# Perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg in partial fulfilment of the requirements for the degree of Master of Medicine in the branch of Anaesthesiology.

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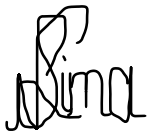
## Declaration

I, Najiba Sima declare that this research report is my own unaided work. It is being submitted for the Degree of Master of Medicine in the branch of Anaesthesiology at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



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# Abstract

## Background

The WHO Surgical Safety Checklist (WHO Checklist) fosters communication and teamwork between the perioperative team and perceptions influence its acceptance and use. This study explores the perceptions of the perioperative team to the WHO Checklist in operating theatres at the University of the Witwatersrand affiliated hospitals.

## Methods

A qualitative, contextual, exploratory research design was employed. Purposive sampling was used to invite theatre nurses, anaesthetists and surgeons to participate. Focus group interviews were held for each group. Interviews were audio-recorded and transcribed verbatim. Thematic analysis was used to analyse the data.

## Results

Ten nurses, 6 anaesthetists and 4 surgeons participated in the focus group interviews. Four themes relating to patient safety were identified namely, the prevalence of power struggles in theatre, a breakdown in communication, a culture of silence and the inadequate and siloed training. The perceptions of the perioperative teams interviewed describe a daily flight plagued by turbulence that may result in serious adverse events.

## Conclusion

In a complex system such as a hospital theatre environment, the introduction of a simple tool such as the WHO Checklist has a limited impact on patient safety if the underlying supportive network is not intact. This study demonstrates the importance of interpersonal relationships, changing teams and lack of integration of teams, processes and training, on the use of the WHO Checklist as a safety tool in a South African hospital setting. A prevailing culture of safety is a prerequisite for successful implementation and use of the WHO Checklist.

## Acknowledgements

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For Shamiel Areff, long gone are the days when behind every successful man is a woman - women are successful of their own accord, but if every man believed in his woman the way you do in me, the world would be a different place.

Finally, thank you to my daughter, Aaliyah and son, Zayan for your independence, non-complaining attitudes and understanding of your mother always working.

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# Abbreviations

| | |
|---|---|
| CEO | Chief Executive Officer |
| CHBAH | Chris Hani Baragwanath Academic Hospital |
| CMJAH | Charlotte Maxeke Johannesburg Academic Hospital |
| M&M | Morbidity and mortality |
| SURPASS | Surgical Patient Safety System |
| USA | United States of America |
| WHO | World Health Organisation |
| WHO Checklist | WHO Surgical Safety Checklist |
| Wits | University of the Witwatersrand |

## Statement

The Research Report consists of a literature review, draft article, study proposal and appendices. The study proposal is included for background reference and is not for examination.

The formatting of this Research Report complies with the University of the Witwatersrand's Style Guide for Theses, Dissertations and Research Reports. The formatting of the draft article may differ from the author guidelines of the Human Resources for Health, the journal to which it is intended to be submitted, in order to comply with the University's style guide.

# Section 1: Review of the literature

## 1.1 Introduction

Operating theatres are potentially high-risk areas with complex work processes where the occurrence of errors has significant implications (1). Doctors have been slow in adopting the use of checklists despite its efficacy being demonstrated in other industries (2). Recognising the possible benefit of using a checklist, there has been a growing movement in the discipline of patient safety to adopt a checklist approach in specific areas of practice.

In the aviation industry, checklists were first adopted in the 1930s in response to a Boeing aeroplane crash (3). Boeing, a prominent aircraft manufacturer in the USA, submitted their model 299 for evaluation by the USA Army Air Corps. Shortly after take-off on the final test flight, the aircraft crashed, resulting in the death of two crew members, including an experienced military pilot. Investigations revealed that the crash was not due to any mechanical errors but rather pilot error. This new Boeing aircraft model was substantially more complex to fly than the previous aircraft. Following the accident, a group of test pilots designed a checklist for take-off, flight, landing and taxiing, which allowed pilots to fly this model for a further 1,8 million miles without an accident (3).

In the 1970s, aircraft crash investigators discovered that over 70% of crashes were due to human error rather than equipment failure or adverse weather conditions (4). Following the introduction of flight data recorders and cockpit voice recorders into modern aircraft, the Crew Resource Management program was developed. According to the United Kingdom civil aviation authority, Crew Resource Management is “a management system which makes effective use of all available resources to promote safety and enhance the efficiency of flight operations” thereby reducing error and avoiding stress. It encompasses a wide range of knowledge, skills and attitudes, including communication, situational awareness, problem-solving, decision-making and teamwork. Crew Resource Management training concepts have been modified for application in a range of industries where dangerous, time-critical decisions must be made, such as air traffic control, ship handling, fire-fighting and operating theatres (4).

In this section, development of the WHO Surgical Safety Checklist (abbreviated as WHO Checklist), its impact in reducing surgical adverse events, factors that affect acceptance of its use, opinions and attitudes of operating theatre staff to its use and modifications to improve acceptance and implementation are discussed.

## 1.2 WHO Surgical Safety Checklist development

In 2008, the annual volume of major surgery, according to data collected from 56 countries, was estimated to be 187 – 281 million (5). With a global peri-operative adverse event rate of 3% and a mortality rate of 0,5%, about seven million patients suffer complications each year and one million deaths occur due to surgical complications. Biccard et al (6), in the South African Surgical Outcomes Study, reported a mortality risk of 25,5% for urgent or emergency surgery and a risk of admission to critical care of 23,7%. Half of these adverse events are preventable. Therefore, the WHO identified surgical safety as a significant public health concern (2).

Challenges to improving surgical safety identified by the WHO include:

- under-recognition of surgical safety as an integral component of public health,
- a paucity of reliable data as well as lack of standardisation of data collected,
- unreliable surgical safety practices and the complexity of the problem, which involves multiple critical steps and teamwork.

In low-income countries, poor infrastructure and equipment, deficiencies in infection control, low quality of medications and unreliable supply, as well as difficulties in staff training and management compound the problem of surgical safety (2).

Working groups of international experts under the leadership of Dr Atul Gawande were therefore established by the WHO to achieve consensus on safety practices in four key areas: teamwork, anaesthesia, prevention of surgical site infection and measurement of surgical services (2). Lessons on safety from other high-reliability industries such as aviation, nuclear power and construction were reviewed and

adopted. The working groups reviewed how advancements made in the field of anaesthesia reduced mortality rates by more than 95% in one decade (7). They also considered how the mandatory implementation of a “surgical pause” prior to surgical incision in the United States of America (USA) reduced the rates of “wrong-site” or “wrong-patient” errors by improving communication between operating theatre team members. They further took into account how, in the study by Pronovost et al (8), the use of a checklist for central line insertion reduced catheter-related bloodstream infections by two thirds within three months. It was recognised that by identifying the basic components of care and standardising routines with tools such as checklists, reliability in surgical safety could be improved (2).

The WHO working groups concluded that the advantages of a checklist approach include memory recall, clarity on the minimum expected steps, encouraging teamwork and establishing a higher standard of baseline performance. The WHO implemented the WHO Surgical Safety Checklist in 2009 as part of the Safe Surgery Saves Lives campaign. The aim of the campaign was to identify a core set of safety standards that could be applied to settings around the world to improve the safety of surgical care. These safety standards were guided by three principles: simplicity, wide applicability and measurability (2).

Modern medicine is exceedingly more complex, specialised and interdisciplinary than in previous decades (9). A well-designed checklist standardises “what, when, how and by whom interventions are done and can reduce errors in routine and emergency situations.” They also provide a public framework to ensure adherence to clinical and procedural requirements. The WHO Checklist is the first major international collaboration to incorporate checklists in everyday clinical practice (10).

## 1.3 The WHO Checklist

The WHO Checklist illustrated in Figure 1 brings the surgical team together at the following three critical points during the surgical process:

- sign in: before administration of anaesthesia
- time out: immediately before surgical incision

- sign out: at the end of surgery before the patient is removed from the operating theatre (10).


**Figure 1: The WHO Surgical Safety Checklist (2)**

The key elements of the WHO Checklist are routinely practiced among nurses, anaesthetists and surgeons. The WHO Checklist provides an opportunity for information sharing between team members and concerns to be communicated timeously (10). Of importance is that the WHO Checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged. It is acknowledged that surgical care is complex, but in order to minimise loss of life and serious complications, the WHO Safe Surgery Saves Lives guidelines support 10 basic essential objectives in any surgical case (2).

- "The team will operate on the correct patient at the correct site.
- The team will use methods known to prevent harm from administration of anaesthetics, while protecting the patient from pain.

- The team will recognise and effectively prepare for life-threatening loss of airway or respiratory function.
- The team will recognise and effectively prepare for risk of high blood loss.
- The team will avoid inducing an allergic or adverse drug reaction for which the patient is known to be at significant risk.
- The team will consistently use methods known to minimise the risk for surgical site infection.
- The team will prevent inadvertent retention of instruments and sponges in surgical wounds.
- The team will secure and accurately identify all surgical specimens.
- The team will effectively communicate and exchange critical information for the safe conduct of the operation.
- Hospitals and public health systems will establish routine surveillance of surgical capacity, volume and results" (2).

## 1.4 Surgical adverse events

De Vries et al (11) defined adverse events as: "an unintended injury or complication resulting in a prolonged hospital stay, disability at the time of discharge or death and caused by healthcare management rather than by the patient's underlying disease process". Rolston et al (12) suggested that adverse events can further be classified into preventable and non-preventable. Non-preventable adverse events include accepted surgical complications such as the risk of haemorrhage. Preventable adverse events, conversely, include harm caused by errors such as "wrong-patient" or "wrong-site" surgery, failure to offer standard treatment such as deep venous thromboembolism prophylaxis and antibiotic prophylaxis in surgical patients (12).

The terms complications and adverse events are often used interchangeably. Complications, as opposed to adverse events, are usually less well defined and include all adverse events as well as harm related to the disease process rather than from medical care (12). Errors are acts or omissions that may lead to an undesirable outcome but also crucially include events that cause no harm, termed "near misses" or "close calls" (12).

In the USA, 9 744 malpractice claims were paid out for surgical adverse events between 1990 and 2010 and included claims for retained foreign bodies, “wrong-site”, “wrong-patient” and “wrong-procedure” surgeries which resulted in a mortality rate of 6,6 %, permanent injury in 32,9% and temporary disability in 59,2% of patients, at a cost of 1,3 billion dollars (13). It is estimated that 4 082 surgical adverse event claims occur each year in the USA, which is an underestimation of the true incidence because as many as 69% of patients do not file claims. Globally, the incidence is difficult to measure due to a lack of data and mandatory reporting (2).

Causes of surgical adverse events include lack of communication and teamwork, communication failure, fatigue and stress and failure of existing safety checks and safety systems (14). Doctors are prone to deny the effects of fatigue and stress on work performance and the use of a checklist may be beneficial in reducing errors, especially during after-hour work and emergencies (15).

Human error has long been recognised as an important factor in adverse outcomes (9). All tasks are prone to human error, given the limitations of memory and attention span and the ability to cope with stress, fatigue, illness, interruptions, new situations and production pressures. Hamilton (16) in 1979 had the view that anaesthetic deaths attributable to human error played a larger role than deaths due to other causes. The American Society of Anaesthesiology set up a Committee on Standards in the 1980s, which was lauded by other specialities for leadership in patient safety (7).

Sexton et al (17), as part of the University of Texas Human Factors Research Project, investigated teams at work in safety-critical environments such as aviation, space, maritime and medicine. The authors surveyed 1 033 health professionals working in operating theatres and intensive care units and compared their attitudes towards errors, stress and teamwork to those of about 30 000 airline cockpit crew. It was found that in medicine, errors are not universally acknowledged and appropriately handled, and there is pressure to cover up mistakes, overlooking opportunities for improvement, whereas the aviation approach is to deal with errors non-punitively and proactively. The authors also found that medical staff downplay the effects of stress and fatigue, whereas pilots

are the least likely to deny these effects and are trained to manage them appropriately. They found that surgeons are the least likely to support a flat hierarchy compared to cockpit crews and intensive care staff, and that surgeons perceive communication and teamwork to be of a higher quality than the rest of the operating theatre team. The research team's experience with the aviation industry has shown that highly effective cockpit crew use a third of their communications to discuss threats and errors in their environment, regardless of their workload, compared to only 5% in poor-performing teams. The authors concluded that the aviation industry has created a culture that deals more effectively with error than in healthcare (17).

In the medical field, numerous tools have been developed, such as incident reporting, morbidity and mortality reviews, case follow up for complications and root cause analyses of errors that have occurred to identify and prevent subsequent errors and complications (12). The WHO Checklist is one such tool and is also an example of systems thinking: the entire team is involved and leveraged to prevent mistakes, not just the surgeon. Studies on surgical adverse events emphasised that improving patient safety requires an analysis of the entire health system to which a patient is exposed (18). Thus, systems thinking is critical. Essentially, a complex system such as the medical one produces errors not only through technical mistakes and omissions but also through cultural, social and organisational problems. To prevent harm to patients, the system should be designed to detect errors and mitigate harm (18).

The underlying desire of the medical profession is to prolong and enhance the lives of patients who seek medical care (19). While it is understood that undesired outcomes may occur, acceptance of undesired outcomes has changed as medical science has progressed and patient expectations have risen (19). Preventing errors and adverse events not only benefits society, but there is evidence for both effectiveness and cost-saving with the implementation of the WHO Checklist (20).

## 1.5 Role of the WHO Checklist in reducing adverse events

Haynes et al (21) evaluated the WHO Checklist in 2009 in a prospective pre-intervention and post-intervention study at eight international pilot sites. This study

enrolled 3 733 patients at baseline and 3 955 patients post-intervention. The results demonstrated a decrease in the surgical complication rate from 11% at baseline to 7% after introducing the WHO Checklist. Mortality rates during surgery decreased from 1.5 to 0.8% post-checklist use. Appropriate antibiotic usage increased from 56 to 83%, correct site marking from 54 to 92% and overall clinical safety processes from 34 to 57% using the WHO Checklist. These results were consistent across all eight sites representing diverse socio-economic conditions. Based on the results of this study, the WHO Checklist was mandated for use in all hospitals in the United Kingdom by the National Patient Safety Agency (22).

Following these results, de Vries et al (23) conducted the SURPASS study in the Netherlands. This study examined the effects of a comprehensive, multidisciplinary checklist termed “SURgical PAtient Safety System: SURPASS”, which targeted the entire surgical pathway from admission to discharge, not only in the operating theatre. It included pre-operative, intra-operative, recovery room and post-operative checklist items with components to be completed by the ward doctor, nurse, surgeon, anaesthetist and operating theatre assistant. This study consisted of a pre-implementation baseline phase of three months and a post-implementation phase of three months. The SURPASS checklist was implemented at six academic hospitals, while five non-academic hospitals were used as controls. The post-operative complication rate in the intervention group was reduced from 27,3 per 100 patients at baseline to 16,7 per 100 patients post-checklist implementation. The in-hospital mortality rates decreased from 1.5% to 0,8% post-checklist implementation. The control groups demonstrated no reductions in post-operative complication and mortality rates. These results were statistically significant. The outcomes of the SURPASS study were comparable to the outcomes of the WHO Checklist study (21) but only applied to hospitals with a high baseline level of care (23).

Van Klei et al (24) evaluated the effect of the implementation of the WHO Checklist on mortality, and determined the extent of the relationship between mortality and checklist compliance. The authors performed a retrospective cohort study in a university hospital in the Netherlands from 1 January 2007 to 30 September 2010. The findings of this study were similar to the previous two

studies (21, 23), showing a reduction of in-hospital mortality rates in surgical patients following the use of the WHO Checklist. This reduction only occurred when the checklist was fully completed, implying a strong association between checklist compliance and reduced mortality rates (24).

Mayer et al (22) explored the relationship between WHO Checklist compliance and clinical outcomes after national implementation in the United Kingdom. A statistically significant reduction in complications was obtained when all three components of the checklist were completed. However, checklist completion was not associated with a reduction in mortality rates. This study also failed to ascertain to what extent WHO Checklist completion was a proxy for pre-existing safety attitudes within the operating theatre team (22).

To examine the impact of the WHO Checklist on operating theatre processes, safety-related issues and communication among surgical staff, Takala et al (15) surveyed nurses, anaesthetists and surgeons before and after implementation. It was found that WHO Checklist implementation increased the awareness of patient-related issues, the procedure being performed and the expected risks by the operating theatre team. Team communication improved, and communication failure decreased. Patient identification was confirmed more frequently, and operating theatre delays were reduced (15).

Further to these studies, specific items on the WHO Checklist were examined, such as its effect on compliance to venous-thromboembolism prophylaxis guidelines in general surgery inpatients. Truran et al (25) conducted a prospective study in a United Kingdom hospital in this regard. The authors found that the pre-checklist non-compliance rate to venous-thromboembolism prophylaxis guidelines was 6.9%. Six months after the WHO Checklist implementation, non-compliance was only 2,9%, with all other measures to improve compliance constant. This study confirmed the effect of the WHO Checklist on improving patient safety and preventing surgical complications (25).

Westman et al (26) examined another WHO Checklist item: the timing and administration of appropriate antibiotic prophylaxis in patients undergoing surgery. The authors analysed the effects of implementing the WHO Checklist on the

occurrence of post-operative neurosurgical infections using the Turku University Hospital's hospital-acquired infection register to obtain data on surgical site infections post-neurosurgery in 4 678 patients between 2007 and 2011. Infections were considered hospital-acquired if they occurred within 30 days of surgery, or within one year where foreign material was implanted. The study period was divided into pre- and post-implementation periods of the WHO Checklist. Results indicated that time from surgery to early-onset surgical site infection was shorter before than after WHO Checklist implementation, indicating a positive effect on the onset of early hospital-acquired infections. However, the WHO Checklist had no significant impact on the overall incidence of surgical site infection with 4,1% pre-implementation and 4,5% post-implementation. The authors concluded that more than a single checklist was required to prevent surgical site infections in complex neurosurgical patients (26).

In contrast to the pilot study by Haynes et al (21), a study conducted in Ontario, Canada, by Urbach et al (27) demonstrated no significant reduction in operative mortality or complications with the implementation of the WHO Checklist. This study was conducted during two three-month periods before and after the adoption of the WHO Checklist. Compliance rates for checklist completion were 99 to 100% during the study period. Results demonstrated a surgical complication rate of 3,86% before the use of the checklist and 3,82% after implementation and a mortality rate of 0,71% before implementation and 0,65% afterwards. The results obtained were unexpected and could not be explained by inadequate power as this study included over 200 000 surgical procedures in 101 hospitals. The authors considered the possibility that the WHO Checklist may be less effective in practice than suggested by existing literature, and that improved performance under observation, as well as publication bias (studies showing improvements in outcomes after checklist implementation are more likely to be published than are negative studies), may be possible explanations. Although this study concluded that using the WHO Checklist did not translate into meaningful improvements in surgical patient outcomes, the authors acknowledged that there is value in its use, such as enhanced communication, teamwork and the promotion of a safety culture (27).

Evidence for using the WHO Checklist has been criticised as lacking in randomised, control studies with a predominance of pre- and post-intervention study designs without controls (28, 29). There is also a lack of evidence for the WHO Checklist's effect on length of hospital stay and associated cost-savings. This led to the first randomised control trial in two hospitals in Norway to determine the effect of the WHO Checklist on in-hospital morbidity, mortality and length of stay (29). The order of the WHO Checklist implementation was randomised among five surgical specialities until, eventually, all specialities received the intervention. This allowed each group to switch from control to intervention at different study time points and resulted in 2 212 procedures falling into the control group and 2 263 procedures into the intervention group. Complication rates dropped by a statistically significant 42% following the introduction of the WHO Checklist. The largest effect was achieved when all three parts of the WHO Checklist were completed. Furthermore, mortality rates decreased from 1,6 to 1,0%, and length of in-hospital stay decreased by 0,6 days with significant cost-saving implications. These results were consistent with the findings of previous studies (21, 23, 24, 29, 30) regarding the effects of WHO Checklist use.

The WHO Checklist has been in use since 2009, and studies (21, 23, 24, 29, 30) across the globe have demonstrated its effectiveness in reducing surgical morbidity and mortality rates both in high- and low-income settings. As with any safety tool, the initial focus is on its impact at implementation, but gradually, the need arises to understand why and how the effect has been brought about to facilitate true behavioural change (22).

## 1.6 Factors that affect acceptance of the WHO Checklist

Scott and Shafi (1) describe operating theatres as hierarchical environments, reflected by the behaviour of team members. This can pose a challenge to acceptance of the WHO Checklist and developing a culture of teamwork. The value of using the WHO Checklist may only be understood and accepted when there has been an event that has a negative impact on the patient and the team (1).

Russ et al (31) identified barriers and facilitators to accepting the WHO Checklist across 10 hospitals in England from March 2010 – March 2011. Interviews with 119 operating theatre staff members were conducted and analysed. The following barriers were identified: resistance or non-compliance from senior staff members; lack of a planned approach in implementing the WHO Checklist; repetition of existing safety practices; the WHO Checklist being inappropriate for certain specialities or clinical situations; the WHO Checklist taking too long to complete and the process creating a false sense of security leading to complacency. Several facilitators for checklist implementation were also identified, such as providing supporting evidence to staff for its efficacy and relevance, adequate training sessions, provision of data and feedback, consequences for non-compliance, visible hospital management support, integration of the WHO Checklist into existing processes, strong leadership presence and a user-friendly WHO Checklist (31).

Peceny and Biffl (28) found that a planned approach to WHO Checklist implementation is required, such as leadership by senior surgical staff, design adaptations and proper training in order to overcome resistance. This addresses questions about the value of the WHO Checklist over other standardised processes as well as its usefulness in non-complex, routine procedures. The authors cautioned that complacent tick-box performance should not replace sound judgement, thoughtfulness and experience for patient safety. Checklists should also not be a solitary measure of the reliability of the safety environment but rather a method by which it can ensure the most basic steps to improve patient care is accomplished (28).

Winters et al (9) found that the excessive use of checklists may overburden clinicians, complicate tasks and reduce efficiency. Checklists should be succinct, unambiguous, focused and ultimately be effective and efficient. Poorly designed checklists hinder its acceptance and use. Checklists should be dynamic and incorporate emerging evidence to facilitate best practice patient care. Every item on the checklist should be supported by empiric and tacit evidence (9). Bosk et al (32) proposed that checklists have limitations and will not fix every safety problem. Extensive problems within an organisation will reduce it to a tick-box exercise,

adding no value. The authors echoed Russ et al's (31) findings that checklists might distract from how safer care is achieved and may lead to complacency (32).

## 1.7 Opinions and attitudes towards the WHO Checklist

In the medical field, clinicians have largely resisted checklists believing them to insult their intelligence and expertise, and doubt their effectiveness (9). Since implementation of the WHO Checklist, very little attention has been given to clinicians' opinions and attitudes to the checklist (33). Norton et al (33) surveyed operating theatre staff's attitudes and perceptions regarding the impact of the WHO Checklist in a paediatric academic medical centre. A year after its implementation, the survey was developed and distributed via e-mail to 196 operating theatre clinicians, which included nurses, anaesthesiologists, surgeons and surgical scrub technologists. The respondents generally felt that the checklist benefitted safety in the operating theatre, helped prevent errors and improved efficiency and workflow. Of respondents, 32% thought that the WHO Checklist was too long and that the content was not relevant to every procedure. Most respondents wanted the WHO Checklist to be used for their children if they required surgery, indicating that they believed that patients were safer with the checklist use than without it. Interestingly, this study found that nurses viewed the WHO Checklist more positively than other clinicians in improving efficiency, communication and safety (33).

A Brazilian public hospital study showed that the WHO Checklist was easy to use, improved communication and reduced operating theatre errors (34). However, 14% of surgeons surveyed considered it extensive and time-consuming. The attitude of surgeons to the WHO Checklist was found to hinder implementation and acceptance. Nurses in this study had a more positive attitude to the WHO Checklist than surgeons. When questioned on whether operating theatre team members would like the WHO Checklist performed if they were subject to surgery, 98% responded positively (34).

Similarly, Haynes et al (35) found that 93% of interviewees in their study would prefer the performance of the WHO Checklist if they were subject to surgery. In this study, a pre-intervention survey was completed by 281 respondents and a

post-intervention survey by 257 respondents in operating theatres at eight sites. The majority of the post-intervention survey respondents agreed that the WHO Checklist improved operating theatre safety and communication (80,2% and 84,8% respectively) and 78,6% believed that it helped prevent errors (35). This study concluded that there was an increase in safety climate and team function following the introduction of the WHO Checklist (35).

A study describing Swedish registered nurse anaesthetists' experiences with the WHO Checklist confirmed the popular opinion that it improved peri-operative care and increased a sense of teamwork (36). Negative aspects concerning its use included a lack of clarity on who was responsible for its completion and that it was time-consuming. Most of the nurse participants felt that the surgeon should be responsible for completion of the WHO Checklist, but that surgeons were often disinterested and of the opinion that the checklist was "unnecessary and inconvenient". This study demonstrated low compliance to completing the first part of the WHO Checklist as all the items had already been checked prior to the patient entering theatre. Limitations of this study included the small sample size and a questionnaire that was not psychometrically tested (36).

Vohra et al (37) distributed a short questionnaire across social media platforms to survey frontline medical professionals' attitudes to the WHO Checklist. The questionnaire was completed by 6 269 medical professionals identified as medical students, interns, residents and consultants from 69 countries in different global regions. Data were stratified according to age, gender, level of seniority, type of hospital and country's level of income. Countries were grouped into upper-income, upper-middle-income, lower-middle-income and low-income countries. The questions focused on attitudes to the WHO Checklist's usefulness, whether it prevented mistakes, caused delays and its effectiveness. This study found that increasing age, female gender, increasing seniority and university teaching hospitals were associated with increased routine use of the WHO Checklist. Fewer respondents routinely used the WHO Checklist in lower-middle-income countries than high-income countries (43,5% versus 83,5%). The WHO Checklist was believed to be helpful by 66,7% of respondents and 64,3% felt it prevented mistakes. However, 12,2% of respondents thought it caused delays and 6,2% did

not believe it worked. Of concern was that the WHO Checklist use was lowest in lower-middle-income countries where its benefits may be the greatest. This was attributed to a lack of the resources required to effect implementation and secure compliance. This study identified that local leadership and championing by senior staff is required for successful implementation of the WHO Checklist and that improved education on its benefits should be integrated into under- and post-graduate training programs (37).

Haugen et al (38) examined the impact of the WHO Checklist on safety culture in the operating theatre of a single university hospital in Norway. Pre- and post-intervention surveys using both intervention and control groups over a nine-month period were conducted among a total of 641 participants. The response rate was 61% at baseline and 51% post-intervention. The researchers described safety culture as a combination of attitudes, common thoughts and behaviour of personnel within an organisation, with regards to safety. They found that WHO Checklist implementation had a limited impact on safety culture at this hospital even though compliance rates were high (77 to 85%) and successful implementation strategies were used. The explanation for these results was that baseline safety culture levels were already high with a ceiling effect, the study timeline was too short or that safety culture and safety checklists were unrelated (38).

From the discussed studies, it is evident that majority of clinicians surveyed find the WHO Checklist to have a positive impact on patient safety, believe in its effectiveness in reducing morbidity and mortality and that it improves teamwork and communication. Of concern are the findings that surgeons, who are often considered team leaders in the operating theatre, are the least likely to support the checklist as well as the low checklist utilisation rates in lower-middle-income countries.

## 1.8 Modifications to improve acceptance and implementation of the WHO Checklist.

The WHO Checklist contains the statement at the bottom that, “This checklist is not intended to be comprehensive. Additions and modifications to fit local practice

are encouraged" (2). The WHO encourages modifications to its checklist to suit local needs, create a sense of ownership and foster buy-in. However, the WHO Checklist should retain key safety steps and not be reduced to a regulatory or administrative tool (2).

Solsky et al (39) analysed 155 WHO Checklists from hospitals in the USA and other English-speaking countries to determine if any modifications were made and the extent thereof. All the checklists were modified. The most frequently added items were related to the need for special equipment or implants, deep venous thrombosis prophylaxis, patient positioning, hypothermia, and an opportunity to discuss remaining safety issues. The most frequently removed items from the WHO Checklist were the pulse oximeter check, the articulation of patient-specific concerns, the surgeon-led discussion on anticipated blood loss and the case duration. Other WHO Checklist modifications included the addition of the hospital name or logo, space for a patient sticker, space for written comments and an instruction to submit the checklist. Modifications to the background and text colours were also found. This study found that the WHO's call to customise the WHO Checklist was heeded but of concern was the removal of items from the Anticipated Critical Events section, which is intended as a moment to open communication between all team members. Checklists that remove or alter conversation prompts are at risk of turning into tick-box exercises rather than an opportunity to facilitate communication (39).

One of the frequently overlooked aspects of WHO Checklist completion is visibility and readability by the entire surgical team (40). An operating theatre team at a Washington University hospital computerised the WHO Checklist and displayed it on a large, centrally located wall-mounted flat screen, which the team completed together. A quality improvement study conducted with trained observers found a reduction in missed checklist items, increased team participation and a decreased level of distraction (40).

Although checklist customisation is encouraged by the WHO, it is important to maintain its core components of being simple to implement, promoting teamwork and communication, and as a tool for safety processes (39).

## 1.9 Summary

Checklists have shown great utility in a variety of industries. The use of the WHO Checklist is variable across the world, across countries and cities and even within facilities with implications for patient safety. Many barriers to implementing the WHO Checklist are described and strategies to overcome them are available. It is important for the upcoming generation of nurses, anaesthetists and surgeons to view the WHO Checklist as a tool for improving operating theatre teamwork and communication and not just as a memory aid. Future challenges faced by WHO Checklist use include sustaining its effectiveness, maintaining enthusiasm for its support and use and modifying it to suit different environments (41).

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# Section 2: Author guidelines

Human Resources for Health

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### Abstract

The Abstract should not exceed 350 words. Please minimize the use of abbreviations and do not cite references in the abstract. Reports of randomized controlled trials should follow the CONSORT extension for abstracts. The abstract must include the following separate sections:

- **Background:** the context and purpose of the study
- **Methods:** how the study was performed and statistical tests used
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- Consent for publication
- Availability of data and materials
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- Funding
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- All data generated or analysed during this study are included in this published article [and its supplementary information files].
- The datasets generated and/or analysed during the current study are not publicly available due [REASON WHY DATA ARE NOT PUBLIC] but are available from the corresponding author on reasonable request.
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## Figures, tables and additional files

See General formatting guidelines for information on how to format figures, tables and additional files.

# Section 3: Draft article

# Perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist

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**Keywords:** WHO Surgical Safety Checklist, patient safety, operating theatre, perioperative team, perceptions
**Trial registration:** Not applicable

## Abstract

### Background

The WHO Surgical Safety Checklist (WHO Checklist) fosters communication and teamwork between the perioperative team and perceptions influence its acceptance and use. This study explores the perceptions of the perioperative team to the WHO Checklist in operating theatres at the University of the Witwatersrand affiliated hospitals.

### Methods

A qualitative, contextual, exploratory research design was employed. Purposive sampling was used to invite theatre nurses, anaesthetists and surgeons to participate. Focus group interviews were held for each group. Interviews were audio-recorded and transcribed verbatim. Thematic analysis was used to analyse the data.

### Results

Ten nurses, 6 anaesthetists and 4 surgeons participated in the focus group interviews. Four themes relating to patient safety were identified namely, the prevalence of power struggles in theatre, a breakdown in communication, a culture of silence and the inadequate and siloed training. The perceptions of the perioperative teams interviewed describe a daily flight plagued by turbulence that may result in serious adverse events.

### Conclusion

In a complex system such as a hospital theatre environment, the introduction of a simple tool such as the WHO Checklist has a limited impact on patient safety if the underlying supportive network is not intact. This study demonstrates the importance of interpersonal relationships, changing teams and lack of integration of teams, processes and training, on the use of the WHO Checklist as a safety tool in a South African hospital setting. A prevailing culture of safety is a prerequisite for successful implementation and use of the WHO Checklist.

## Introduction

Gawande et al (1) state that surgery has been an essential component of public health care for over a century. Complications of surgical care have become a major cause of death and disability worldwide, with half of these complications being preventable (2, 3). Gawande et al (1) highlighted that almost seven million surgical patients suffer serious complications each year, and one million die during or immediately after surgery. In South Africa, Biccard et al (4) reported a mortality risk of 25,5% for urgent or emergency surgery and a risk of admission to critical care of 23,7%. Operating theatres are complex, stressful environments, with the most critical resources the nurses, anaesthetists and surgeons' knowledge and experience. Effective teamwork can avert a considerable proportion of life-threatening complications. However, perioperative teams have had little guidance in fostering effective teamwork (1).

The World Health Organization (WHO), urged by the World Health Assembly in a 2002 resolution to strengthen the safety of health care and monitoring systems, recognised surgical safety as a significant public health concern (1). The WHO also realised that surgical safety in developing countries is further compounded by lack of resources, skills shortages and under-financing. The WHO developed Safe Surgery Guidelines in 2007 in collaboration with experts worldwide and launched the Safe Surgery Saves Lives Programme. In 2009, the WHO introduced the WHO Surgical Safety Checklist, hereafter referred to as the WHO Checklist, as part of its Safe Surgery Saves Lives programme. The WHO Checklist was designed to promote safety by ensuring pre-operative, intra-operative and post-operative safety checks are undertaken in a timely and efficient manner, open communication and foster teamwork. Its aim was not to create a regulatory tool but rather to introduce key safety elements into the operating theatre routine without undue burden on the system or the providers (1).

Following its introduction, the effects of using the WHO Checklist were tested at eight international pilot sites representing diverse socio-economic conditions (5). The results demonstrated a significant reduction in surgical complication rates and mortality rates post-checklist use (5). These results were reproduced in subsequent studies (6-8) at different sites worldwide and led to the widespread

use of the WHO Checklist. Further studies revealed that using the WHO Checklist improved communication between operating theatre staff, positively impacting patient safety and avoiding errors (9-11).

However, health care workers often view the WHO Checklist with scepticism (10, 12), and in some settings, it has been reduced to a mere tick-box exercise (13). Some of the criticisms by health care workers are that the WHO Checklist is too time-consuming, repetitive of existing safety practices and inappropriate in certain surgical cases (14). Quantitative studies have demonstrated that attitudes and opinions differ between health care workers in the same healthcare setting (10-12). Also, a lack of training on its use, poor implementation strategies and a lack of leadership contribute to a negative attitude (14). Haugen et al (15) demonstrated a ceiling effect using the WHO Checklist in settings where compliance to safety practices was already high. This raised the possibility that safety culture and the use of the WHO Checklist are unrelated (15). The aim of this study was to explore the perceptions of the perioperative team regarding the use of the WHO Checklist in the operating theatres at the University of the Witwatersrand (Wits) affiliated hospitals.

**Methods**

A qualitative, contextual, exploratory research design was followed. The Wits Human Research Ethics Committee (Medical) (M191123) approved the study.

The study population consisted of the perioperative teams working in the operating theatres at the three main Wits affiliated hospitals. These hospitals have a total of 4 588 beds and 53 theatres performing more than 96 500 surgeries annually. In this study, the perioperative team refers to all theatre nurses, anaesthetists and surgeons. The sample consisted of three focus groups aiming to include 6 to 9 participants per group. Purposive sampling was employed to ensure rich data. Interns, nursing and medical students were excluded.

Due to power relations in the perioperative team, the focus groups were divided into nurses (10 participants), anaesthetists (6 participants) and surgeons (4 participants). The anaesthetists and surgeons rotate between the three hospitals and the nurses represented all three hospitals. The primary author (NS) facilitated

the interview process and was supported by an experienced moderator (JS). The interviews were held in a private, permissive, non-evaluative and non-threatening environment to facilitate group discussion. Participation was entirely voluntary. The direction of the interview was not pre-determined, but an interview guide was used.

Participants were greeted and welcomed by NS and JS and offered light refreshments. A few minutes were spent on introductions. At the beginning of the session, NS explained the reason for the interview and provided a brief description of the study aim. Participants signed two consent forms, one to participate in the study and the other to be audio-recorded during the interview. The author outlined the process of the session and explained that the participants were not being evaluated or judged and that their input was important in improving the understanding of the topic being researched. Participants were encouraged to freely express their emotions, opinions and experiences. Access to recordings was limited to the authors. The focus group interviews lasted 60 to 90 minutes. Field notes were used to increase the richness of the data collected and its interpretation. Two smartphone devices placed on the table were used to record the interviews. NS transcribed all audio recordings from the focus group interviews verbatim which were verified for accuracy by NS and JS and one person from each focus group. Thematic analysis, according to Braun and Clark (16), was used to analyse the data.

Trustworthiness was ensured as proposed by Lincoln and Guba (17). Credibility was ensured by the range of participants validating the data by providing their own multiple perspectives of the subject within the group, and by returning the transcripts to participants for final validation. Transferability of the data was enabled by providing context to the environment and population being studied. A detailed description of the methodology allows for dependability. The primary author reflected on her role as an anaesthetist in this environment and acknowledged the impact on her interpretation of the data. This study ensured authenticity by comprehensively recording data and giving examples of contextual descriptions by participants to illustrate the interpretation of the information collected.

## Results

A summary of the focus group sessions and participants is shown in Table 1. Only four surgeons were available to attend due to service delivery commitments. All three focus group interviews yielded lively discussions.

**Table I – Summary of focus group sessions and participants**

| Group | Nurses | Anaesthetists | Surgeons |
|---|---|---|---|
| Total | 10 | 6 | 4 |
| Males | 1 | 1 | 4 |
| Females | 9 | 5 | |
| Range of experience (years) | 2 – 29 | 5 –11 | 3 – 5 |
| Age group: <50 years | 9 | 6 | 4 |
| >50 years | 3 | | |
| Duration of interview | 1hr 1min | 1hr 18min | 48min |

Checklists in the aviation industry for seemingly mundane tasks avoid the costs of human error. They reduce the reliance on human judgement and memory. Similarly, anaesthesia is often likened to flying a plane, with induction equating to take-off, maintenance to cruising altitude and landing to emergence. Numerous processes need to dovetail, and anaesthetists must be in tune with the rest of the team and rely on their skills and experience to safely land the patient. The team huddle, where the planned operating schedule for the day and specific changes and concerns are discussed, followed by WHO Checklist completion for each patient, are critical components in creating teamwork and a safety culture in theatre.

The WHO Checklist was introduced in South African hospitals to foster teamwork and communication and to mitigate the potential for error and serious adverse events. However, the participants describe a daily flight plagued by turbulence that may result in serious adverse events. The theatre process is perceived as generally disjointed, characterised by a breakdown in communication and teamwork, both in the microcosm of a theatre environment and the macrocosm of

a hospital system. They describe the response to adverse events as reflecting toxic hierarchies and a culture of silence with limited accountability. Participants use the correct buzzwords but lack a deeper knowledge and understanding of the relevance of the WHO Checklist for patient safety.

The perceptions among participants from the perioperative teams (nurses, anaesthetists and surgeons) of the WHO Checklist and its usage revealed four themes relating to patient safety: the prevalence of power struggles, a breakdown in communication, a culture of silence and the inadequate and siloed training. The perioperative period depicted as a turbulent flight is illustrated in Figure 1.

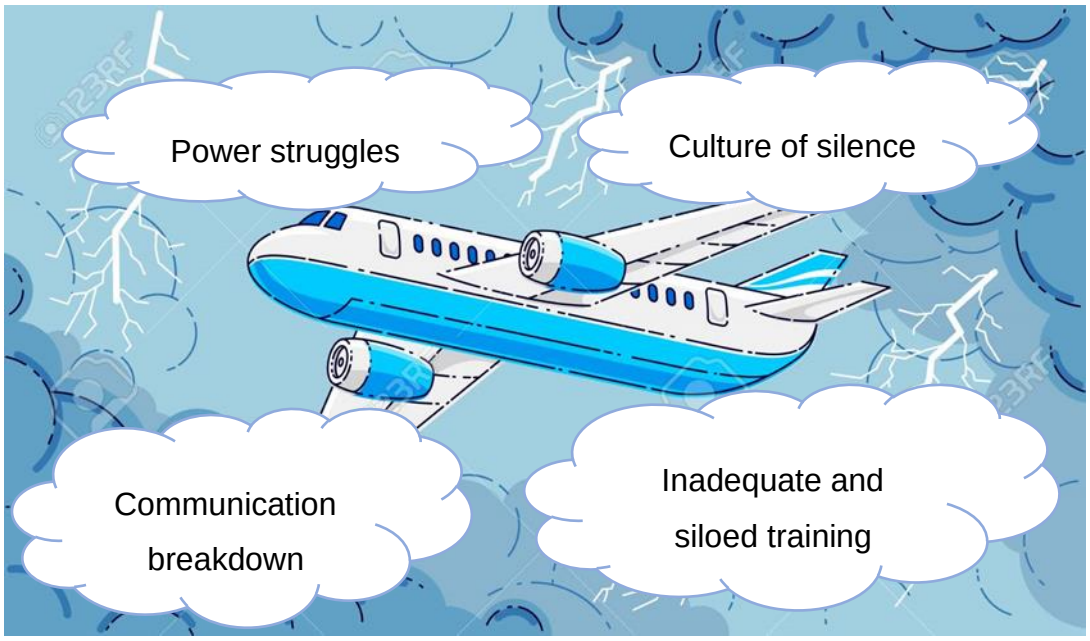


**Figure 1 – The perioperative period depicted as a turbulent flight buffeted by several factors**

**Prevalence of power struggles in theatre**

Participants in this study outlined the daily power struggles between nurses, anaesthetists and surgeons in theatre. They also recognised the benefits of using theWHO Checklist. When power was wielded by a senior, respected member of the operating team to create a positive working environment, patient safety was enhanced.

"*There is harmony when we started the list and there was peace and there was a team. And then the likelihood of incidences become low, because there is support"* (N1).

Certain surgical disciplines (vascular surgery and arthroplasty) conducted a team huddle at the beginning of the surgical list followed by WHO Checklist completion for every patient. Usually, a senior surgeon drove the process of getting everyone in theatre to stop and pause for the huddle.

"*It's a person of authority who drives that moment of silence"* (A2).

In theatres where good relationships already existed between nurses, anaesthetists and surgeons, everyone felt part of the team, and the person of authority wielded that power to a positive outcome.

In most hospital theatres, complex power relationships exist. Participants described fractious relationships between nurses, anaesthetists and surgeons. These were further complicated by the embedded hierarchy between senior and junior team members. Nurses perceived anaesthetists as afraid of the surgeons, while surgeons perceived nurses as being in control of theatre. Anaesthetists felt that surgeons wielded power in theatre and set the tone for the prevailing culture, stating,

"*If the surgeon takes it seriously, then everyone else does*" (A2).

They further described the power struggles evident between anaesthetists and surgeons:

*"The problem boils down to the attitude between surgeons and anaesthetists in terms of who drives this. Because the reality here is surgeons are in charge, we like to think we're running the show, but the surgeons are in charge*" (A1).

The surgeons interviewed acknowledged that the hierarchical structure made the theatre environment particularly challenging.

> "*I don't think there is a flat hierarchy in medicine by any stretch. So, it can be a challenging environment to manage the egos, let's call it, in theatre*" (S1).

Surgeons perceived that nurses controlled whether the WHO Checklist was completed or not.

> *"… it feels from my perspective like it is administered by the nurses and they take control by asking us the questions"* (S4).

The surgeons admitted to relegating the morning huddle in theatre to the most junior team members, who lacked insight into the potential pitfalls of the cases ahead. This practice was attributed to being part of the training culture for the junior surgeon. Junior team members admitted to succumbing to intimidation and being placed in situations beyond their comfort levels.

> *"I must say that I often do succumb to intimidation and yes, I'm not comfortable about it, but it's a dynamic that exists"* (A5).

Anaesthetists felt that the hierarchical relationships in theatre created a sense of helplessness in taking any initiative. They described feelings of powerlessness and pressure from their seniors to move ahead with the theatre list.

> "*You keep your head down until there's like a real disaster*" (A2).

Anaesthetists viewed WHO Checklist initiation as one of the nurse's duties and described surgeons as unwilling to take responsibility for patient safety processes in theatre.

> "*They're in charge of theatre but they don't want to be stuck in with all the nitty-gritty stuff*" (A2).

Nurses were tasked with initiating the WHO Checklist in theatre but perceived disinterest and negativity from the rest of the team. They described surgeons as irritated when asked to pause and impatient to push forward with the surgical list. They expressed feeling disrespected and unsupported by the rest of the operating team.

*“Now it becomes a nurse’s duty. Where is the respect there? Because this is a team effort”* (N5).

This created a work environment fraught with frustration and resentment.

“*If you keep on continuing getting resistance, you end up demotivated to do the right thing*” (N1).

**Breakdown in communication**

Miscommunication between a pilot, his crew and air traffic control can be catastrophic. Miscommunication between operating team members performing complex procedures leads to adverse patient outcomes. The WHO Checklist was introduced as a tool to facilitate communication, starting with basic personal introductions. An important component of open communication is addressing each other by name.

“*If you address someone by their name, I think you get a better response, more participation*” (S3).

Anaesthetists acknowledged that open communication was essential to raise any patient issues, “*I do think it makes it easier to voice concern*” (A2). Participants across groups confirmed that good communication improved participation and brought attention to the procedure being performed by focussing on the patient.

“*I feel that if everybody is participating, everyone is concerned about this patient*”(N2).

“*When everyone is on the same page, there seems to be a lot more focus*” (S3).

Furthermore, when surgeons initiated completion of the WHO Checklist, it decreased the tension in theatre and created a more harmonious environment, improving workflow and theatre efficiency.

Even though participants were aware of the importance of communication, the daily practice was far more disjointed. When trying to complete the WHO Checklist, nurses complained of being met with sarcasm and disinterest by

surgeons and anaesthetists. They experienced a reluctance by the other team members in sharing information with them, stating,

> "*They don't tell you anything. They don't want to participate*" (N2).

Surgeons viewed this lack of communication and participation differently. They felt pressured to proceed with surgery, especially in an emergency, and to complete theatre lists. They viewed pausing to complete the WHO Checklist as wasting time and said that it was irrelevant to them.

> *"I think irrelevant to me as a surgeon, but I'm sure it's still got some relevancy to nursing staff, to anaesthesia, the machine checks etc"* (S1).

Surgeons also doubted the commitment of nurses to the process, regarding it as a tick-box exercise.

The anaesthetists interviewed acknowledged that they often turned a blind eye to whether the WHO Checklist was completed or not. They displayed a lack of initiative and ownership of the safety practices in theatre, admitting,

> "*I think we have a role to play to reinforce the actual Checklist itself, not just if it's not done, it's not done, it's not my problem*" (A4).

They expressed that facilitating communication in theatre with the aid of the WHO Checklist was everyone's responsibility.

> "*It shouldn't just be the sole responsibility of the nurse to grab everyone's attention. I think we should all have an onus upon ourselves to say that, okay, this is important*" (A5).

It became apparent from the focus group interviews that the WHO Checklist enhanced teamwork and good communication rather than created it. Operating team members felt that they needed to get to know each other first by working together regularly, to build up trust relationships.

> "*You get to know your team; you know the weak points. You know their strengths and actually it makes a big difference"* (A2).

Participants further proposed that interdepartmental communication was essential to create a consistent safety culture across all theatres.

**A culture of silence**

Silence and personal blame characterised the response to an adverse outcome. This is seen in the aftermath described after a patient fell off an operating theatre table.

> "*It becomes very personal, that you were at fault*" (A1).

This participant was discouraged by a senior colleague from openly discussing the event. This, however, did not prevent clandestine discussions in corridors among colleagues. Such events lead to a culture of non-disclosure with participants fearing reprimand and blame.

> "*If I don't feel like talking about it, I'm not going to tell anyone*" (A3).

Surgeons interviewed, detailed the process following an adverse event in their department,

> *"In surgery, we've got a pretty robust M&M [morbidity and mortality] system. We do weekly M&Ms and we're harsh on each other, let's put it that way"* (S1).

A participant described his experience following an adverse event and the personal blame and regret he felt.

> "*We had an incident at … hospital where a few registrars were reprimanded because we operated on the wrong kidney. So, I feel like if only we stopped for a second to do the checklist that day, probably that would never have happened"* (S2).

Nurses' perceptions were that patient safety was only taken seriously after an adverse event had already occurred, or when a team member faced litigation.

> "*Those who experience litigations, they follow the proper things*" (N4).

Nurses believed that when an adverse event occurred, team members scrambled for cover and searched for a scapegoat. This once again perpetuated the culture of silence. None of the participants in this study experienced formal debriefing processes following adverse events.

**Inadequate and siloed training**

Effective training on the use and implementation of the WHO Checklist is imperative for its successful introduction. In the hospitals studied, it was apparent that WHO Checklist training and implementation was inadequate, lacked depth, siloed into different departments and further siloed within departments to different ranks. Of the three focus groups interviewed, the nurses were the most familiar with the contents of the WHO Checklist. A random pattern to the training emerged reflected by,

> *"Other people would have been taught maybe in the seminar, or another person would have been taught maybe by a colleague. Another person would have been taught by somebody that is senior*" (N1).

Nurses acknowledged that the inadequate training resulted in knowledge gaps and understanding of the WHO Checklist and its role in patient safety. They also lacked training on how to implement the WHO Checklist.

Surgeons interviewed held the perspective that the WHO Checklist belonged to nurses but that they lacked understanding of it. This view was echoed by the anaesthetists who believed the nurses lacked training.

> "*I just don't think the nursing staff actually receive training on the WHO form*" (A2).

Participants admitted to their own lack of knowledge and understanding of the WHO Checklist.

> "*If you had to ask one of us now, what are the components of the checklist, we probably won't know, and the assumptions that we think we know is not a true reflection of how much we know*" (A4).

Neither the surgeons nor the anaesthetists demonstrated buy-in to the WHO Checklist use and training.

> "*Imagine if we announced a compulsory workshop for all theatre staff on the Checklist and how we run it. Can you imagine the complaints? Or not even complaints, I don't think people would come*" (A1).

From the interviews, it was evident that WHO Checklist training at the hospitals studied was sporadic and existed in departmental silos. Most participants lacked insight into its relevance to them and lacked a deeper understanding of its relevance to patient safety.

## Discussion

In our study, participants agreed that WHO Checklist use impacted patient safety positively and helped reduce adverse events, using all the appropriate buzzwords. On deconstruction, a turbulent picture of the operating theatre environment emerged. Participants described disinterest and resistance to using the WHO Checklist, deeming it redundant, time-consuming, and irrelevant. Russ et al (14) demonstrated similar barriers to WHO Checklist completion across hospitals in England interviewing operating theatre staff. Nurses in our study perceived the greatest negativity from surgeons when attempting to complete the WHO Checklist. Ronnberg et al (18) reported similar results surveying Swedish nurse anaesthetists. In our study, nurses were the most accepting of the WHO Checklist and viewed it positively, similar to Norton et al (11) and Santana et al's (10) findings. Sexton et al (19) found in their research that doctors are the most likely to deny the effects of stress, fatigue and human error and, therefore, the most likely to resist the use of a checklist. Of concern was that Vohra et al (12) found the lowest WHO Checklist use in lower-middle-income countries where patient safety is a greater challenge (1). Although South Africa is classified as an upper-middle-income country (20), many hospitals operate in a resource-constrained environment. A cost-effective tool such as the WHO Checklist would be an added benefit to improving patient safety.

Our study demonstrates that using the WHO Checklist has a limited impact on improving safety culture. The pre-existing safety culture in our operating theatres is influenced by individual behaviour and attitudes as well as hierarchical structures. Daily power struggles play out between nurses, anaesthetists and surgeons and between senior and junior team members. Safety-related tasks such as WHO Checklist completion are relegated to junior team members, who lack insight into potential patient complications. A breakdown in communication and lack of teamwork makes WHO Checklist completion challenging. Scott and Shafi (21) noted that empowered theatre environments where open discussion is encouraged generate a culture of safety in which tools such as the WHO Checklist are valued. Interestingly, in environments with a high baseline safety culture, the WHO Checklist had a limited impact on improving patient safety, as demonstrated

in Canada (22) and Norway (15). A baseline culture of safety is required for the WHO Checklist to be accepted, but it fails as a sole instrument to create a culture of safety.

Organisational problems contribute to the WHO Checklist being reduced to a tick-box exercise (13). Participants in our study detailed a theatre environment with sporadic leadership depending on individual personalities and a visible lack of support from management. Inadequate and siloed training and implementation strategies were among the organisational problems encountered. Kappagoda (23) detailed how systems thinking is necessary to improve patient safety. The patient is exposed to the entire hospital system. Cultural, social and organisational problems as well as technical errors will lead to the occurrence of adverse events. Systems thinking promotes proactive solutions when potential errors are identified (23). Bosk et al (13) cautioned on the limitations of checklists: they will not fix every safety problem. Russ et al (14) found that checklists might distract from how safer care is achieved, leading to a false sense of security on patient safety issues. Our operating theatres require a shift to address organisational problems, focussing on interdepartmental communication and comprehensive training programs.

The management of adverse events in our study is mostly reactionary and punitive. Staff are discouraged from open discussions, experience personal blame and no feedback is given after an adverse event. This is in contrast to the aviation industry, which fosters a flat hierarchy, encouraging open communication and dealing with adverse events non-punitively and proactively (19). This has led to improved safety in the aviation industry. A similar approach is required in the medical field to effect improved patient safety.

Although the initial studies (5, 7, 9, 24) on WHO Checklist implementation conveyed a positive outcome on patient safety, it has since been recognised that patient safety is a complex problem that a simple checklist cannot fix (13). Unlike the aviation industry, checklists are not broadly accepted in the medical field in ensuring a safe flight through patient care. Broader organisational problems need to be addressed, systems need to be reviewed, and a theatre environment

promoting a culture of safety is required for a tool such as the WHO Checklist to be effective.

## Conclusion

In a complex system such as a hospital theatre environment, the introduction of a simple tool such as the WHO Checklist has a limited impact on patient safety if the underlying supportive network is not intact. This study demonstrates the importance of interpersonal relationships, changing teams and lack of integration of teams, processes and training, on the use of the WHO Checklist as a safety tool in a South African hospital setting. A prevailing culture of safety is a prerequisite for successful implementation and use of the WHO Checklist.

## Conflict of interest

The authors declare that we have no financial or personal relationships, which may have inappropriately influenced us in writing this paper.

## List of abbreviations

| | |
|---|---|
| M&M | Morbidity and mortality |
| WHO | World Health Organisation |
| WHO Checklist | WHO Surgical Safety Checklist |
| Wits | University of the Witwatersrand |

## Declarations

## Ethics

The Wits Human Research Ethics Committee (Medical) (M191123) approved the study.

## Consent for publication

Not applicable.

## Availability of data and material

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

## Competing interests

The authors declare that they have no competing interests.


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No funding was received.


## Authors' contributions

NS and JS: Overall conception and design of study, acquisition and analysis of data, writing of first draft of manuscript, critical revising of manuscript for submission and final approval of manuscript for submission.
HP and NS: Overall conception and design of study, analysis of data, writing of first draft of manuscript, critical revising of manuscript for submission and final approval of manuscript for submission.


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## Section 4: Proposal

# Perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist

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## 4.1 Introduction and problem statement

Gawande et al (1) state that surgery has been an essential component of public health care for over a century. Complications of surgical care have become a major cause of death and disability worldwide, with half of these complications being preventable (2, 3). Almost seven million surgical patients suffer serious complications each year, and one million die during or immediately after surgery. Operating theatres are complex, stressful environments, with the most critical resources being the knowledge and experience of the surgeons, anaesthetists and nurses. Effective teamwork can avert a considerable proportion of life-threatening complications. However, operating theatre personnel have had little guidance in fostering effective teamwork (1).

The World Health Organization (WHO) urged by the World Health Assembly in a 2002 resolution to strengthen the safety of health care and monitoring systems, recognised surgical safety as a significant public health concern (1). The WHO also realised that surgical safety in the developing world is further compounded by lack of resources, skills shortages and under-financing. The WHO developed Safe Surgery Guidelines in 2007 in collaboration with experts from around the world and launched the Safe Surgery Saves Lives Programme. In 2009, the WHO introduced the WHO Surgical Safety Checklist, hereafter referred to as the WHO Checklist, as part of its Safe Surgery Saves Lives programme. The WHO Checklist was designed to promote safety by ensuring pre-operative, intra-operative and post-operative safety checks are undertaken in a timely and efficient manner, to open communication and to foster teamwork. Its aim was not to create a regulatory tool but rather to introduce key safety elements into the operating theatre routine without placing an undue burden on the system or the providers (1).

Following its introduction, the effects of the use of the WHO Checklist were tested at eight international pilot sites representing diverse socio-economic conditions (4). The results demonstrated a significant reduction in surgical complication rates and mortality rates post-checklist use (4). These results were reproduced in subsequent studies (5-7) at different sites worldwide and led to the widespread

use of the WHO Checklist. Further studies revealed that using the WHO Checklist improved communication between operating theatre staff with a positive impact on patient safety and the avoidance of errors (8-10).

However, healthcare workers often view the WHO Checklist with scepticism (9, 11), and in some settings, it has been reduced to a mere tick-box exercise (12). Some of the criticisms by healthcare workers are that the WHO Checklist is too time-consuming, repetitive of existing safety practices and inappropriate in certain surgical cases (13). Studies have demonstrated that attitudes and opinions differ between healthcare workers in the same healthcare setting, with greater acceptance of the WHO Checklist by nurses and anaesthetists than by surgeons (9-11). Also, lack of training on its use, poor implementation strategies and lack of leadership contribute to a negative attitude towards its use (13). Haugen et al (14) demonstrated a ceiling effect with the use of the WHO Checklist in settings where compliance to safety practices was already high. This raised the possibility that safety culture and the use of the WHO Checklist are unrelated (14).

The WHO Checklist has been in use since 2009 in hospitals around the world (7). In some South African hospitals, its use has been adopted as a standard of care in an attempt to improve patient safety. However, anecdotally it is known that the adoption of the WHO Checklist is not uniform or universally accepted and supported. The reasons for this are complex and vary between surgeons, anaesthetists and nurses in the operating theatre. Perceptions of the WHO Checklist such as being too time-consuming, repetitive, unnecessary, causes delays or that it promotes safety culture and improves communication and teamwork, affect its acceptance and use. The perceptions of the perioperative team regarding the use of the WHO Checklist in the operating theatres at the University of the Witwatersrand (Wits) affiliated hospitals are not known.

## 4.2 Aim and objectives

### 4.2.1 Aim

The aim of this study is to explore the perceptions of the perioperative team regarding the use of the WHO Checklist in the operating theatres at the Wits affiliated hospitals.

## 4.3 Research assumptions

The following definitions will be used in this study.

**Perioperative team:** the operating theatre staff responsible for the patient's wellbeing while the patient is in the operating theatre. These will include surgeons, anaesthetists and nurses.

**Surgeons:** are qualified doctors working in the Department of Surgery, including medical officers, registrars and consultants.

**Anaesthetists:** are qualified doctors working in the Department of Anaesthesiology, including medical officers, registrars and consultants.

**Nurses:** will include scrub, anaesthetic and floor nurses. The nurses can be professional, enrolled or auxiliary nurses.

## 4.4 Demarcation of study field

The study will be conducted among the perioperative team working in the following hospitals which are affiliated to Wits.

- Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), a 1 200-bed central hospital.
- Chris Hani Baragwanath Academic Hospital (CHBAH), a 2 888-bed central hospital.
- Helen Joseph Hospital, a 500-bed regional hospital.

## 4.5 Ethical considerations

Approval to conduct the study will be obtained from the Human Research Ethics Committee and the Graduate Studies Committee of Wits, the CEO of CMJAH, the medical advisory committee of CHBAH and the Helen Joseph research committee. Consent to conduct the study was obtained from the Heads of Departments of Anaesthesiology and Surgery as well as the Operating Theatre Nursing Managers of the respective hospitals (Appendix B).

Surgeons, anaesthetists, and nurses will be approached. The study will be explained to them and they will be invited to participate. Those who agree will be provided with an information letter (Appendix C) and will also be required to sign an informed consent (Appendix D) and consent to be audio recorded (Appendix E).

Anonymity of the participants cannot be assured, however, participants will be requested to keep the focus group interview confidential. Data will be collected without identifying information and a study number will be used. A list of participant names and study numbers will be compiled and filed separately. Only the researcher and supervisors will have access to the raw data, thereby ensuring confidentiality. Audio recordings will be done in accordance with Human Research Ethics Committee standard operating procedures. The audio recordings and transcribed data will be stored securely and will be destroyed two years after publication (if it is published) and six years after the study was completed if it was not published.

If perceptions of the WHO Checklist are found to negatively affect its adoption and use, information-sharing workshops will be organised after discussion with the relevant Heads of Departments.

The study will be conducted according to the principles of the Declaration of Helsinki (15) and the South African Guidelines for Good Clinical Practice (16).

## 4.6 Research methodology

### 4.6.1 Research design

A qualitative, contextual, exploratory research design will be followed in this study. Qualitative research is a systematic, subjective approach used to describe life experiences and give them meaning (17). The qualitative research approach is based on a holistic worldview with the belief that there is more than one reality. This reality varies from person to person, is based on their perceptions and changes over time (17). This study aims to explore the perceptions which shape attitudes regarding the use of the WHO Checklist.

De Vos et al (18) describe a contextual study as a study that seeks to describe people in their habitat or natural setting, small-scale world, in order to understand the dynamics of human meaning as fully as possible. This study will explore perceptions of the perioperative team regarding the use of the WHO Checklist in the contextual setting of the operating theatres at Wits affiliated hospitals.

The objective of an exploratory study is to explore a research question about which little is known (18). The purpose is to gain new insights into a phenomenon and to develop hypotheses that can be investigated and tested later. In the operating theatres at Wits affiliated hospitals, the perceptions regarding the use of the WHO Checklist are unknown.

### 4.6.2 Study population

The study population consists of the perioperative team working in the operating theatres at Wits affiliated hospitals.

### 4.6.3 Study sample

#### Sample size

The sample will consist of three focus groups aiming to include 6 to 9 participants per group. It is often difficult for perioperative teams to attend meetings due to service delivery commitments that present at short notice. According to De Vos et

al (18), the ideal size for a focus group is between 6 and 9 participants. Groups with more than 12 members limit each participant's opportunity to share experiences. Groups with 4 to 6 participants are easier to recruit and host but limit the range of experiences available.

**Sampling method**

Qualitative research requires that the data to be collected must be rich in description of people and places (18). For this reason, a purposive sampling method will be employed. Purposive sampling is based on the judgement of the researcher, in that, a sample is composed of the elements which contain the most characteristic, representative or typical attributes of the population being studied (18). The researcher will select participants from the perioperative teams working in operating theatres of Wits affiliated hospitals who are most likely to provide rich information and insight regarding the use of the WHO Checklist.

**Inclusion and exclusion criteria**

The inclusion criteria for this study are:

- participants working in the operating theatres of Wits affiliated hospitals
- who consent to take part in the study and to be audio-recorded.

The exclusion criteria in this study are:

- interns, nursing and medical students.

### 4.6.4 Data collection

**Focus Group Interviews**

Focus group interviewing is a qualitative data-gathering method that originated from market research (18). "Focus" implies that the discussion that occurs will be limited to the specific theme under investigation. "Group" can be defined as the number of participants with a similar background and common interests. "Interview" implies the presence of a moderator who can facilitate discussion between all members of the group to elicit information on the desired topic (18). The focus groups in this study will aim to consist of 6 to 9 participants to allow

maximum opportunity for each participant to share information. Due to power relations in the perioperative team, the focus groups will be divided as follows.

- Focus group 1: anaesthetists.
- Focus group 2: nurses.
- Focus group 3: surgeons.

The researcher will facilitate the interview process and be supported by an experienced moderator. The interviews will be held in a private, permissive, non-evaluative and non-threatening environment to facilitate group discussion. Participation will be entirely voluntary and no remuneration will be offered.

**The interview guide**

Focus group interviews provide participants with the opportunity to express their opinions on a particular subject without having to answer a structured questionnaire. The direction of the interview is not pre-determined, but an interview guide is available to direct the discussion (Appendix F). The design of the interview guide establishes the agenda for the interview and provides the structure within which the participants will interact (19). Stewart and Shamdasani (19) advise that questions be ordered from general to more specific.

**Conducting the focus group interview**

Wednesday afternoons are allocated to academic meetings. Theatre lists are booked as half-day lists, ending at 12:00, allowing surgeons, anaesthetists and nurses to attend academic meetings. The focus group interviews will be scheduled before or after the academic meetings. Once participants accept the invitation to attend the focus group interview, they will be provided with advanced notice of the date, time and location of the interview. Information letters (Appendix C) will be e-mailed to all participants.

The interviews will be held in a relaxed setting where participants can sit comfortably around a table to maintain eye contact with each other. The acoustics of the room should be adequate and smartphone recorders will be placed unobtrusively.

Participants will be greeted and welcomed by the researcher and moderator and offered light refreshments. A few minutes will be spent on introductions. At the beginning of the session, the researcher will explain the reason for the interview and provide a brief description of the aim and objectives of the study. The participants will be asked to sign two consent forms, firstly to take part in the study (Appendix D) and secondly to be audio-recorded during the interview (Appendix E). The researcher will outline the process of the session and explain that the participants are not being evaluated or judged and that their input is important in improving the understanding of the topic being researched. Participants will be encouraged to freely express their emotions, opinions and experiences without any negative judgement. Access to any recordings will be limited to the researcher and supervisors. A focus group interview session will last until data saturation is achieved. It is anticipated that it will be approximately an hour.

**Field notes**

Field notes are a written account of the things the researcher hears, feels, sees, experiences and thinks about during data collection (20). They include both empirical observations and personal interpretations of the researcher, as well as preconceptions, expectations and prejudices (18). Field notes also allow non-verbal communication between participants to be documented and allows the researcher to capture the participant's input in its entirety. Field notes are either used as part of the data or for verification purposes.

The researcher will utilise field notes to record observations during and after the focus group interviews. These notes will allow critique of the research methods and also allow the researcher to note her experiences and feelings during the interview. The field notes will be used to increase the richness of the data collected and its interpretation.

**Audio recording**

Audio recording ensures accuracy of the information obtained and allows the researcher to concentrate on the interview (20). Two smartphone devices will be used to record the interviews. They will be placed on the table to ensure quality

recording. The recording function of the smartphones will be tested before commencement of the interviews.

### 4.6.5 Data analysis

Analysis of the data obtained will be done in conjunction with the supervisors who are experienced in research. Thematic analysis according to Braun and Clark (21) will be used to analyse the data. This is a method for identifying, analysing and reporting patterns within data. The phases of thematic analysis include:

- familiarising yourself with the data
- generating initial codes
- searching for themes
- reviewing themes
- defining and naming themes
- producing the report.

In this study, the researcher will transcribe all audio recordings from the focus group interviews, verbatim. The researcher and one supervisor will verify the transcriptions by correlating them with the recordings. Field notes compiled by the researcher will be typed out, placed into context with the recordings and be used as supporting information to the discussion. The data will be read, and re-read, and initial ideas will be noted. Next, interesting features from the data will be coded in a systematic fashion and data relevant to each code will be collated. Thereafter, the codes will be collated into potential themes. The researcher will check that the themes work in relation to the coded extracts and the entire data set, generating a thematic “map” of the analysis. Ongoing analysis will help define the specifics of each theme, generating clear definitions and names for each theme. The final phase is the last opportunity for analysis of data, which will be related back to the research question and literature. The researcher will produce a report, which demonstrates the validity and merit of the analysis of the data.

## 4.7 Significance of the study

Variations in attitudes and perceptions of healthcare workers towards the WHO Checklist have been identified in previous studies (9-11, 22). Some of these

attitudes and perceptions may have a negative effect on the adoption and use of the WHO Checklist in the operating theatres at Wits affiliated hospitals. The results of this study will provide a better understanding of the perceptions that influence the use of the WHO Checklist in operating theatres at Wits affiliated hospitals. Factors that may negatively or positively influence these perceptions may also be identified. This may lead to the formulation and implementation of appropriate interventions to improve patient safety.

## 4.8 Validity and reliability of the study

Trustworthiness refers to the degree of confidence qualitative researchers have in their data (20). As proposed by Lincoln and Guba (23), it consists of four epistemological standards: credibility, transferability, dependability and neutrality. A fifth standard was added by Lincoln and Guba (23) in 1994: authenticity.

Credibility determines whether the researcher has confidence in the truth of the findings, and the context in which the research was undertaken (20). A range of participants will be invited to take part in this study. By using “person triangulation”, data provided by participants will be validated through multiple perspectives of the subject within the group. This will allow for an information-rich representation of the issue from a range of people. The researcher will self-reflect and self-interrogate her own potential biases in order to remain objective about the subject. Debriefing sessions between the researcher and supervisors will allow for critique on the interpretations of the findings. Furthermore, return to the participants for their views on the findings will serve as a final form of validation.

Transferability refers to the degree to which findings can be applied to different contexts and groups (20). This can prove to be challenging with qualitative data as the data provided is specific to the individual and the context being described. To assist with fulfilling this criterion, adequate background information will be provided regarding the environment being described and the population being studied. This will include the demographic data of the participants and a description of the operating theatre environment and conditions at Wits affiliated hospitals.

Dependability takes into account whether the findings will be consistent if the study was replicated with the same participants in a similar context (20). Dependability

relies on a reliable audit trail; traceable variability ascribed to an identifiable source; stepwise replication of the study; thick and dense description of the methodology; triangulation of methods, data sources, theories and investigators; peer examination; and code-recode of data or using a co-coder (20). The methods used in this study will be described in detail so that the research can be repeated in future if need be. This includes the research design and implementation and the means of data collection and analysis.

Neutrality entails freedom from bias during the research process and the result description. It refers to the degree to which the findings represent the information provided by the participants and conditions of the research and are not influenced by the researcher's personal feelings and opinions (20). In this study, the researcher's perceptions and preconceived beliefs will be identified and a position statement will be formulated (Appendix G). The limitations of the study will be identified and their possible contributions to the outcomes will be discussed. The methodology will be described in detail, which will allow the process to be scrutinised.

Authenticity emerges in a report when it conveys the feeling tone of participants' experiences as they experienced it. It invites the reader into the lives of the participants and enables heightened sensitivity to the issues being depicted (20). This study will ensure authenticity by comprehensively recording data and giving examples of contextual descriptions by participants to illustrate the interpretation of the information collected.

## 4.9 Potential limitations

Purposive sampling will be used in this study and may not be representative of the entire perioperative team of the operating theatres of Wits affiliated hospitals.

## 4.10 Project outline

### 4.10.1 Time frame

| Activity | Oct 2019 | Nov 2019 | Dec 2019 | Jan 2020 | Feb 2020 | Mar 2020 | Apr 2020 | May 2020 | Jun 2020 | Jul 2020 |
|---|---|---|---|---|---|---|---|---|---|---|
| Proposal preparation | | | | | | | | | | |
| Literature review | | | | | | | | | | |
| Proposal submission | | | | | | | | | | |
| Ethics approval | | | | | | | | | | |
| Postgraduate approval | | | | | | | | | | |
| Data collection | | | | | | | | | | |
| Data analysis | | | | | | | | | | |
| Draft article | | | | | | | | | | |
| Submission | | | | | | | | | | |

### 4.10.2 Budget

| Item | Price per page | Number of pages | Copies | Total |
|---|---|---|---|---|
| Proposal | 1 | 15 | 10 | R 150 |
| Ethics | 1 | 10 | 25 | R 250 |
| Post graduate form | 1 | 2 | 6 | R 12 |
| Complete report | 1 | 100 | 4 | R 400 |
| **Grand total** | | | | **R 812** |

The Wits Department of Anaesthesiology will incur the costs of paper and printing.

## 4.11 References


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## 4.12 Appendices

## Appendix A: Template Requesting Approval from Heads of Departments

Date_____

_____
The Head, Department of _____
University of the Witwatersrand
Johannesburg

Attention: _____

Re: Consent to conduct study

My name is Najiba Sima. I am an anaesthesiology registrar at Wits . As part of my MMed, I would like to conduct a study titled: " Perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist in the operating theatres s at Wits affiliated hospitals".

The WHO Checklist is a tool used to promote patient safety in the operating room and to improve communication between team members in order to avoid surgical errors that have a significant impact on patient morbidity and mortality. It is not always utilised in a consistent manner. The approach to its use is shaped by the attitudes and perceptions of the team members in the operating theatre.

This study will be conducted using focus group interviews with doctors working in the departments of surgery, anaesthesiology and theatre nurses. These interviews will be held in the Department of Anaesthesiology on a Wednesday afternoon when academic meetings are held.

This study will be put forward to the Human Research Ethics Committee (1) for approval and to the Graduate Studies Committee at Wits.

I hereby request consent to conduct this study in your department.

Yours sincerely

_____

Najiba Sima
MP 0535648
Cell: 0833241208
E-mail: greensideclinic@gmail.com

## Appendix B: Approval Head of the Department of Surgery

08 October 2019

Professor Martin Smith
The Head, Department of Surgery
University of the Witwatersrand
Johannesburg

Attention: Prof. Smith

Re: Consent to conduct study

My name is Najiba Sima. I am an anaesthesiology registrar at Wits . As part of my MMed, I would like to conduct a study titled: " Perceptions of the perioperative team regarding the use of the WHO Checklist in the operating theatres at Wits affiliated hospitals".The WHO Checklist is a tool used to promote patient safety in the operating theatre and to improve communication between team members in order to avoid surgical errors that have a significant impact on patient morbidity and mortality. It is not always utilised in a consistent manner. The approach to its use is shaped by the attitudes and perceptions of the team members in the operating theatre.

This study will be conducted using focus group interviews with doctors working in the departments of surgery, anaesthesiology and theatre nurses. These interviews will be held in the research office in the Department of Anaesthesiology on a Wednesday afternoon when academic meetings are held. This study will be put forward to the Human Research Ethics Committee (1) for approval and to the Graduate Studies Committee at Wits.I hereby request consent to conduct this study in the Department of Surgery.

Yours sincerely

Najiba Sima
MP 0535648
Approved

# Appendix B: Approval head of the Department of Anaesthesiology

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

WITS UNIVERSITY

**Department of Anaesthesia – University of the Witwatersrand**

7 York Road, Parktown, 2193 South Africa • Telegrams "Witsmed" • Telephone (011) 488-4344 • Fax (011) 488-4343

Department of Anaesthesia
Area 361
Charlotte Maxeke Johannesburg Academic Hospital

Tel: 011 488-4344

8th October 2019

Subject: **Permission to conduct survey from Department of Anaesthesiology**

To whom it may concern,

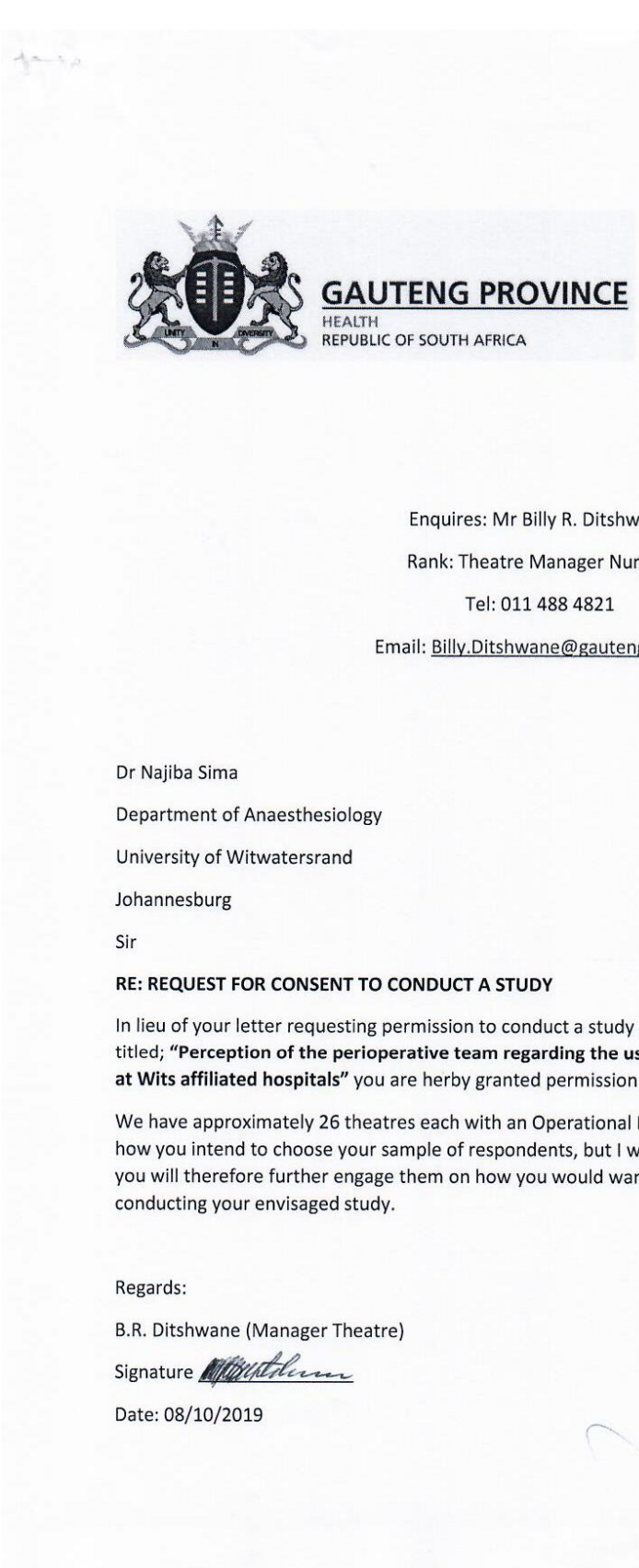
This letter stands to affirm that I, Dr PMV Motshabi, grant permission to Dr Najiba Sima HPCSA number MP 0538648, to conduct a survey in Department of Anaesthesiology at University of Witwatersrand for her study "Perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist in the OTs at Wits affiliated hospitals".

The approximate period will be, but not limited to, the months of January 2020 to June 2020, until her sample size is obtained. The information obtained from the data will be used for Dr Sima research study for her Masters in Medicine only, and will include information and data relevant to her study.

Yours sincerely,

WITS UNIVERSITY
**Dr Palesa Motshabi**
*Academic Head: Department of Anaesthesia*
*Head of Clinical Unit: Cardiac Anaesthesia*
**Tel:** +27 (0)11 488 4344
**Cell:** 083 432 1994
**Email:** palesa.motshabi@wits.ac.za
**Website:** www.wits.ac.za
WITS SCHOOL OF CLINICAL MEDICINE
FACULTY OF HEALTH SCIENCES
Charlotte Maxeke Johannesburg Academic Hospital, 6th Floor, Area 361/16, Jubilee Road, Parktown, Johannesburg

## Appendix B: Approval theatre nursing manager



GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

Enquires: Mr Billy R. Ditshwane

Rank: Theatre Manager Nursing

Tel: 011 488 4821

Email: Billy.Ditshwane@gauteng.gov.za

Dr Najiba Sima

Department of Anaesthesiology

University of Witwatersrand

Johannesburg

Sir

**RE: REQUEST FOR CONSENT TO CONDUCT A STUDY**

In lieu of your letter requesting permission to conduct a study in our Operating theatre complex titled; **"Perception of the perioperative team regarding the use of WHO Safety Checklist in the OTs at Wits affiliated hospitals"** you are herby granted permission to conduct the study as requested.

We have approximately 26 theatres each with an Operational Manager in charge of it. I'm not sure how you intend to choose your sample of respondents, but I will inform them of your request and you will therefore further engage them on how you would want them to assist and support you in conducting your envisaged study.

Regards:

B.R. Ditshwane (Manager Theatre)

Signature

Date: 08/10/2019

## Appendix C: Information letter

**Study title:** Perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist.

Dear colleague,

**Introduction**

My name is Najiba Sima. I am a Registrar in the Department of Anaesthesiology. I would like to invite you to participate in my M Med research study entitled: "Perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist in the operating theatres at the Wits affiliated hospitals".

The aim of this study is to explore the perceptions of the perioperative team regarding the use of the WHO Checklist in the Operating Theatres at the Wits affiliated hospitals.

**What would my participation involve?**

You would be asked to take part in a focus group interview session in the research office in the Department of Anaesthesiology. This will take place on a Wednesday afternoon when theatre lists are booked as half-day lists. The group will consist of 6 to 9 of your colleagues. The duration of the meeting will be approximately 60 minutes and light refreshments will be provided. The exact date of the meeting will be provided once all relevant participants have been contacted and a convenient time is chosen.

With the participant's permission, this focus group will be audio-recorded and you will be asked to sign an informed consent form for inclusion in this study and to be audio-recorded. Your participation in this study is entirely voluntary and you will not be discriminated against should you refuse or wish to withdraw. Any information given will be valuable to the study and there are no correct and incorrect answers. All information provided by you will be recorded and treated by the researcher with the strictest confidentiality. However, anonymity and confidentiality cannot be guaranteed as you will be known to the other participants of the group. The recordings will be erased after a maximum period of six years.

**Risks and benefits**

There are no known risks in participation, nor are there any direct benefits, but the results from the study could positively change the environment in which you work and improve the safety of your patients.
There is neither cost nor payment involved in participation.

**Confidentiality**

As mentioned, many participants are likely to recognise one another, but no individual will be identified by name in the study report, or in any publication arising out of it.

**Further information**

If you require any further information before, during or after the study, please contact me or my supervisor:
Dr Najiba Sima (researcher): tel no. 083 324 1208, or e-mail: greensideclinic@gmail.com
Professor Juan Scribante (supervisor): tel no. 082 882 9938, or e-mail: juan.scribante@wits.ac.za

**Results**

I will be pleased to provide a summary of the study results on request.

**Ethical approval**

This study has been approved by the Human Research Ethics Committee of the University of the Witwatersrand, Johannesburg. A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.

If you have any concerns over the way the study is being conducted, please contact the chairperson of this Committee who is Dr Clement Penny, who may be contacted on telephone number 011 717 2301, or by e-mail at Clement.Penny@wits.ac.za. The telephone numbers for the Committee secretariat are 011 717 2700/1234 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za.

Thank you for reading this information letter.

Yours Sincerely
Najiba Sima

## Appendix D: Informed consent form

I_____ hereby confirm that I have read and understood the information letter regarding the study titled: “Perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist in the operating theatres at the Wits affiliated hospitals”, and I am satisfied with all the information provided.

I am aware that the information provided by me will be treated in a confidential manner, will not be used to discriminate against me, and will be used anonymously when the study is reported.

Participant

I hereby give consent to take part in this study.

_____ _____ _____

(Participant name) (Participant signature) (Date)

Researcher

I_____ hereby confirm that the above participant has been fully informed about the nature and benefits of this study.

## Appendix E: Informed consent to be audio-recorded

I_____ hereby confirm that I have read and understood the information letter regarding the study titled: “Perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist in the operating theatres at the Wits affiliated hospitals”, and I am satisfied with all the information provided.

I am aware that the information provided by me will be treated in a confidential manner, will not be used to discriminate against me, and will be used anonymously when the study is reported.

Participant

I hereby give consent to be audio-recorded during the focus group discussion.

_____ _____ _____

(Participant name) (Participant signature) (Date)

Researcher

I_____ hereby confirm that the above participant has been fully informed about the nature and benefits of this study.

## Appendix F: Focus group interview guide

**Perceptions of healthcare workers towards the WHO Surgical Safety Checklist in the perioperative period**

1. Welcome and introductions

2. Signing of the consent forms

3. Introduction to study and to focus group discussion

Problem statement: Completion of the WHO Checklist is important to ensure patient safety, open communication between operating theatre team members and to reduce the risk of surgical adverse events.

Aim: The aim of this study is to explore the perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist in the operating theatres at the Wits affiliated hospitals.

4. Discussion:

Questions to stimulate conversation

- How do you feel about the use of the WHO Checklist in the perioperative period?
- What is your understanding of the rationale for the WHO Checklist use in our theatres?
- To what extent have you used the WHO Checklist in your operating theatre?
- If you or a family member presented for surgery, would you want the WHO Checklist to be performed?
- Any further information that may be of relevance?

5. Thank participants and close

## Appendix G: Position statement

Anaesthetists have a key role to play in patient safety perioperatively. Modern anaesthesia is technologically advanced and complex with many built-in safety mechanisms. Patients are continuously monitored and many anaesthetic practices incorporate safety measures to prevent errors and adverse events. Anaesthetic equipment also has engineered safety devices to prevent errors and adverse events. Safety is therefore a fundamental principle in anaesthesia.

However, equipment can malfunction and human error can occur under the effects of stress and fatigue. Also, many environments are resource-constrained and may not have the latest safety technology and human resources to ensure patient safety at all times. The WHO Checklist is a cost-effective, easy to use and effective tool that can be used in all settings.

The researcher of this study has an anaesthetic background and is of the opinion that the WHO Checklist is a necessary safety tool for use in operating theatres, as it does improve team communication, promotes safety behaviour and helps reduce potential surgical adverse events.

# Section 5: Annexures

## 5.1 Ethics approval

UNIVERSITY OF THE
WITWATERSRAND
JOHANNESBURG

R14/49 Dr N Sima

**HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)**
**CLEARANCE CERTIFICATE NO. M191123**

| | |
|---|---|
| NAME: (Principal Investigator) | Dr N Sima |
| DEPARTMENT: | School of Clinical Medicine<br>Departmen of Anaesthesiology<br>Medical School<br>University |
| PROJECT TITLE: | Perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist |
| DATE CONSIDERED: | 2019/11/29 |
| DECISION: | Approved unconditionally |
| CONDITIONS: | |
| SUPERVISOR: | Profs J Scribante & L Green-Thompson; Ms H Perrie |
| APPROVED BY: | Dr CB Penny, Chairperson, HREC (Medical) |
| DATE OF APPROVAL: | 2020/06/09 |

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

**DECLARATION OF INVESTIGATORS**

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the 3rd Floor, Philip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.
I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to submit details to the Committee. I agree to submit a yearly progress report. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **November** and will therefore reports and re-certification will be due early in the month of **November** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

2020/06/15
Date

## 5.2 Graduate studies approval

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

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

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

10 May 2020
Person No: 9402634T
PAG

Dr N Sima
P O Box 5073
Lenasia
1820
South Africa

Dear Dr Najiba Sima

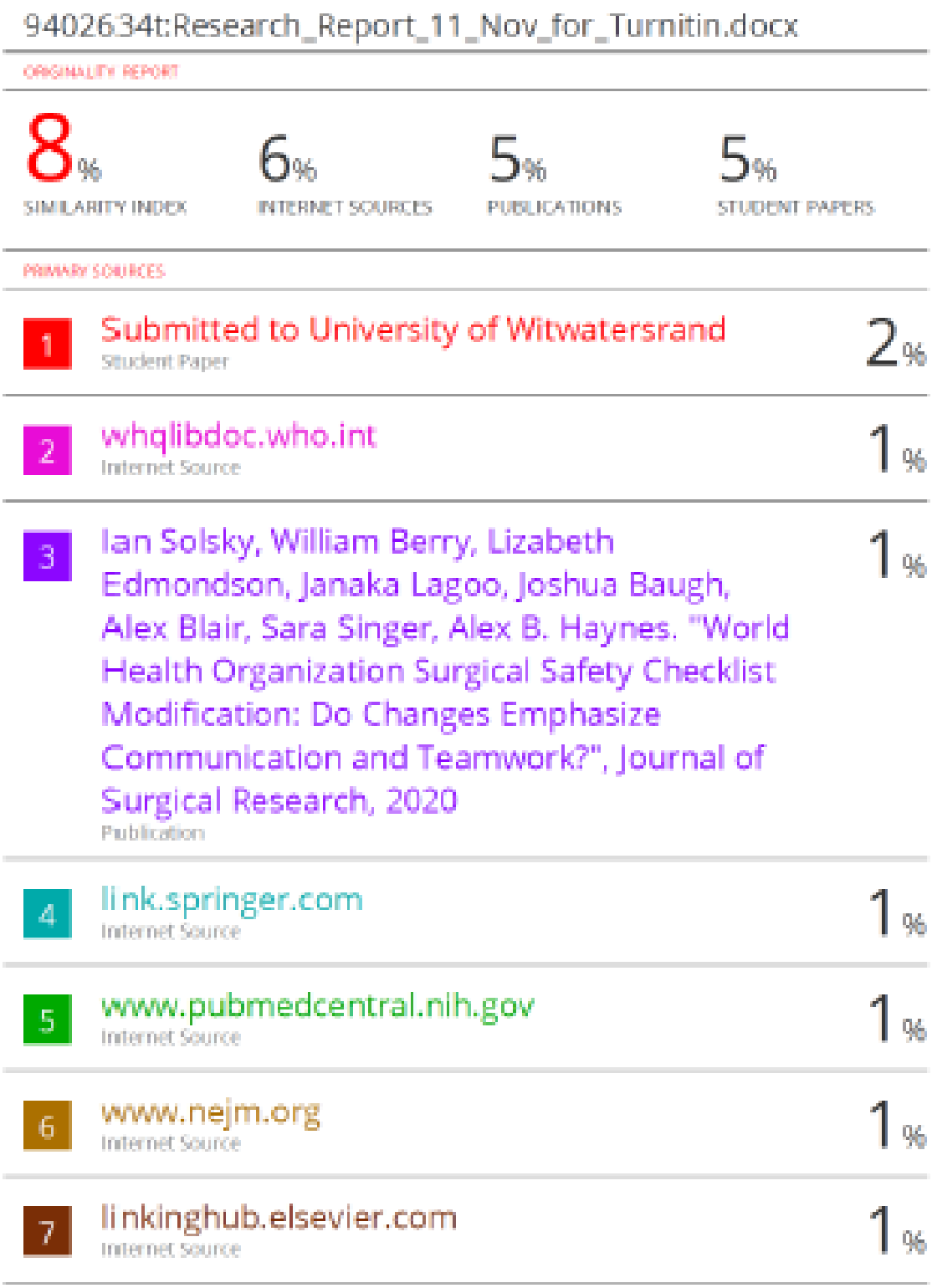
**Master of Medicine in Anaesthesia: Approval of Title**

We have pleasure in advising that your proposal entitled *Perceptions of the perioperative team regarding the use of the WHO Surgical Safety Checklist* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

## 5.3 Turnitin report



9402634t:Research_Report_11_Nov_for_Turnitin.docx

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| 3 | Ian Solsky, William Berry, Lizabeth Edmondson, Janaka Lagoo, Joshua Baugh, Alex Blair, Sara Singer, Alex B. Haynes. "World Health Organization Surgical Safety Checklist Modification: Do Changes Emphasize Communication and Teamwork?", Journal of Surgical Research, 2020<br>Publication | 1% |
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UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG | FACULTY OF HEALTH SCIENCES

11 November 2021

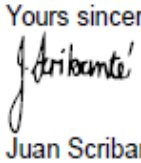
The Chairperson
Graduate Studies Committee
Faculty of Health Sciences
University of the Witwatersrand

Dear Professor Papathanasopoulos

Re: M Med: **Perceptions of the perioperative team regarding the use of The WHO Surgical Safety Checklist**

Dr Najiba Sima, student number: 9402634T has submitted her research report to Turnitin, which revealed a similarity index of 8%. These similarities appear not to be plagiarism but mainly the use of common terminology and phrases specific to the topic of the research.

Yours sincerely,



Juan Scribante
Supervisor