent to initiate the checklist
- To identify the participants perceived barriers and experienced during the use of the SSC

5.2.1 Objective 1: Attitude of the staff concerning hospital norms on the use of the SSC

The attitude and behaviour of staff towards the effectiveness and completion of the SSC differs for each healthcare provider. Nurses believe that the SSC was mandated by the organisation to be completed, while surgeons are concerned with the communication and safety benefits of the SSC.

The theatre environment and surgical disciplines play a vital role in the attitude of the surgical personnel. Theatre nursing staff may not utilise their skills to their full potential in an area in which they are not comfortable. Emotional discomfort and stress become intense in an environment where personal safety is threatened (Brasaite, Kaunonen, Martinkenas & Suominen, 2016:1).

In this study participants were asked six questions to determine their attitude towards the implementation of the SSC. Statistically significant differences were identified among the participants with reference to their attitude regarding the implementation of the SSC.

5.2.1.1 Staff knowledge towards WHO SSC

Inexperienced health care practitioners present a threat to patient safety as tasks are rendered without the required knowledge and level of skill. Health care practitioners must be fully accountable for their actions and omissions that can cause harm to the patient (Larizgoitia, Bouesseau & Kelley, 2013:1).

The WHO strongly recommends the use of the surgical safety checklist in all healthcare organisations. Many organisations have reported a high satisfactory rate since the implementation of a surgical safety checklist in their operating rooms (Mascherek, Schwappach & Bezzola., 2013:1; Borchard *et al*., 2012:295; Haugen *et al*., 2013:811)

In this study 39% of participants are not aware whether there is any difference between the WHO SSC and the checklist they are using in their theatre. Thus, the researcher assumes the participants are not aware of the content of the original WHO SSC.

5.2.1.1 Implementation of the SSC

Sub-Saharan Africa consists of low and middle-income countries with limited resources to provide surgical care to their communities. Shortage of trained professionals, resources and consumables are always reported as constraints when meeting patient needs (Epui *et al*., 2016:2). The value of nurse training in South Africa are constrained by shortage of practically experienced nurses, heavy workload and unavailability of equipment (NES group, 2012:27).

In this study (55%) of participants strongly agreed that the checklist was completed in the theatre they worked in and 59% strongly agreed that the checklist is used for every procedure.

However, evidence shows that, for example, perceptions of accurate completion by staff are in reality found to be non-compliant. For example, Fourcade *et al*. (2011:4) reported in a study by the French National Federation of Cancer Centres a 92% compliance rate with a completion rate of 61%. A systematic literature review by Borchard *et al*. (2012:927), reported compliance rate ranging from 12% to 100%.

The results from this study are comparable with results from previous studies hence the use of the checklist still needs improvement. As mentioned in previous chapters the SSC is a crucial aspect in improving patient safety in the operating room and organisations should aim for 100% compliance rate.

In conclusion more than half the participants indicated that the checklist is used for most of the procedures but effort and time should be invested to establish full compliance during all surgical procedures.

5.2.2 Objective 2: To describe the participants perceived impact of the SSC on safety and teamwork

According to Bandura (1986:391), individuals regulate their behaviour on the perception of other people or the environment to achieve their goals. People thoughts and behaviour are elements that affect the safety culture in an organisation (Haugen *et al*., 2013:808).

Teamwork is considered an essential component in delivering optimal surgical care in the OR. Team communication is associated with an increase in nurses' incident reporting performance (Huang *et al*., 2015:17). Nurses should be encouraged and motivated, including the senior management, to report incidents of poor performance. An increase in nurse incident reporting will reduce patient safety risk and healthcare professionals should learn from their mistakes (Hwang *et al*., 2015:17).

5.2.2.1 The surgical team believe the checklist improves patient safety in the operating room

These findings are supported by literature that report improved patient safety post implementation of the SSC (Haugen *et al*., 2013:811). The implementation of the complete checklist for all surgical procedures will remind surgical team members of the critical steps to prevent surgical errors (WHO, 2014:8). The study participants (82%) believed that using the checklist can improve patient safety and are congruent with other study findings such as Papaconstantinou *et al*., (2013:304); Walker *et al*., (2012:51) and O`Conner *et al*., (2013:4).

5.2.2.2 The surgical team believe the checklist improved teamwork in the operating room

Teamwork is a vital component in providing quality care in an operating room setting (Hwang & Ahn, 2015:16). Previous research studies indicate that nurses are more receptive to issues of poor team work than other surgical team members (O`Conner *et al*., 2013:4). In this study participants (75%) strongly agreed that the use of the SSC improves team work in the operating room and 67% support the mandatory use of the checklist for each procedure. A significant difference among participant's belief and team work were identified. Thus, the objective of exploring the opinions of the participants on the impact on teamwork and safety of the checklist was successfully explored.

5.2.3 Objective 3: To determine the participant's opinion on the support of the SSC

from specific groups within the OR

In the past 10 years a considerable amount of research has been performed to determine whether a checklist methodology can improve patient safety in the operating room (Weiser & Haynes, 2018:298).Team participation is required during initiation of the checklist. The entire team should stop (*Time Out*) for a few seconds before the start of the procedure and to accomplish successful implementation of the checklist all stakeholders should buy into this process (Hurtado *et al*., 2012:2). Regretfully, although medical practitioners are part of the OR team, they often do not support change in the working environment (Mogale, 2011:85). Most of the reported adverse events were classified as environmental or organisational factors (Runciman *et al*., 2016:23). Heavy workloads, noncompliance to policies and procedures, shortage of resources and malfunction of systems were identified as potential risks for adverse events (Tang, Sheu, Yu, Weil & Chen, 2007:447). Adverse events or preventable errors account for 10% of patient injuries in health care facilities worldwide, and 20-40% of health care funds are wasted due to poor performance and failure in patient safety standards (Dhai, 2016:2). The number of malpractice claims among South African healthcare providers has increased (Samlal, 2018:80).

5.2.3.1 Surgical personnel support the use of the checklist

The effective implementation of the SSC requires a culture change among all surgical team members in the way they perform their daily tasks (Borchand *et al.,* 2012:925).

In this study the majority of participants indicated that management (81%) support the use of the checklist and this is consistent with the findings of O`Conner *et al*. (2013:5).

Factors that influence medical practitioners' involvement in patient safety are their belief and conviction to participate in a process will enhance the patient's outcome (Hurtado *et al*., 2012:2). Another important factor is the acceptance and attitude towards the SSC and this will facilitate the intent to use this tool (Hurtado *et al*., 2012:2). A checklist is not new to anaesthetists as they use one daily to check their equipment. In this study (54%) of participants believe that the anaesthetists support the use of the checklist and (62%) of nurses. These findings are consistent with literature that reports that extensive support to this process comes from nurses and anaesthetists (O`Conner *et al*., 2013:3).

In this study participants (81%) believe management supports the implementation and (70%) of senior nurses also support it as found by O`Conner *et al*. (2013:5). Despite the results that management and senior nurses, support the use of the SSC, few (41%) indicated that junior nurse's support the use of the SSC. This result indicates that not all surgical team members

are aware of the risks and benefits of the WHO SSC. Awareness and training should enforce the value of the use of the SSC (Borchard *et al*., 2012:925).

5.2.4 Objective 4: To describe the participant's intent to initiate the checklist

5.2.4.1 I have initiated the use of the checklist

A checklist is an assisting tool that reminds users of critical steps during the intra operative phase. The WHO SSC was developed to remind surgical team members of these critical steps to improve surgical outcomes (Epui *et al*., 2016:2). Walker *et al*. (2012:48) recommends that surgical personnel should not rely on human memory by memorising the content of the checklist but to read each step out load when performing a checklist briefing. Surgical staff raised concerns that the checklist may be difficult to conduct during urgent and emergency procedures (Walker *et a*l., 2016:48).

In this study 25% of participant with more than 5 years of experience in the operating room slightly agreed that they have initiated the use of a checklist. According to Benner (2001:31) a person working in the same environment for more than 5 years can be considered an expert with regards to knowledge and skill. These individuals are required to illustrate insight and intuition in delivering safe patient care (Benner, 2001:31).

5.2.4.2 I intend to initiate the use of the checklist in the future

Although 58% strongly agreed to initiate the checklist in the future 17% slightly agreed and another 17% selected the neutral option. The participants who responded to these results are at the same level of experience as summarised in the previous statement. The results clearly indicate that senior surgical team members are not fully committed to initiate the checklist and therefore the adherence to evidence-based hospital protocols.

5.2.5 Objective 5: To identify the participants perceived barriers and experience during the use of the SSC

Numerous studies have recognised and identified various barriers with implementing the SSC, that included a lack of training, time constraints, understanding of critical points and conflicting roles of members during execution of the safety checks (Levy *et al*., 2012:332; O`Conner *et al*, 2013:4; Papaconstantinou *et al*., 2013:306).

5.2.5.1 The requirement for signature

O`Conner *et al*. (2013:5) identified that nurses, more than surgeons or anaesthetists, voiced that the requirement for signature, lack of time and staff assertiveness were barriers to the completion of the SSC. In this study 31% strongly agreed and 25% slightly agreed that the requirement for signature is a barrier.

In previous studies nurses raised concerns that the lack of a signature from the surgeon who is ultimately responsible for performing the procedure could implicate that the nurse would be held liable in legal action (O`Conner *et al*., 2013:6). Non-adherence to policy, procedures and guidelines can affect staff performance and have a negative effect on patient outcome. The causes of adverse events and patient dissatisfaction regarding quality healthcare may be a reflection of non-adherence to standards and policies that guides practices to reduce sentinel events (Uwaliraye, Puana, Binagwaho & Basinga, 2013:59)

5.2.5.2 The lack of assertiveness of staff

In this study (34%) agreed that a lack of assertiveness is a potential barrier, (40%) slightly agreed and (20%) chose the neutral option. In most healthcare organisation the circulating nurses are assigned to initiate the checklist process. Despite the fact that nurses are merely facilitating this process of initiating the checklist, the hierarchy by the surgical team (doctors) can be challenging (O`Conner *et al*., 2013:6). Nurses are overwhelmed with providing the necessary patient care within the given time frame of their shifts, which may lead to negligence in patient safety and grounds for legal action. A decrease in workload could help nursing staff to focus more on the provision of quality care and patient safety (Kang *et al*., 2016:59). A patient could institute legal proceedings for compensation against an employee if it can be proved that the injuries suffered were the result of misconduct (Daly, Speedy & Jackson, 2010:168). Healthcare providers have a responsibility to provide care and function in a specific role and to ensure patient's needs are taken care of. Armstrong, Bhengu, Kotze, Nkonzo-Mtembu, Ricks, Stellenberg, van Rooyen and Vasuthevan (2013:234) identify duty of care as a healthcare provider's responsibility to function in a specific role to ensure optimal care is provided to their patients. Healthcare providers are obligated to perform a certain degree of care and to consider the patient in every task (Armstrong *et al*., 2013:234).

5.2.5.3 The lack of time

The WHO has described in their literature that completion of the checklist takes a few minutes and that no decrease in surgical time was reported (WHO, 2014:8). They recommend that a designated person should be assigned to complete the checklist and the process of completion should not be rushed (WHO, 2008:8).

In this study (23%) of all participants strongly agreed that a lack of time is a barrier to the completion. The reluctance of medical practitioners in private practice to abide by the process is another area of concern since medico-legal claims are becoming increasingly prevalent in South Africa. Other than in emergency situations, the cost of OR facility charges and those of the private specialist involved cannot be justifiable in putting patients at risk, including the surgical team's reputations (Liebenberg, 2018:73). Nurses from the private sector in South

Africa identified that a lack of time was a barrier to the completion of their daily tasks. Liebenberg, (2018:84) identified production pressure as a potential obstacle to the supervision and the support of new staff as they have limited time to attend to the students and new staff learning needs.

5.2.5.4 The lack of training

In this study (20%) strongly agreed and (37%) slightly agreed that a lack of training is a potential barrier. Levy *et al*. (2012:332) assert that a lack of training is considered a potential barrier to the successful implementation or even non-adherence of the checklist as corroborated by Vats *et al*. (2010:503). Inadequate knowledge or a lack thereof on how to use the checklist can result in a lack of interest (Papaconstantinou *et al*., 2013:306) and if this is remedied compliance could improve.

The aim of the WHO implementation of SSC is to provide healthcare organisations with a brief tool and guide to utilise during the peri-operative phase of patient care, to identify and reduce surgical risk and improve surgical outcomes (O`Conner, 2013:6; Epui *et al*., 2016:2). Breedt (2017:67) states that OR staff and students expressed that the time allocated to staff orientation is in adequate. They suggested a revision of the existing OR orientation program for new OR nurses. This may enhance their learning experience and adoption of the OR standards (Breedt, 2017:85). The value of nurse training in South Africa is constrained by the shortage of practically experienced nurses, heavy workloads and unavailability of equipment (NES group, 2012:27). Nursing staff identified the shortage of staff and the increase workload as obstacles to be effective mentors (Liebenberg, 2018:85). Therefore, inadequate training may result in non-adherence to norms and protocols.

5.3 LIMITATIONS OF THE STUDY

The limitation of a research study refers to the components of the study that may possibly impact on the generalisability of the results (Burns & Grove, 2007:37).

The selection of one private hospital in the region as a single-case study means that the sample is not representative of the population in the private hospital group. The potential problems identified in this study may also be specific to this population and therefore not generalisable.

As this was a survey using a self-completing paper and pen questionnaire, it may not be an accurate reflection of the current practice. Finally, the researcher identified a concern that some of the participants may not have been exposed to the original WHO SCC. Therefore, they may have been unable to make an informed selection. No literature could be found where

a factoral analysis was conducted in the South African context to test if the constructs resonate with the South African medical population.

5.4 RECOMMENDATIONS

Based on the study findings, the researcher suggests the following:

5.4.1 Training of staff

Globally the healthcare sector is in a serious crisis in respect of a shortage in nursing and it is affecting patient care (Alluttis, Bishaw & Frank, 2014:1). The WHO reported a shortage of approximately 4.3 million healthcare professionals in Africa (van Vuuren & Mofokeng, 2014:1). The shortage of nurses and turn over in South Africa is of great concern, thus new staff and agency nurses are utilised to provide surgical care on a daily basis. To assist the staff shortage the private sector in South Africa has initiated the recruitment of international nurses from India to fill vacant positions (Dube, 2016:1). The increase in workload demand and the shortage of nursing staff may be a potential reason for the poor care delivery and the increase in negligence claims (van Vuuren *et al*., 2014:1). The mandatory use of the SSC should be included in the orientation program and the employment contract of all new recruits. Continuous in-service training programmes should include patient safety activities supported by documentation audits.

A similar study conducted in 2018 in two Western Cape metropole provincial hospitals revealed that 35% of staff with more than 5 years of experience indicated that they were not adequately trained in the use of the SSC (Koopman, 2018:64). This finding is similar to a study conducted in 2018 in two large hospitals in Durban (Verwey & Gopalan, 2018:337). Vijayaseker and Steele (2009:206) describe that untrained users of the SSC may disengage themselves to the use and effective implementation of the SSC.

5.4.2 Quality improvement projects

The OR could initiate a quality improvement project to promote a culture of safety among surgical team members. As already mentioned, monthly auditing of the compliance of SSC and provision of feedback to the staff identified in non-compliance could encourage obedience. Involving leaders in the quality improvement project and selecting champions to facilitate the project is highly recommended. As mentioned in the previous chapters the SSC is a crucial aspect in improving patient safety in the OR and organisations should aim for 100% compliance rate.

5.4.3 Future research

Firstly, the researcher suggests that this research project be expanded to all the hospitals in the group. An observational study to evaluate the process conducted by the surgical team members may provide additional information on staff behaviour and team dynamics. As recommended in the study by Levy *et al*. (2012:7), the audit documents could be compared to the observations to identify variables, such as work pressure, team dynamics and poor communication.

Another opportunity could be to implement a pre- and post-intervention study to evaluate the improvement in compliance. Furthermore, although the pilot study indicated that the questionnaire was understandable, it might be prudent to test the validity and reliability of it in the South African context, given the different levels of education amongst OR nursing staff.

5.5 CONCLUSION

The WHO SSC was initiated to improve patient safety, enhance communication and foster teamwork among OR team members. Over the past ten years, the effects and benefits of this safety protocol have been extensively published. However, many organisations struggle to ensure the optimal utilisation. Medico-legal claims are increasing both the private and public sector and no member of the OR team is immune to being held accountable for their omissions or commissions in adverse events. This study raises awareness that buy-in to the concept of the value of the SCC in avoiding near miss or adverse events in a private hospital requires intervention.

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APPENDICES

APPENDIX 1: ETHICAL APPROVAL FROM STELLENBOSCH UNIVERSITY

UNIVERSITEIT
STELLENBOSCH
UNIVERSITY

Amendment Approval Letter

04/06/2018

Project Reference #: 4413

Ethics Reference #: S17/04/075

Title: Barriers affecting the implementation of the World Health Organization Surgical Safety Checklist by staff in a private hospital in the Cape Metropole

Dear Mr Peter Sauls,

Your amendment request submitted 21 May 2018 refers.

The Health Research Ethics Committee (HREC) reviewed and approved the amended documentation through an expedited review process.

The following amendment was reviewed and approved with the following stipulation:

1. Submit proof of permission from the study site before commencement of research activity.

Where to submit any documentation

Kindly note that the HREC uses an electronic ethics review management system, *Infonetica*, to manage ethics applications and ethics review process. To submit any documentation to HREC, please click on the following link: https://applyethics.sun.ac.za.

Please remember to use your Project ID [4413] and ethics reference number [S17/04/075] on any documents or correspondence with the HREC concerning your research protocol.

National Health Research Ethics Council (NHREC) Registration Numbers: REC-130408-012 for HREC1 and REC-230208-010 for HREC2

Federal Wide Assurance Number: 00001372

Institutional Review Board (IRB) Number: IRB0005240 for HREC1

Institutional Review Board (IRB) Number: IRB0005239 for HREC2

The Health Research Ethics Committee complies with the SA National Health Act No. 61 of 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki and the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles, Structures and Processes 2015 (Department of Health).

Yours sincerely,

Mrs. Ashleen Fortuin

Health Research Ethics Committee 1

Page 1 of 1

APPENDIX 2: PERMISSION OBTAINED FROM THE INSTITUTION

24 July 2018

Mr PJ Sauls

saulspeter7@gmail.com

Dear Mr Sauls

PERMISSION TO CONDUCT RESEARCH AT XXXXXXXXXXXXXXXX

Your research proposal entitled "Barriers affecting the implementation of the World Health Organization Surgical Safety Checklist by staff in Private hospitals in the Western Cape province" refers.

It is in order for you to conduct your research at XXXXXXXXXXXXXXXX and I wish you success with this project.

Yours sincerely

General Manager Clinical Services

APPENDIX 3: PARTICIPANT INFORMATION LEAFLET AND DECLARATION OF CONSENT BY PARTICIPANT AND INVESTIGATOR

TITLE OF THE RESEARCH PROJECT: Knowledge, attitude and practices of perioperative personnel towards the WHO SSC.

REFERENCE NUMBER: 17325811

PRINCIPAL INVESTIGATOR: Peter Jonathan Sauls

ADDRESS [redacted]

CONTACT NUMBER: (966) 0503459669

You are invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the researcher any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is entirely voluntary, and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the Committee for Human Research at Stellenbosch University and will be conducted according to the ethical guidelines and principles of the International Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

- *Patient safety in the perioperative setting.*
- *This research study aims to evaluate registered professional and staff nurses' knowledge, attitude and practices towards the WHO SSC.*
- *The study will be conducted in one hospital located in the Middle East. The study will include both day and night nursing staff.*
- *You will be given a consent form to complete before your participation in the research project. Participation is entirely voluntary and anonymous. On completion of the consent form, you will place the consent form in a sealed envelope and slot it into a special locked box provided by the researcher. The questionnaire will be distributed once the consent form has been completed. No names or hospital names are attached*

to this questionnaire; the answers are in the form of alphabetic numbers. The questionnaire will take approximately 30 minutes to complete. Once the questionnaire has been completed, it will be placed in a sealed envelope and placed into a second box marked questionnaires also provided by the researcher. All questionnaires will be completed in the department where you are working. The researcher will deliver and collect all the consent forms and questionnaires in person.

Why have you been invited to participate?

- *As a registered professional or staff nurse currently working in a perioperative setting, your input is valuable to determine the current knowledge, attitude and clinical practice towards the WHO SSC.*

What will your responsibilities be?

- *You will be requested to complete a consent form and place it in a sealed envelope into a box marked "Consent forms". After completion of consent, you will be given a questionnaire to be completed and placed in a sealed envelope into a box marked "Questionnaires". There will be no names affixed to the questionnaire. Therefore, the study will be done anonymously. There is no way the researcher will be able to identify the participants by either hospital or individual names.*

Will you benefit from taking part in this research?

- *The data generated through your participation in this research project will benefit both staff and patients as it might lead to adaptation in the way in which patient safety is currently managed. In-service training programmes in the WHO SSC will be developed to improve the quality of patient safety care that is provided to all perioperative patients.*

- **Are there any risks involved in your taking part in this research?**

- *No risks have been identified by means of your participation in this project.*

If you do not agree to take part, what alternatives do you have?

- *Your participation in this research project is entirely voluntary, and if you select not to participate, you will not be penalized in any way.*

Will you be paid to take part in this study and are there any costs involved?

- *No, you will not be paid to take part in the study. There will be no costs involved for you if you do take part.*

Is there anything else that you should know or do?

- *You can contact the Committee for Human Research at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by the researcher.*

Declaration by participant

By signing below, I ……..…….. agree to take part in a research study entitled**.**

I declare that:

- I have read or had read to me this information and consent form, and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary**, and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.

Signed at (*place*) .....…….....…….. on (*date*)……...…….. 2016.

..... **.....**

Signature of Participant Signature of witness

Declaration by investigator

I *(name)* ……..…… declare that:

- I explained the information in this document to ……..
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above.

Signed at (*place*) .....…….....…….. on (*date*) ……...…….. 2016.

.....	.....
Signature of investigator	Signature of witness

APPENDIX 4: INSTRUMENT

Barriers affecting the implimentation of the WHO SSC by staff in a Private hospital in the Cape Metropole

INSTRUCTIONS:

- ✓ Please answer all the questions by marking your choice with a tick (√), e.g.:
  Are you a typist?

Yes	√
No	

- ✓ There are three pages to this questionnaire consisting of four sections, and it should take you about 30 minutes to complete.
- ✓ Place the completed questionnaire in the self-sealing envelope provided. Post it in the sealed "Questionnaires" box.

SECTION A:							
NO.	**In the department where I work...**	**Disagree Strongly A**	**Disagree Slightly B**	**Neutral C**	**Agree Slightly D**	**Agree Strongly E**	**Don't Know F**
01-06	There is little difference between the current surgical checklist and the WHO surgical checklist						
07-12	The complete checklist is used for every procedure in every theatre.						
13-18	The complete checklist is used for every procedure in which I am involved in theatre						
19-24	When the checklist is being carried out, everyone in						

	theatre stops what they are doing and listens until it is completed.						
25-30	Sometimes sections of the checklist are not completed.						
31-36	The individual who signs the checklist personally ensures that the relevant steps have been completed.						
37-42	I believe that failing to use the checklist is poor professional practice.						
43-48	I believe using the checklist reduces the likelihood of human error.						
49-54	I believe using the checklist improves patient safety.						
55-60	I believe using the checklist improves teamwork in theatre.						
61-66	The use of the checklist should be mandatory for every case.						
67-72	Surgical personnel support the use of the checklist.						
73-78	Anaesthetic personnel support the use of the checklist.						
79-84	Nursing staff support the use of the checklist.						
85-90	Senior theatre personnel support the use of the checklist.						

91-96	Junior theatre personnel support the use of the checklist.						
97-102	Management supports the use of the checklist.						
103-108	I have initiated the use of the checklist in the past.						
109-114	I intend to initiate the use of the checklist in the future.						

SECTION B:							
In my opinion the potential problems to the correct use of the WHO SSC may be:		**Disagree Strongly**	**Disagree Slightly**	**Neutral**	**Agree Slightly**	**Agree Strongly**	**Don't Know**
115-120	The requirement for signatures						
121-126	Lack of assertiveness of staff						
127-132	Lack of time						
133-138	Lack of training						
139-144	The lack of an electronic version of the checklist that could be completed on the theatre computer system						

NO.	**SECTION C: PROFESSIONAL PROFILE**
145-148	What job do you perform in theatre (please mark the appropriate response)?
	Surgeon |

	Anaesthetist	
	Nurse	
	OTP	
149-150	If you are a doctor, please write your grade in the block provided	
	Consultant Surgeon	
	Assistant Surgeon	
151	If you are a nurse, please write your grade in the block provided (e.g. PN, EN, ENA, OTP)	
152	Please indicate in the block provided your years of experience since qualifying in your area of patient care?	
153	In which country did you do your basic training?	

O'Connor, P., Reddin, C., O'Sullivan, M., O'Duffy, F. & Keogh, I. 2013. [Online]. Available: http://www.midss.org/sites/default/files/midss.pdf

APPENDIX 5: DECLARATIONS BY LANGUAGE AND TECHNICAL EDITORS

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2 December 2018

Mr. P. Sauls
Student Number: 17325811
22 Gladstone Street
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Cape Town 7500

The above-named student's thesis titled **"**Barriers affecting the implimentation of the Surgical Safety Checklist in a private hospital in the Cape Metropole**,"**was edited for grammar, spelling and syntax, referencing and formatting.

The revisions were recommended for the author's attention and integration in the final document. Formatting errors may have occurred during internet file transfers from the editor to the author. The author was responsible for checking for such manifestations and making the necessary adjustments.

T. Pfeffer

Lize Vorster Communication

To whom it may concern

This letter serves as confirmation that I, Lize Vorster, performed the technical formatting of Peter Jonathan Sauls's thesis entitled:

Barriers affecting the implementation of the World Health Organization Surgical Safety Checklist by staff in a Private hospital in the Cape Metropole.

Technical formatting entails complying with the Stellenbosch University's technical requirements for theses and dissertations, as presented in the Calendar Part 1 – General or where relevant, the requirements of the department.

Yours sincerely

Lize Vorster
Language Practitioner

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