

# Challenges in introducing innovation. Barriers and enablers to the WHO Surgical Safety Checklist at the University Teaching Hospital in Lusaka, Zambia: a qualitative study

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## Research Article

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# Abstract

## Background

Surgical perioperative deaths and major complications are important contributors to preventable morbidity, globally and in sub-Saharan Africa. The surgical safety checklist (SSC) was developed by WHO to reduce surgical deaths and complications, through utilizing a team approach and a series of steps to ensure the safe transit of a patient through the surgical operation. This study explored enablers and barriers to the utilization of the Checklist at the University Teaching Hospital (UTH) in Lusaka, Zambia.

## Methods

A qualitative case study was conducted involving members of surgical teams (doctors, anaesthesia providers, nurses and support staff) from the UTH surgical departments. Purposive sampling was used and 16 in-depth interviews were conducted between December 2018 and March 2019. Data were transcribed, organized and analysed using thematic analysis.

## Results

Analysis revealed variability in implementation of the SSC by surgical teams, which stemmed from lack of senior surgeon ownership of the initiative, when the SSC was introduced at UTH five years earlier. Low utilization was also linked to factors such as: negative attitudes towards it, the hierarchical structure of surgical teams, lack of support for the SSC among senior surgeons and poor teamwork. Further determinants included: lack of training opportunities, lack of leadership and erratic availability of resources. Interviewees proposed the following strategies for improving SSC utilisation: periodic training, refresher courses, monitoring of use, local adaptation, mobilizing the support of senior surgeons and improvement in functionality of the surgical teams.

## Conclusion

The SSC has the potential to benefit patients; however, its utilisation at the UTH has been patchy, at best. Its full benefits will only be achieved if senior surgeons are committed and managers allocate resources to its implementation. The study points more broadly to the factors that influence or obstruct the introduction and effective implementation of new quality of care initiatives.

## Background

Surgical perioperative deaths account for 0.4–0.8% and major complications for 3–17% of surgical cases globally and are an important contributor to preventable deaths (Treadwell et al, 2014), with an estimated double these rates in sub-Saharan Africa (Biccard BM, E Thandinkosi, HL Kluyts, et al 2018).

There is evidence that lack of safety protocols could lead to a range of adverse events (Chhabra et al., 2019). Avoidable complications during surgery arise mostly because of factors such as; operating on the wrong patient, using the wrong procedure or at the wrong site; inadequate anaesthesia and surgical skills and equipment; lack of readiness to manage unanticipated blood loss; and non-sterile equipment and surgical items and sponges left inside body cavities of patients, resulting in sepsis (Treadwell et al, 2014). Patient safety and measures to ensure optimal outcomes of surgery is particularly important in Africa, where patients are twice as likely to die after surgery compared to the global average (Biccard et al; 2018).

The World Health Organization (WHO) developed the Surgical Safety Checklist (SSC) in 2008 in order to improve surgical patient safety. The SSC is a tool aimed at reinforcing safety practices in surgery and fostering better communication and teamwork between clinical disciplines (WHO Implementation Manual: Surgical Safety Checklist, 2009). It is designed to allow the surgical team (surgical providers, anaesthesia providers, nurses and others) to discuss, agree and check important details about each surgical case at three key time-points in the normal flow of a surgical procedure, namely: i) "briefing phase before induction of anaesthesia, ii) "time out" period after induction and iii) before surgical incision and iii) debriefing phase after wound closure, before leaving the operating room. A designated coordinator within the team should confirm that the team has completed its tasks before proceeding further in each phase (Weiser et al, 2018).

The integration of the SSC into routine practice may require surgical teams to adjust the way they work together and to dedicate sufficient time to complete all three phases. At times, this may be perceived as an obstacle, affecting SCC compliance and buy-in (Russ et al, 2015, Fourcade et al (2011). However, a substantial body of evidence has demonstrated considerable benefits in the use of the SSC to improve safety (Weiser et al; 2010), to reduce complication rates (Weiser et al; 2010, Abbott et al., 2017) and mortality rates; and to ensure critical incident reporting (Austin et al., 2015).

In Zambia, data on rates of perioperative mortality are not systematically collected and reported. However, a study conducted at the University Teaching Hospital (UTH) estimated that over 60% of perioperative deaths registered in 2012 at the hospital were avoidable or potentially avoidable (Lillie, E.M.M.A., Holmes, C.J., O'Donohoe, E.A. *et al.*2015). Key factors identified as contributing to avoidable mortality at UTH included, among others undue delays in surgery, inadequate preparation of the patient, and poor perioperative and post-operative care (both surgical and in anaesthesia) (Lillie, E.M.M.A., Holmes, C.J., O'Donohoe, E.A. *et al.*2015). The study also compared findings with historical data from 1987 and found no improvements in perioperative mortality, concluding that many deaths remained avoidable (Heywood AJ, IH Wilson &JR Sinclair, 1989). This suggested the urgent need to enhance quality and safety of surgical service delivery at UTH and countrywide.

The WHO SSC was first introduced at the UTH around 2009/2010 as an initiative by the College of Surgeons of East, Central and Southern Africa (COSECSA) in collaboration with surgeons from the UTH. Additionally in 2015, the UK Royal College of Nursing (RCN), in partnership with the Zambia Union of

Nurses Organization (ZUNO) and the Zambia Operating Theatre Nurses Interest Group (ZOTNIG), conducted a formal training in the utilisation of the SSC in an attempt to improve surgical safety. The National Surgical, Obstetrics and Anaesthesia Plan (NSOAP) 2017–2020 included an explicit commitment towards protecting surgical patients from avoidable complications and improving health outcomes, and endorsed the use of the WHO SSC.

The aim of this study was to determine compliance with the WHO SSC at the UTH and to explore factors related to its utilisation in order to identify any shortcomings and potential areas for improvement.

## **Methods**

The study employed an exploratory qualitative approach involving semi-structured interviews with key members of the surgical teams at the operating theatres departments of UTH. UTH, located in the capital city Lusaka, is the largest hospital in Zambia with 9,960-recorded surgical operations in 2018.

### **Study sample and data collection**

Sixteen members of the surgical teams at UTH participated in the study. They were selected using purposive sampling, with the following inclusion criteria: medical doctors, anaesthesia providers, nurses who had sufficient knowledge of use of the SSC, were working full time at the UTH theatre departments, and were willing be interviewed. There were four doctors, four nurses, four anaesthesia providers and four general workers included in the study. The nurses included only those with a specialty training in perioperative care and not the general nurses who worked in the operating rooms intermittently as part of their rotation across departments. An interview guide was developed based on a review of relevant published studies. The questions explored views and experiences of the surgical team members on utilisation of SSC and factors related to implementation of the checklist. Interviews lasted 30 to 60 minutes and were conducted using an audio recorder supported by note taking.

Data were collected between December, 2018 and March, 2019 by the first author, who is an operating theatre nurse by training, familiar with qualitative research methods. Participant information was read out aloud and questions were answered before each interviewee signed the consent form. Recorded data were transcribed into verbatim. To ensure anonymity and confidentiality, a coding system was used delinking interviews from participant characteristics. Interviewees were informed that the results of the study might benefit the safety of patients undergoing surgery. There was no financial incentive for taking part in this study.

### **Data analysis**

Thematic analysis was performed following the steps proposed by Braun and Clarke (Braun & Clarke, 2006). The first author started by reading the transcribed interview data to identify any factors mentioned by respondents that may influence the utilisation of the SSC. After this first familiarization with the data, all factors reported to affect SSC utilisation were coded accordingly. Subsequently, conceptually related

factors were combined under themes (see Figure 1). These were discussed and reviewed together with the other authors before the final coding tree was agreed upon.

Finally, emerging themes were grouped into three broad overarching categories (at organizational, system and team levels), following the model by Russ et al (2015), which was adapted to the purpose of this study. Organisational themes relate to organisational structures, policies and standards, including in relation to staff training and supervision; and organisational safety culture and priorities. System level themes relate to the integration (or lack of) of the checklist into existing systems and procedures. At the team level themes relate to teamwork (e.g. communication, cohesion), team structure (e.g. leadership and power dynamics), and team buy-in of the checklist. Checklist-specific themes in the Russ et al model were not applicable to this study because the design and content of the checklist had already been adapted (Pierre C Kariyoi, Joyce Hightoweri, Jean Bosco Ndiokubwayoii et al, 2013).

## **Ethics approval**

Approval to conduct the study was endorsed by the School of Public Health at the University of Zambia and thereafter-ethical clearance was sought and obtained from the University of Zambia Biomedical Research Ethics Committee (UNZABREC). Authority to conduct research was obtained from the National Health Research Authority (NHRA) and the Senior Medical Superintendent of the University Teaching Hospitals granted permission to conduct the study. Informed consent was obtained from all participants, and this study including the methods used were carried out in accordance with relevant local guidelines and regulations as per the ethics approvals.

## **Results**

Most interview respondents indicated that the WHO SSC was not used consistently for all surgical operations performed by teams working at UTH, despite the MoH endorsement of the SSC as standard practice.

### **Barriers to SSC utilisation**

Respondents provided detailed accounts of the reasons why the checklist was not integrated as a standard procedure before each surgery performed. These barriers to SSC utilisation are presented in the following sections according to the three overarching categories: organisational factors, systemic factors and team factors.

#### **Organisational barriers**

##### ***Surgical Team- Inconsistent training and lack of supervision***

Study participants reported that, after initial training, there had not been further training opportunities for new staff in order to reinforce consistent use of the SSC at UTH. This would have been beneficial in particular for newly hired staff as well as staff rotating from other departments. As a result, the checklist

was not followed in the operating rooms run by new or rotating staff (mainly emergency OTs). In these OTs, medical and nursing senior staff who had undergone training rarely conducted routine checks to monitor and reinforce the use of the SSC. Lack of adequate and regular training for all members of the surgical team consequently led to a poor understanding of the purpose and benefits of the SSC, or misbeliefs about its purpose.

### ***Lack of ownership and management structures***

Interviewees stated that poor ownership of the SSC initiative, among other reasons, was because some of the senior staff did not attend the initial SSC training. Consequently, these staff members failed to fully grasp the value of the SSC and perceived it as an unnecessary imposition.

**(MD6)** *“Yes, very senior staff, especially some medical doctors who have been operating for years without any recorded AEs/complications, may think that the tool is being imposed on them by the westerners, and feel it is not important and won’t utilize the tool. If they are trained and shown actual data from other countries they may change and they would do well to be part of the adverse events audit.”*

Study participants also indicated that there was no supervision nor any formal oversight measure in place to ensure consistent use of the SSC at UTHs operating theatre department. Due to the result of a flawed introduction of the SSC, the main reported issue was the lack of a designated person in-charge of ensuring the SSC’s utilisation. This resulted in lack of accountability of members of the team in instances of non-adherence.

**(AP1)** *“Where I work from I rarely see among other leaders, consultants to check on how the junior medical doctors are working. In short there is no leader figure ensuring that the SSC is utilized consistently at UTHs, despite the fact that there are a lot of new staff who haven’t yet been trained on the application of the SSC, and who find it difficult to fit in.”*

### **System barriers**

#### ***Non-availability of resources***

According to study participants, the often-occurring non-availability of essential surgical equipment and supplies at the time of an operation had an indirect, negative impact on the use of the SSC. All participants consistently indicated that in some instances, a considerable amount of time was spent on searching for and borrowing resources from other theatre rooms, or sending faulty equipment for repairs, reflecting challenges in the management of the OTs.

This delayed the operations and took away some of the actual surgery time, which could only start when all required resources were present in the operating room, with a knock on effect on the surgical list. As a result, in these instances the surgical teams tried to make up for lost time by skipping the SSC.

**(MD6)** *"You would want to be out of theatre as soon as possible"...and therefore, you end up not utilizing the SSC. This is because the challenges with the availability of material resources are huge and come in the form of less numbers or nothing at all to use for most times, such as equipment, instruments, consumables and there are no comfortable well ventilated theatres.*

### **Staff workload and fatigue**

Additionally, there was a reported widespread shortfall of essential surgical staff such as nurses, anaesthesia providers and support staff to cover each operating room at any given time. Participants reported that non-specialized nurses (non-perioperative) were often allocated to work in the surgical departments to fill these gaps. The non-specialist nurses were usually given on the job orientation to be able to work in the operating theatres, but the use of the SSC was mostly not routinely covered during this orientation, because its use had not been mainstreamed into routine practice. Further, the use of the SSC was not adapted to the local environment at the time of the study.

**(PN9)** *...staffing is also a huge barrier because you have for example... [There are] very few nurses [available] against all the operating rooms that are open, the recovery room and theatre sterile supply unit to prepare surgical sets continuously. You end up having the medical doctors conducting certain operations alone, while the nurses are scrubbed up in the other operating rooms and you find that the SSC will not be used."*

Inadequate human resources were also reported to contribute to high workload and fatigue of surgical teams, particularly the ones handling emergency operating rooms. Respondents stated that, these staff shortages coupled with lack of the SSC protocols to enforce utilisation before every surgical operation and meant that when clinicians were overwhelmed, they skipped the SSC use at the time of operation. This was in instances where the printed out copies were misplaced. As reported, this in turn resulted in failure to conduct adequate handovers of cases at the end of shifts, which led to recording incomplete medical details about patients undergoing surgery now and then.

**(PN9)** *"...you have the surgical 'firm' of medical doctors 'On Call' and other firms rushing in their emergency cases and adding to the already prevailing high workload and also the nature of the urgency of doing these cases. If not reminded, due to the workload the medical doctors and support staff can actually work without using the SSC"*

### **Team barriers**

The absence of a standard operating procedure to guide the work of the surgical teams and an assigned champion to ensure implementation of the SSC resulted in its inconsistent application. Rather than following a team approach, participants reported excessive influence of individuals whose behaviour and attitude could either drive or hinder the use of the checklist. The decision whether to implement the checklist or not was linked to individual team members' attitude towards it, and more broadly, with their professional attitude and work ethics. This was due to several reasons as described below:

## Hierarchical surgical team structure

Participants reported that the structure of surgical teams at UTH was highly hierarchical. Within this structure, the surgeon was regarded as having a central, decision-making role, while the other team members (anaesthesia providers and nurses) were perceived to be in a subordinate position. This power dynamics within the team meant that the attitude of team members at the top of this hierarchy towards the use of the checklist usually prevailed over others and guided the manner in which decisions to use the checklist were made. Respondents in 'lower' positions in the team indicated that often it was they who suggested following the SSC, but in some instances, the surgeon leading the operation was not supporting its use.

**(TSS13)** *"Sometimes you find that you need to remind the medical doctors as junior staff to utilize the SSC, like 'let's do this ...let's do this'. However, they would not want to apply the SSC and you then just start conducting the surgery. Eventually as a junior staff, you mostly follow what senior staff take on board (...) with regard to keenness towards utilisation of the SSC."*

The perceived seniority had also an effect on the roll out of the initial training in the use of the SSC offered to UTH surgical staff in 2015.

**(MD8)** *"Some of the senior staff did not attend the training due to various reasons. This meant that they missed knowledge empowerment. It is an issue of specific team members not wanting to attend training that brings and mixes the entire surgical team in one room."*

The above quote provided an example of how the hierarchical and surgeon-centred structure of the surgical team played a role in how the SSC training was perceived. According to the interviewee, senior staff did not want to receive training from a person who they considered junior to them (*a nurse*).

## ***Attitudes***

Negative attitudes towards the SSC were also manifested in the way the checklist was perceived by some members of the surgical team. Participants reported that their seniors often '*rushed*' to proceed with a case, seeing the SSC as an unnecessary '*delay*'. In some instances, such behaviour made the junior staff reluctant to further suggest using the SSC for subsequent cases, because they had received no support towards the utilisation processes. This attitude of senior members also resulted in a lack of team approach to the use of the SSC.

**(AP1)** *The only problem that I have mentioned even before, is that the other team members think anaesthesia providers delay when signing in the patient and would then force the use of the SSC.*

The interviewed senior surgeons, who were supportive of the use of the SSC, also indicated the same behaviour. They acknowledged that their peers' dismissive attitude had negative consequences for the team dynamics and ultimately led to the poor utilisation of the SSC.

**(MD6)** *'I think mostly it is a misconception by seniors that surgery revolves around them and not the other members of the surgical team. It is important to respect the opinions of each member of the team and discourage intimidation of junior team members for them to feel part of the team.'*

The reported hierarchical relationships were attributed to occasional occurrence of 'intimidating' behaviours, where some junior staff were told that they 'want to waste time' after they had suggested utilisation of the SSC prior to the operation. This in turn further deteriorated the already poor team dynamics and reinforced the hierarchical structure. The effect of this reported 'intimidation' behaviour was illustrated in the following way:

**(TSS14)** *"Like to me, personally, I do try to engage seniors when they do something I perceive is not in line with [good] practice such as utilisation of the SSC and their responses vary as individuals. I think that is why we have even forgotten a lot about the SSC use, because this affects our confidence levels."*

### **Poor work ethics**

Participants also reported that the utilisation of the SSC was undermined by the poor work ethics of some of the team members. One of the issues identified by respondents was the late reporting for work, which led to failure to form surgical teams on time and delayed the start of the operation. To compensate for the time lost, the surgical teams proceeded with surgery without applying the SSC. This had a knock-on effect on other surgical teams operating later on in the day. A delay caused by one team could derail the whole operating room schedule, forcing the next team to work under unnecessary time pressure.

**(MD5)** *"Some of the barriers regarding non-utilisation of the SSC are that we are supposed to start surgery at 08.00 hours but because of the late coming by some team members we normally start work at about 09.30 - 10.00 hours... then they would want to catch up with the lost time and as such omit SSC use."*

## **Enablers to SSC utilisation**

### **Organisational enablers**

Identified enablers corresponded to the barriers presented above. Firstly, training on SSC for all new surgical staff members was deemed necessary before rotation to the theatre rooms from other departments. Refresher training for all existing staff was also suggested as a way to improve adherence to the checklist.

**(MD7)** *"It is better to keep training all new staff on SSC utilisation and I think there is a need to plan on our calendars that we need to regularly hold workshops to update our knowledge. The preoperative phase is equally very important and there is a need to also empower surgical ward nurses with skills on pre-operative preparation of patients and include them in lessons about safe surgery."*

The respondents suggested that a formal system already put in place by the Ministry of Health, termed Service Quality Assessment (SQA), could improve SSC utilisation. This involved the use of a tool to

monitor compliance that needed to be reinforced with specific funds allocated to this purpose, in order to enhance SSC utilisation and accountability in the operating rooms at UTH. It was also noted that, implementation champions would be needed to ensure consistency in the use of the SSC. Such champions would put in place a mechanism for constant feedback to the theatre teams and facilitate communication with hospital management. The champions would also ensure that compliance with SSC use is measured and documented. Additionally, setting up teams to periodically evaluate the SSC utilisation in view of monitoring patient safety was also seen as an essential component of standard surgical practice.

**(PN9)** *“Another way to enhance SSC utilisation would be for management to bring on board funded initiatives to strengthen monitoring of the SSC utilisation, because it will then make the staff know that they have to be answerable to someone.”*

### **System enablers**

There was a reported need to adapt the SSC to the UTH’s local setting and systems in order to enhance application in the operating rooms. Participants suggested that a review of how the SSC was implemented would help to adapt it better to the local setting, taking into account the handling of emergencies and the deficiencies in the human and material resources, as envisaged in the WHO checklist.

Additionally, respondents reported the need to ensure more visibility of the SSC tool by displaying it in the OT room in a visible place. They stated this would act as a reminder for the entire team, especially the new staff, to follow the steps during the execution time in the operating rooms.

### **Team enablers**

Participants made a number of suggestions for improving the overall management of the surgical theatre, including surgical team functionality, division of roles and responsibilities and accountability at the workplace, in order to overcome challenges related to negative attitudes and poor work ethics.

**(AP2)**- *“What we need first and foremost is agreeing on the start time for procedures. Basically the whole team should start together instead of what is happening currently, where at times some team members just come into theatre along the way, meaning their input won’t be known and they miss the briefing and ‘sign in’ of the SSC process. Conducting the briefing sessions in every operating room to discuss among other issues the SSC use is very important.*

*Senior staff also need to delegate leadership roles to juniors for them to learn the skills but remain answerable for the juniors’ tasks instead of what happens where sometimes the seniors usually take up a lot and fail to do important practices like SSC utilisation. Now one person does everything alone then safety is compromised. It is equally good to conduct elaborate handovers of cases at the end of a work shift too.”*

## Discussion

The main objective of this study was to assess utilisation of the WHO SSC at UTH. The findings demonstrated inconsistent use of the SSC at the UTH theatre departments, linked to three types of factors: at the organisational, system and team levels. While the findings pertain to the SSC, they point to broader deficiencies in the management of the surgical theatres, tensions between hierarchical and team approaches, and a lack of commitment and involvement on the part of some senior surgeons in the introduction and implementation of new quality improvement initiatives.

The organisational barriers firstly related to lack of adequate training offered to all surgically active staff at UTH. After the initial training, there was no follow up refresher training, and no training for new staff joining the theatre department to ensure consistent implementation and compliance. Continuous training of staff is important, due to the constant influx of new personnel to the operating theatres from other departments. High staff turnover may be due to health workforce factors not researched in this study. Introduction of a checklist does not automatically lead to improved outcomes, but extensive education and sustainable training regarding its use is required to improve buy-in among surgical staff (Russ SJ, N Sevdalis, K Moorthy, et al .,2015 )

Although the NSOAP indicated some high-level commitment towards improving patient outcomes with the SSC, there was no ongoing role or involvement of the Ministry of Health (MoH) in its implementation. A potential solution to ensure local sustainability would have been to introduce the SSC in a stepwise manner, introducing it first to the top management (hospital managers and senior surgeons), bolstered by a directive from the MoH. Lack of a high-level directive and commitment of senior staff, identified in this study, contributed to poor local ownership and lack of champions who could then drive and sustain the implementation of the SSC across different operating rooms at UTH.

The findings also revealed the lack of monitoring of the team practices in SSC execution. Lack of a supervision system and local champions to reinforce adherence to the checklist identified in this study is a common barrier reported by others across different settings (Vohra RS, JB Cowley, N Bhasin, Barakat HM, et al.,. 2015). These findings are supported by studies elsewhere which reported that surgical safety checklist utilisation improved after local champions were introduced (Russ et al., 2015;Treadwell et al., 2014; Kim et al., 2015;Epiu et al., 2016).

To successfully introduce the SSC a structured approach that includes monitoring of the use of the SSC is needed. In other studies, the introduction of dedicated teams to periodically monitor and evaluate outcomes was identified as an essential component of strengthening SSC execution (García-París et al., 2015). In our study facility, management support was indicated to be key in ensuring consistent implementation of the SSC and accountability. This is in line with findings from other studies suggesting that accountability is unlikely to be achieved without institutional support of and leadership within the surgical teams (Aveiling et al; 2015).

This study found that the SSC protocols were not displayed in some operating rooms at UTH, which was reported as an implementation barrier. Other studies demonstrated that the introduction of a relatively simple and inexpensive change such as wall-mounted checklists could enhance team engagement and compliance with its implementation (Ong et al, 2015; Martis et al., 2016).

Respondents also indicated that there was a need for the SSC tool to be adapted to the local setting and systems at their hospital. There is evidence that adapting the SSC to local settings promotes the feeling of ownership and increases compliance in the operating rooms with the SSC implementation practices. (Close KL, 2017; Russ et al., 2015; Gagliardi et al., 2014; Vats et al., 2010; Solsky et al.,2018; WHO.,2009; Cabral et al., 2016).

Systemic inefficiencies of the surgical department at UTH related to staff shortages and study participants as factors, which impeded full implementation of the SSC, mentioned equipment and supply shortages. Consequently, surgical staff felt fatigued and unmotivated to fulfil the demands of the SSC utilisation. Fatigue combined with lack of standard patient safety protocols create a negative feedback loop making surgical staff prone to making mistakes (Ragusa et al, 2016; Westbrook et al, 2018). The resources needed to execute the SSC on a patient are minimal but it is heavily dependent on changing staff attitudes and behaviours.

These findings are similar to studies elsewhere which reported that, when surgical resources were insufficient, considerable time would be spent to address these shortages, compromising the time spent on the actual operation. Improving availability of resources within the operating theatre environment is key to preserving the time that is needed for surgical work. Other studies highlighted that improvements in hospital practice and resources improved the use of the SSC (White et al., 2018; Kwok et al., 2013; Close et al, 2017; Pugel et al., 2015). However, findings from studies in Cambodia and Moldova (Garland et al, 2017; Kwok et al, 2013) reported that material resources were not the primary barrier to checklist implementation in these settings and a good level of SSC implementation was achieved despite limitations in resources. This suggests some contextual differences across geographical regions, possibly related to leadership and championing of the SSC by senior surgeons that should be explored in further studies.

Analysis of the surgical team dynamics, with the surgeon at the centre in a power-holding position, points to a critical factor enabling or hindering sustained implementation of the SSC. Negative attitudes of the lead surgeon were a clear barrier to its use. These findings are supported by studies elsewhere, where nurses and anaesthetists were found to be the most supportive of SCC utilisation, while surgeons ranked the lowest (Vats et al, 2010; O'Connor et al, 2013; White et al ,2018). Another study showed that nurses had a more positive attitude towards the checklist compared to other personnel (Vats et al, 2010; O'Connor et al, 2013; White et al, 2018).

In other studies, the negative attitude of the lead surgeon towards the SSC was also linked with reported intimidation of some junior surgical team members who encouraged the SSC utilisation. In some instances led to conflict in the surgical team (Ragusa et al, 2015; White et al, 2018; Cochran and Elder

2014/ 2015; Higgins and MacIntosh, 2010; Bergs et al, 2015; Russ et al, 2015). These findings are similar to a study conducted in 10 African countries in 2013 aimed at analysing challenges and barriers to the use of the SSC. After the introduction of the SSC, the main barriers to its long-term utilisation were related to organisational and cultural factors, which could be addressed through strong supportive leadership (Kariyoi et al, 2013). Factors identified in this study, which need to be addressed through a cultural change, include reported poor work ethics and poor team approach to surgery. Issues worthy of further exploration include identifying the types of (and reasons for) staff routinely arriving late to surgery and the reasons why senior surgeons cited lack of time as a reason for skipping the SSC. The impact on public sector work of pressure of time due to engaging in dual public-private practice is debated in the literature (Ashmore, J and Gilson, L. 2015).

The WHO SSC is an important tool in the operating room environment (Oznur Gurlek Kisacik and Yeliz Cigerci, 2019; N.Pattni,C.Arzola, A.Malavade et al, 2019; Elin Thove Willassen, Inger Lise Smith Jacobsen, Sidsel Tveiten, 2018).

Its introduction is a behavioural intervention, which is complex and challenging. To achieve successful implementation and good adherence rates, it takes time and a change in the safety culture among clinicians (Perry & Kelly, 2014). Although introductory programmes are essential to kick start the culture of using the checklist in facilities where it had not been used before, they are likely to achieve little long term impact without a strong and sustainable system reinforcing the use of the checklist after the initial intervention is finished.

## **STUDY STRENGTHS AND LIMITATIONS**

The strength of this study is that it is the first study in the Zambian setting examining utilisation of the WHO SSC in a tertiary hospital exploring user-related barriers and facilitators of the WHO SSC. Sixteen (16) in-depth interviews were conducted with four types of surgical personnel providing a comprehensive understanding of the setting in which the teams work and implement the SSC. The lead researcher was a senior operating theatre nurse working at UTH, familiar to all of the study participants. This was instrumental in getting good quality data and deeper accounts from study participants who were likely to engage in a frank conversation with the interviewer. The importance of this paper is that, while reporting and discussing findings on the introduction of the surgical safety checklist at a national teaching hospital in Africa, it points to a broader set of dynamics around hierarchical versus team working and a patchy involvement of senior surgeons in the introduction and embedding of new quality of care initiatives.

This study has several limitations. Firstly, it was not designed to capture and quantify the extent to which the SSC is being utilized and further studies are needed to unpack measure and analyse the factors determining its utilisation. Secondly, the evidence presented in this publication is self-reported, which is a limitation due to potential biases; and in particular the willingness, openness and/or reluctance of participants to discuss the factors determining SSC utilisation with the lead author, who was a staff

member at the UTH operating theatre. Finally, within the resources available in this study, it was not possible to conduct a survey of operating theatre staff, nor undertake a detailed, first-hand observation of the implementation of the surgical checklist. However, the use of qualitative interviews was appropriate to developing insights and elucidating the factors that led to sub-optimal utilisation of the surgical safety checklist at Zambia's national teaching hospital .

## Abbreviations

AE – Adverse Event

COSECSA - College of Surgeons of East, Central and Southern Africa

MoH – Ministry of Health

NHRA - National Health Research Authority

NSOAP - National Surgical, Obstetrics and Anaesthesia Plan

OT – Operating Theatre

RCN - UK Royal College of Nursing

SSC – Surgical Safety Checklist

UNZABREC - University of Zambia Biomedical Research Ethics Committee

UTH – University Teaching Hospital

WHO – World Health Organisation

ZOTNIG - Zambia Operating Theatre Nurses Interest Group

ZUNO - Zambia Union of Nurses Organization

## Declarations

### **Ethics approval and consent to participate:**

Approval to conduct the study was endorsed by the School of Public Health at the University of Zambia and thereafter-ethical clearance was sought and obtained from the University of Zambia Biomedical Research Ethics Committee (UNZABREC). Authority to conduct research was obtained from the National Health Research Authority (NHRA) and the Senior Medical Superintendent of the University Teaching Hospitals granted permission to conduct the study. Informed consent was obtained from all participants, and this study including the methods used were carried out in accordance with relevant local guidelines and regulations as per the ethics approvals.

## Consent for publication

Not applicable

## Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available due to confidentiality but are available from the corresponding author on reasonable request.

## Competing interests

None

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## Authors' contributions

JM developed the concept and study design; conducted data collection, data analysis, data interpretation; led on writing of the first draft of the manuscript.

JK interpreted the data, critically reviewed the manuscript and approved the final manuscript.

CP conducted data analysis, data interpretation, supported writing of the first draft of the manuscript; critically reviewed and edited the manuscript; approved the final manuscript.

LB interpreted the data, critically reviewed the manuscript and approved the final manuscript.

MC interpreted the data, critically reviewed the manuscript and approved the final manuscript.

RB interpreted the data, critical review, edited the manuscript and approved the final version.

JG conducted data analysis, data interpretation; supported writing of the manuscript; critically reviewed it; supported final editing and approval of the final manuscript.

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## Figures

### Figure 1

*Factors related to SSC utilisation at the UTH - emerging themes*