

**SCHOOL OF PUBLIC HEALTH
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**THE WORLD HEALTH ORGANIZATION'S SURGICAL SAFETY
CHECKLIST: ACCEPTABILITY AMONG SURGICAL PERSONNEL IN
KORLE BU TEACHING HOSPITAL IN ACCRA, GHANA.**

BY

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DECLARATION

“I, Dr. Eyram Cyril Bansah, declare that except for other people’s investigations which have been duly acknowledged, this work is the result of my own original research, and that this dissertation, either in whole or in part has not been presented elsewhere for another degree. Also, I have wholly undertaken the study reported herein under the supervision of Dr. Alexander Manu.”

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I confirm that the work reported in this thesis was carried out by the candidate under my supervision.



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DEDICATION

To my beloved wife Diana and my sons Dom and Davis Bansah. Thank you for standing by me all the way.

To my mother Doris; siblings Elorm, Etornam, Eli and Eyako Bansah. Thank you for your support and prayers.

Lastly, to my late father Mr. H.D.K. Bansah, I will forever be grateful for the solid foundation you gave me in life.

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May God richly blessed you all.

ABSTRACT

Background: Despite the encouraging outcomes, the use of the WHO SSC is poor, with compliance as low as about 12% in some areas. This study was conducted to investigate the factors that influence acceptability and utilization of the WHO SSC among surgical personnel in Korle-Bu Teaching Hospital (KBTH) in Ghana.

Methods: A cross-sectional design that employed quantitative method of data collection was conducted among 186 surgical personnel at the KBTH in Ghana. Data was obtained from May to June 2019 using structured questionnaires. A logistic regression analysis was conducted to assess the association between socio-demographic characteristics, training on SSC, surgical subspecialty and adherence to WHO SSC.

Results: Out of the 190 personnel recruited, 186 consented and participated in this study giving a response rate of 97.9%. Participants were made up of 69 (37%) surgeons, 66 (36%) anaesthesiologists and 51 (27%) nurses. This study found a high level of awareness and acceptability of the WHO SSC among theatre staff at the KBTH. Adherence however was low. Only 30.4% of surgical personnel at the KBTH use the SSC all the time. The majority (67.7%) of the surgical personnel had no training on the use of the SSC and the proportion was significantly higher among the Surgeons (81.2%) as compared to the Nurses (51%) and Anesthesiologists (66.7%) ($p < 0.001$). Poor communication between anesthesiologists and surgeons is a barrier to the use of the SSC. The surgical subspecialty of a personnel was significantly associated with their knowledge of the SSC ($p = 0.002$) and whether or not they received training on SSC ($p = 0.030$). The Neurosurgery subspecialty had higher odds of frequent use of the SSC as compared to the General surgery subspecialty (OR, 95% CI; 4.86, 1.57-15.04; $p = 0.006$). Training was also significantly associated with frequent use of the SSC.

Conclusion: Despite the high level of awareness and acceptability, there are gaps in knowledge and utilization of the WHO SSC among theatre staff. The outcome of this study will provide baseline empirical evidence to serve as a platform for further studies aimed to improve the adherence of the SSC. This study recommends periodic training for surgical staff to enhance their knowledge and use of the SSC.

TABLE OF CONTENTS

DECLARATION	i
DEDICATION	ii
ACKNOWLEDGEMENT.....	iii
ABSTRACT.....	iv
TABLE OF CONTENTS	vi
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
ABBREVIATIONS	x
CHAPTER ONE.....	1
INTRODUCTION.....	1
1.1 Background Information	1
1.2 Problem Statement	2
1.3 Justification of the Study.....	3
1.4 Research Questions	4
1.5 Null Hypotheses	5
1.6 Objectives of the Study.....	5
1.6.1 General Objectives.....	5
1.6.2 Specific Objectives	5
CHAPTER TWO.....	6
LITERATURE REVIEW	6
2.1 What is the WHO SSC?	6
2.2 History of the WHO SSC.	6
2.3 Overview of the WHO SSC.....	8
2.4 Why a safety checklist?	10
2.5 Benefits of using the WHO SSC	11
2.6 Acceptability of the WHO SSC	14
2.7 Adherence to the WHO SSC	16
2.8 Attitudes of surgical staff towards the WHO SSC.....	20
2.9 Barriers to the use of the SSC	22
CHAPTER THREE	25
METHODOLOGY.....	25
3.1 Study design.....	25
3.2 Study area and population.....	25

3.3 Inclusion criteria.....	26
3.4 Exclusion criteria.....	26
3.5 Sampling and sample size consideration	26
3.6 Study procedures.....	27
3.6.1 Data collection instrument and methods	27
3.6.2 Study variables.....	27
3.7 Data handling	28
3.8 Data analysis and statistical considerations	28
3.9 Limitations of the study.....	29
CHAPTER FOUR	30
RESULTS	30
4.1 Background characteristics.....	30
4.2 General information on the WHO SSC	33
4.3 Perception on benefit of using the WHO SSC.....	35
4.4 Determinants of non-use of WHO SSC among surgical personnel	37
4.5 Association between educational level, sub-specialty, and experience and knowledge and training on SSC	41
CHAPTER FIVE	45
DISCUSSION.....	45
5.1 Acceptability of the WHO SSC among surgical personnel.....	45
5.2 Determinants of non-use of the WHO SSC	47
5.3 Knowledge and use of the SSC among surgical sub-specialties.....	49
5.4 Knowledge and use of SSC among surgical personnel	49
CHAPTER SIX	51
CONCLUSION AND RECOMMENDATIONS	51
6.1 Conclusion	51
6.2 Recommendations.....	52
REFERENCES	54
APPENDIX A - STUDY QUESTIONNAIRE.....	64
APPENDIX B - ETHICAL APPROVAL	68
APPENDIX C – WHO SURGICAL SAFETY CHECKLIST.....	69

LIST OF TABLES

Table		Page
Table 4.1	Background characteristics of respondents	29
Table 4.2	Report on knowledge, awareness and utilization of the surgical safety checklist among surgical staff	32
Table 4.3	Perception on benefit of using the surgical safety checklist (SSC) among Surgical Personnel	33
Table 4.4	Determinants to the use of WHO SSC among surgical personnel	34
Table 4.5	Association between educational level, surgical unit and experience and knowledge and training on SSC	36

LIST OF FIGURES

Figure		Page
Figure 4.1	Type of personnel	28
Figure 4.2	Cluster bar chart showing effect of training on knowledge of SSC	38

ABBREVIATIONS

ANOVA	Analysis of Variance
CHAG	Christian Health Association of Ghana
CPD	Continuous Professional Development
ENT	Ear Nose and Throat
GHS	Ghana Health Service
KBTH	Korle Bu Teaching Hospital
LMIC	Low- and Middle-Income Countries
MO	Medical Officer
MOH	Ministry of Health
OPD	Outpatient Department
OR	Odds Ratio
SD	Standard Deviation
SSA	Sub-Saharan Africa
SSC	Surgical Safety Checklist
SSI	Surgical Site Infection
SSSL	Save Surgery Saves Life
WHO	World Health Organization
WHA	World Health Assembly

CHAPTER ONE

INTRODUCTION

1.1 Background Information

The safety of patients undergoing surgery became a matter of public health concern globally since the turn of the 21st century (World Health Organization, 2009). As part of its effort to tackle the problem, the WHO adopted safety in surgery in 2007-2008, as the second problem area for the safety challenge. These efforts subsequently culminated in the development and introduction of a checklist; the WHO Surgical Safety Checklist (SSC) in 2008. The aims of the checklist are to improve patient safety, promote effective communication and teamwork and to forestall avoidable adverse effects. The checklist is simply an itemized series of questions that must be asked at three vital stages which is signified by a pause during a surgical procedure. (World Health Organization, 2009).

The usefulness and impact of the SSC has been described in a variety of economic settings and diverse patient populations with the evidence suggesting a possible greater impact in developing countries (Haynes et al., 2009a). Despite the encouraging outcomes, its usage remains poor with compliance being reported as low as 12% in some settings (Borchard, Schwappach, Barbir, & Bezzola, 2012; Spence, Goodwin, Enns, & Dean, 2011). Among the reasons for poor usage of the SSC were unfamiliarity and embarrassment, hierarchies in the operating theatres, timing of the checks and duplication of efforts (Vats et al., 2010). There is however a dearth of evidence from LMICs where this checklist will probably be more useful and effective. To improve the uptake of such an intervention, there is the need to understand whether the processes involved are acceptable to the users and to understand why the compliance is very low.

No study to date has explored the acceptability of the checklist and feasibility of implementing in Ghana and LMICs of Sub-Saharan Africa (SSA). This study will seek to elicit the acceptability of the WHO SSC among surgical personnel in Korle Bu Teaching Hospital (KBTH), the largest tertiary facility in Ghana and assess the determinants to implementation of this tool among surgical experts in the country.

1.2 Problem Statement

An estimated 266.2 to 359.5 million surgeries are conducted every year (Weiser, Hayenes, Molina, Lipsitz, Esquivel, Uribe-Leitz and Gawande, 2016) . According to this estimation, about 1 in 25 persons alive has an operation every year, which is more than twice the yearly volume of childbirth (Population Reference Bureau, 2016). Mortality rate associated with these surgical procedures is about 0.4% – 0.8% in developed countries (Kable, Gibberd, & Spigelman, 2002; Gawande, Thomas, Zinner, & Brennan, 1999), and 5–10% in developing countries (Ouro-Bang’naMaman, Tomta, AhouangbeL, & Chobli, 2005; McConkey, 2002; Yii & Ng, 2002). Ouro-Bang’naMaman et al., (2005) reported death rate from anaesthesia related complications in Sub-Saharan Africa (SSA) to be very high (1 in 150). According to Weiser et al. (2016), approximately 7 million people undergoing surgical operation develop severe complications. This includes about 1 million people who die from the operation every year. Most significantly, about half of the complications in these studies were avoidable (Weiser et al., 2016).

Since its introduction in 2008, the evidence suggests that the WHO SSC has reduced perioperative morbidity and mortality. Bergs et al. (2014) in their review of studies on the impact of the WHO SSC made a strong argument in support of lower peri-operative adverse events and deaths observed after the introduction of the checklist. They found

significant decrease in all complications deaths as well as SSI. In a similar study, Treadwell, Lucas, & Tsou (2014) concluded that the WHO SSC was associated with decreased surgical complications including infections.

In spite of its benefits, the acceptance and usage of the WHO SSC has been limited to only few countries and facilities, and certainly very rarely, if any at all, in SSA (Vivekanantham, Ravindran, Shanmugarajah, Maruthappu, & Shalhoub, 2014). Treadwell, Lucas, & Tsou (2014) grouped barriers to initiation of the WHO checklist into four forms namely ambiguity about the correct way of applying the checklist, gross changes to productive system, availability of resources, and staff perspective and approach. At the bottom of all these may be the fact that the checklist is not acceptable to the users. This is key to the uptake of the intervention. Therefore, this research attempts to play a part in addressing this chasm by examining the acceptability of the checklist and exploring what factors are associated with the application of the surgical checklist in routine practice in Ghana as well as similar LMIC settings.

1.3 Justification of the Study

Since the volume of surgical procedures performed every year is on the rise globally along with its inherent complications, there is the need to implement systems that protect the interests of the patients undergoing surgery. The safety checklist is one of such systems. Ever since its introduction in 2008, very few health facilities in Ghana have institutionalised and used the WHO SSC effectively.

However, very scanty to virtually no published work or data exists in literature on its acceptance, use and determinants to non-use. Knowledge of these will help in the development of strategies and policies to improve its acceptance and use. This will be a step towards improving the safety of surgical patients in Ghana in line with global efforts. Korle Bu Teaching Hospital was selected for this study because it is the largest tertiary facility in the country and affiliated with the University of Ghana Medical School, the Ghana and West African College of Physicians and Surgeons. It is the leading training centre for surgeons, anaesthesiologists and theatre nurses. Lastly, KBTH hospital has the largest surgical subspecialties in a single facility. The Surgical department selected for this study performs more than 50% of all surgeries in the hospital yearly. It has the following sub-specialties; General surgery, Neurosurgery, Urology, Paediatric surgery and Anaesthesia.

1.4 Research Questions

1. How acceptable is the use of the WHO SSC to surgical personnel at Korle Bu Teaching Hospital?
2. What is the rate of adherence (defined as using the SSC “always” or “not always”) among surgical personnel at the KBTH?
3. Is there a difference in adherence rate of the WHO SSC among the different surgical sub-specialties in Korle Bu Teaching Hospital?
4. What are the factors influencing acceptability of the WHO SSC among surgical personnel in Korle Bu Teaching Hospital?

1.5 Null Hypotheses

1. There is no difference in the adherence rate of the WHO SSC among surgical personnel (surgeons, anaesthesiologists and theatre nurses) in KBTH.
2. There is no difference in adherence rate of the WHO SSC among the different sub-specialties in KBTH.

1.6 Objectives of the Study

1.6.1 General Objectives

To investigate the factors that influence acceptance of and adherence to the WHO SSC among surgical personnel in Korle Bu Teaching Hospital.

1.6.2 Specific Objectives

1. To determine the acceptability of the WHO SSC among surgical personnel in KBTH.
2. To evaluate the difference in adherence rates among the different surgical personnel and sub-specialties in KBTH.
3. To assess the determinants of non-use of the WHO SSC among surgical personnel in KBTH.

CHAPTER TWO

LITERATURE REVIEW

2.1 What is the WHO SSC?

The WHO SSC is the most popular surgical checklist in use for surgical practice since its introduction. It is list made up of a series of 19 questions asked at three periods referred to as time-outs during an operation. The first time-out is at the beginning of anaesthesia. The second time-out is just before the surgeon makes a skin incision and the third time-out is after surgery, just before the surgical client is sent out of theatre (World Health Organization, 2009).

2.2 History of the WHO SSC.

In the 2002 meeting of the World Health Assembly (WHA), a decree was sanctioned (WHA55.18) in responds to the significant global burden arising from the harm caused by the inadequate safety in patient care (World Health Organization, 2009). The resolution mandated the WHO to lead the patient safety initiative. It further urged member states to step up the reliability of health care as well as monitoring and evaluating systems to promote well-being of patients. Approval for the establishment of a global alliance for the safety of all patients was followed by launching of the WHO Patient Safety Challenge in 2004. The aim of this challenge was to promote the goal of “first do no harm” in health care (WHO, 2009). The WHO Patient Safety initiative brought together the expertise of several specialists and focused its activities on facilitating safety policies and practices through the Global Patient Safety campaign.

The first patient safety challenge was initiated in 2005-2006. It sought to tackle the problem of health care associated infections in patients and was themed “clean care is safe care” (Pittet & Donaldson, 2005). The campaign resulted in the establishment of guidelines on hand washing in hospitals which resulted in the implementation of simple standards for hand washing (Barde, Gralla, Harwijanto, & Marsky, 2002).

The second problem area selected in 2007-2008 for the patient safety challenge sought to promote safety in surgery and hence the “Safe Surgery Saves Lives” (SSSL) campaign (WHO, 2009). The campaign established core sets of protocols and practices to scale up patient safety which could be implemented in all places and settings with the sole purpose of improving safety of surgical patients. It brought together more than 100 international specialists with background knowledge in several specialties including surgery, anaesthesia and in working groups. After reviewing the literature and clinical experiences of health practitioners from the various WHO regions, they reached an agreement on recommended safety practises in four major areas; assessment of surgical practises, anaesthesia, team work and prevention of surgical site infection (SSI) (World Health Organization, 2009). Surgery was defined as “any procedure occurring in the operating room involving the incision, excision, manipulation or suturing of tissue that usually requires regional or general anaesthesia or profound sedation to control pain” (World Health Organization, 2009).

The complexity of surgery has been identified along with the fact that no single measure can alter its safety profile. Hence, maintaining safety during surgical procedures depended on careful implementation of multiple processes by the entire surgical team and not only the surgeon. Therefore, just as hand hygiene was to the prevention of

healthcare associated infection, the WHO SSC became the flagship of the SSSL campaign.

2.3 Overview of the WHO SSC

Generally, checklists are known to be simple, plain and easy to reproduce as a method of standardization regarding safety procedures in the operating room (Abbott et al., 2018). When it comes to patient care, checklists are cost effective tools used to ease patient pain and improve patient outcomes (Lilaonitkul et al., 2015). Among the several checklist available in healthcare, the WHO SSC is the most widely used globally following its global implementation in 2008 (Vijayasekar & Steele, 2009).

The WHO SSC comprises of a 19-item tool spread in three phases. These are: “before induction of anaesthesia, before surgical incision, and before the patient leaves the operating theatre” (Vandijck & Bergs, 2014; Vijayasekar & Steele, 2009). The SSC requires several actions including checks for a variety of items like patient name, introduction of surgical team members, and antibiotic prophylaxis (Vijayasekar & Steele, 2009). The general aim of the WHO SSC is to aid in the improvement of patient safety. It achieves this by standardising the treatment of surgical clients in theatre through a cascade of vital safety checks (Lilaonitkul et al., 2015). The checklist in addressing safety issues in the operating theatre enhances the commitment of surgical personnel (Vandijck & Bergs, 2014).

The WHO SSC is now regarded as the yard-stick for assessing quality of surgical care delivery and has been widely implemented in hospitals all over the world. The application of the SSC has led to a simultaneous decrease in the number of major

adverse events and death in patients undergoing surgery (Fourcade, Blache, Grenier, Bourgain, & Minvielle, 2012). Notwithstanding the reported successes achieved with the SSC, utilizing in the stipulated manner has remained rather low. This low usage rates evince that the SSC may be problematic or points to challenges with communication, teamwork and routine practices among operating staff (Vijayasekar & Steele, 2009).

Although the SSC seem quite simple, research suggest that, its implementation has not been as simple. In fact, a greater proportion of hospitals are striving with its effective implementation (Vandijck & Bergs, 2014). A number of the reasons have been identified. One factor is that utilization of the checklist as a mere tick box exercise in the operating room. Evidently, it is the carrying out of the actions intended, that is important and leads to a reduction in the risk for complications, and not the ticking of boxes on a list. In addition to technical features, the checklist also contains features that can be socially adapted depending on the setting. The technical aspects of the SSC such as starting antibiotics prior to skin incision are obvious and readily initiated actions. On the other hand, the socially adaptive features like the time-out process which reviews the plan of surgery are complex, and requires more involving actions. Strong commitment is therefore needed on the part of all members of the team. Efforts to implement the SSC must ultimately tackle patient safety culture because most of the features of the checklist act as a prompt to encourage communication and teamwork. Features of the checklist such as introducing each member of the team, confirming the site for surgery, and reviewing vital events such as anticipated blood loss, estimated total duration of surgery, etc. will have no positive effect if performed solely as a tick-box activity (Vandijck & Bergs, 2014).

Troyer et al. (2014) in a meta-analysis report, stated that there was not enough evidence of high-quality to outline clear-cut conclusions. Concomitantly, the effectiveness of the SSC in the clinical setting is still not clear; some physicians even object to its utilization (J. Bergs et al., 2014). Checklist compliance audits have produced inconsistent results, mostly disappointing. The results indicate that some surgical staff were often not present in theatre or were inattentive during time-outs and the checklist were incompletely done (Saturno, Soria-Aledo, Gama, Lorca-Parra, & Grau-Polan, 2014; Pickering et al., 2013).

2.4 Why a safety checklist?

Experiences from the use of safety checklists by other high reliability sectors like the airlines and nuclear plants, are classic examples of the effectiveness of checklists in preventing accidents (Reason, 2000). In other medical fields: for example, anaesthesiology, insertion of central venous lines and medication administration: it was evident that the implementation of checklists to standardize basic practises improves reliability (World Health Organization, 2009). According to Reason (2009), the issue of human imperfection can be analysed in two ways; individual and system approaches. The individual approach suggests that individuals are fundamentally flawed and error-prone. Errors such as memory failure, inattentiveness, carelessness and moral weakness are highlighted in this approach. On the other hand, the system approach focuses on the environment in which individuals operate and attempts to counter or mitigate the forces that lead to errors. High reliability organizations use the system approach. Individuals may make mistakes so the culture of the system approach is to provide them with both the reminders and tools such as a checklist to help them avoid making mistakes.

There are many benefits to the checklist approach. The checklist helps personnel to recall from memory boring issues in a patient that very easy to disregard especially in

patients with emergency conditions that produces a chaotic and often distracting environment in the operating room. It defines the baseline required steps in any complex surgical procedure and hence, guarantees that welfare of both client and operating staff (World Health Organization, 2009). Use of checklists have been found to elevate the level of baseline performance through the establishment of team work and safety culture (Hales, 2006). They have been used widely and successfully all over the world particularly in the operating rooms even though there are no robust standards or guidance as to what they should contain (World Health Organization, 2009).

2.5 Benefits of using the WHO SSC

The main goal of the WHO SSC was to help minimize the risk of perioperative complications as well as reduce surgical site infections (WHO, 2004). Since introducing the WHO SSC as a component of a strategy to improve surgical patient safety, studies have reported a reduction in perioperative mortality (Prates, Stadník, Bagatini, Caregnato, 2018; Christie, 2019; Haynes et al., 2017, 2009).

In an observational study, conducted in a general hospital to evaluate the differences between SSI rates in non-contaminated operations prior to and after the application of the WHO SSC among 15,319 cases, the total rate of infection in non-contaminated surgery was 4.17% before application and 1.10% after the application of the SSC ($p < 0.05$). Furthermore, the post-operative wound infection rates in the various surgical sub-specialties were significantly reduced in the post implementation period of the SSC compared to the pre-implementation period (Cassiana et al., 2018). Results from this study show the success achieved with the WHO SSC and thus addition of the checklist

into peri-operative practices contributed to decrease in post-operative wound infection and enhanced overall patient safety.

In the United States, South Carolina based hospitals implemented a self-designed checklist similar to the WHO SSC for a surgical quality improvement program. Compared to other hospitals without such a quality improvement program, there was a significant decrease in the mortality rates after inpatient surgeries in the first 3 years (Haynes et al., 2017). This further leads to the assertion that, implementation of a through and through safety checklist on a large scale just like the WHO SSC is not only feasible but also capable of lowering complications and deaths associated with surgeries.

In Scotland, the only intervention specifically targeted at surgical patients was the introduction of the of the SSC as part of a wider patient safety program (Christie, 2019). Current research indicates that, application of the WHO checklist results in a decrease rate of inpatient deaths of 0.76 (95 % CI: 0.68 to 0.84%) in 2000 to 0.46 (95% CI: 0.42 to 0.50) in 2014. Thus, the introduction of the SSC was responsible for a 36.6% relative decrease in death ($P < 0.001$). It has also been noted that whiles death rates before introduction of the SSC were reducing by 0.003 (95% CI. -0.017 to 0.012) per year; yearly reductions of 0.069 (-0.092 to -0.046) were noticed during and after 0.019 (-0.038 to 0.001) introduction in a national representative surgical cohort (Ramsay et al., 2019). In effect, perioperative complications and deaths have reduced since the application of the SSC in the context of a national patient safety strategy.

In a study conducted in multiple sites, using the safety checklist in emergency surgeries, resulted in outcomes of patients that were significantly improved. Postoperative complications decreased by about a third and death rates fell by about two-thirds (Haynes et al., 2009). Despite circumstances requiring rapid surgical intervention, often accompanied by a dramatic environment, Weiser et al. (2010) observed that it was very possible to use the checklist which ensured that the minimum safety standards were effectively accomplished. In another study, initiation of the SSC in multiple diverse healthcare centres led to significantly better post-operative results; there was a decrease in post-operative adverse events in patients, 16years and above who had non-cardiac surgery (Haynes et al., 2009b).

Regarding patient safety, the evidence so far indicates that breakdown in communication are widespread in operating rooms. The product of this is an increase in the risk of complications such as infections, disabilities and death. The utilization of the checklist may curtail breakdown in communication and lower adverse events in surgery. Research suggests that, the WHO SSC is an instrument to improve communication and safe practices, and realistically has direct impact on surgical outcomes (Pugel, Simianu, Flum, & Patchen Dellinger, 2015).

In summary, Gillespie et al. (2014) in their systematic review came to a conclusion that, the utilization of safety checklists decreases adverse event rates in surgical patients as evinced by past pre- and post-implementation studies. Thus, without the evidence of more intervention studies, it is still conceivable to indicate that there is an inverse association between surgical checklist utilization and post-operative adverse events. This is because introduction of the SSC has demonstrated improved outcomes.

Moreover, use of the WHO SSC in emergency surgeries is practicable and should be considered. Implementation of the SSC proved neither expensive nor cumbersome. Nevertheless, more studies are required to ascertain these observations and discover new factors that may influence implementation of the checklist (Dinesh, 2018).

2.6 Acceptability of the WHO SSC

Several studies have shown that, initiation of the safety checklist led to significant reductions in mortality associated with surgery and also increased patient safety (Rakoff et al., 2018, Haynes et al., 2017; Haugen et al., 2015). However, few studies have investigated the acceptance of the WHO SSC among healthcare staff, required to adhere to the checklist. Describing and or investigating the acceptance of the checklist by personnel's is necessary because it suggests their intention of utilizing the tool which will facilitate or block its implementation (Hurtado, Jiménez, and Peñalongo et al., 2012). Also, the success of training programs is reflected in the level of awareness and knowledge.

A research by Hurtado et al. (2012) among operating staff in Guatemala City revealed that, out of a total of 147 operating staff who were interviewed on the acceptance of the WHO SSC, 93.8% knew about the WHO SSC while 88.8% alluded to knowledge of its objectives. However, proportionately more theatre nurses had correct knowledge of the objectives of the WHO SSC compared to surgeons and anaesthesiologists. Majority of those interviewed agreed that, application of the SSC has benefits and its introduction was a good move. Nevertheless, in spite of the observed high level of acceptability, disparities exist in knowledge with regards to the correct way to use the checklist among

personnel. The negative consequence of this is that, implementation becomes difficult which poses a threat to correct application of the SSC in healthcare facilities.

A qualitative study that investigated the acceptability of the checklist among operating staff in Calgary indicated that, although majority of the respondent alluded to the fact that the checklist may prevent some technical problems and adverse events, only a handful perceived the idea of identifiable benefits in morbidity and mortality. that there have been identifiable improvements to complications and death (Dharampal, Cameron, Dixon, Ghali, & Quan, 2016). According to respondents, the SSC was difficult to incorporate into peri-operative protocols initially due to a change in time management and traditional peri-operative practices. It has however in time, been smoothly incorporated into peri-operative routine. Furthermore, participants were of the opinion that already existing informal checklists were capable of preventing most issues during surgery. In spite of the fact that the checklist may help with workflow and equipment, theatre staff interviewed thought it failed to demonstrate a subjective clinically significant improvement. This opinion is however which is in contrast with many findings that has been reported on the effectiveness of the SSC.

The WHO permits and encourages adaptation of the checklist to fit local requirements of an operating theatre provided the core features are intact. In order to foster and guarantee a sense of proprietorship, there has to be equal involvement of all personnel in the team (Vandijck & Bergs, 2014). According to a study that reported on the acceptance of the SSC in which data was collected from 136 participants (Pat, 2009) on utilization of the SSC, about a fifth of participants said that surgeons did not accept the

checklist well whiles close to two-thirds stated that surgeons only accepted it partially. Overall, theatre nurses had the greatest level of acceptability.

2.7 Adherence to the WHO SSC

Implementation of the surgical checklist has helped to decrease significant adverse events associated with surgery and has led to a reduction in mortality. However, studies evaluating its impact have revealed inconsistent outcomes due to variable level of adherence. Multiple processes and factors account for the observed variation in adherence (Gagliardi, Straus, Shojania, & Urbach, 2014).

In Gagliardi et al. (2014) multicentre qualitative study that examined interacting factors influencing adherence to the WHO SSC, participants indicated that, modification of the WHO SSC in the context of local hospitals' operating procedures makes it more user-friendly. It was observed that, personnel who were more experienced in using the checklist were more likely to have added dimensions to the checklist to improve adherence based on the hospitals operating procedures such as handoffs, anaesthesia related checks, patient positioning and ward of destination after surgery. They were also more likely to have altered the arrangement of steps on the SSC and modified it over a period of time to improve and sustain adherence. Respondents who were based in small-sized facilities were predisposed to deleting features pertinent to surgical operations which are not done in their facility. Modification was seen as important, therefore keeping the integrity of the SSC did not matter as that could lead to irrelevant steps and poor adherence. A few physicians in the study even suggested that the checklist should be readily adaptable to fit different procedures.

Another factor identified by Gagliardi et al. (2014) that influences adherence is responsiveness of operating personnel to the SSC. Most of the respondents saw the SSC as necessary while identifying its numerous associated benefits such as efficient time use, better teamwork, communication and satisfaction among theatre staff. In addition, clients and their families were more reassured when they knew that the checklist was used. (Conley, Singer, Edmondson, Berry, & Gawande, 2011). Several surgical personnel interviewed acknowledged that because of the application of the SSC, they were better prepared for the case at hand including having the right tool and antibiotics, marking the right site, labelling specimens correctly, necessary documentation for all procedures. Overall, responsiveness ensures “the right surgery on the right patient on the right side” (Gagliardi et al., 2014, p. 3). Despite these positive remarks regarding responsiveness and adherence to the SSC, many participants were of the opinion that, surgical personnel needed to have been consulted and taken part in modifying and initiating the SSC to promote proprietorship and further increasing adherence. Rather, they felt the SSC had been forced on them by their managers, which bruised their egos and led to some resistance to accepting the checklist in theatre.

Research has also identified that, even though the checklist is present and well displayed as laminated forms, or posters, and read out in a manner originally designed, the multi-disciplinary interaction among theatre personnel was not observed most of the time (Gagliardi et al., 2014). Some personnel were frequently out of the operating room during time-outs whilst others even refused to partake. Apathy and inattentiveness on the part of some staff during the checklist review undermined the positive effect of the checklist to “just another tick box”. These observations resulted in low quality inter-professional communication among operating staff which led to important patient safety

concerns not being crosschecked in a purposeful way. Fostering effective inter-professional communication among staff in a broader and contextual manner may encourage effective use of the SSC and could help improve adherence among surgical staff.

Facilitation and promotion of the SSC also influences adherence. In their study, Gagliardi et al. (2014) observed that there was little organizational support for facilitation of the SSC. Many surgical staff were not made aware or instructed on the correct way of utilizing the SSC. Moreover, surgical nurses who were championing its implementation in most instances stated that there was not enough time for adequate preparation and pilot testing of the SSC before it was fully launched, and resources were not made available by hospital management for its effective implementation. Hospital management was also not seen as being actively involved in SSC implementation. These observations contribute to poor SSC uptake which affects adherence. Therefore, proper facilitation and promotion of the safety checklist by a designated group of staff in the hospital may improve adherence.

Monitoring of staff pertaining to the utilization SSC helps improve compliance and may increase adherence among surgical staff. Some methods of monitoring SSC use identified by Gagliardi et al. (2014) were regular audit reports of nursing documentations and observational spot checks. They observed that neither was there incentives for strict compliance to use of the SSC nor was there consequences for non-adherence. In some cases, however, nurse in-charges queried non-compliant staff to find out the barriers associated with non-compliance. It is interesting to note that, surgical personnel who were more experienced with the checklist were more likely to state that

non-compliance to the SSC had led to an incidence in theatre (Gagliardi et al., 2014). Scheduled periodic internal audits of the checklist compliance or random audits conducted by an independent team of non-surgical personnel and consequences associated with non-compliance helps improve situation and leads to compliance knowing the consequences that comes with non-utilization. On the other hand, utilization of the checklist is more likely to be enhanced if facility-based statistics are regularly gathered, analysed and disseminated for feedback, leading to informed decision and relieving of the heavy nursing workload from clerical responsibilities.

Lastly, Gagliardi et al. (2014) identified a number of individual and team factors interacting to determine adherence. The conventionally surgeon-dominated power structure of the operating room coupled with low self-confidence among nurses conducting the SSC review, often led to intimidation and avoidance of using the checklist. Typically, lower ranked staff were tensed when they faced resistance most often from surgeons. Other complex factors such as uncertainties regarding how to use the SSC, who to lead the reviews and increased workload of nurse also negatively influenced adherence. To rectify these issues, Gagliardi et al. (2014) recommended that, the complexity in the operating room needed to be demystified and promotion of a culture of inclusivity among staff be encouraged. Continuous education of surgical staff on proper use of the checklist and inter-facility networking to exchange ideas for promoting SSC adherence were also recommended.

In a study in Switzerland regarding the adherence of the WHO SSC, the study illustrated that, factors that advance and retard adherence to the SSC namely individual, procedural and contextual are associated with adherence (Schwendimann et al., 2019). It also

demonstrated that the team time-outs were correctly done. The commonest explanation to why the SSC review was not completed was the fact that some key team members were not in the operating room at sign-out. Thus, extra training of all personnel is needed for effective implementation. Another study revealed that; the checklist was being used always as recommended by WHO. Key features of the checklist intended to facilitate communication are more often than not, overlooked. It was also realized that there was no team effort in during the review process. The authors proposed that the usage of the checklist may be influenced by their perceived concept of hazards and the significance of a checklist in mitigating or preventing these risks. Therefore, to ensure participation of the whole team and advance teamwork, there is the need to address personnel's perceived concept of hazards and the role of a checklist in preventing them. This will ultimately lead to improve compliance (Rydenfält, Johansson, Odenrick, Åkerman, & Larsson, 2013).

2.8 Attitudes of surgical staff towards the WHO SSC

A study in New Zealand on the use of the SSC reveal that, theatre staff in different specialties respond differently to the checklist and interact with it on various levels (Health Quality and Safety Commission New Zealand, 2012). Whereas some professionals indicate that, the checklist has undeniable benefits to the patients, others saw personal relevance to their careers. It was identified that, those personnel who perceived the checklist as a threat to their work and competencies, and hindering efficiency, were more likely to display negative attitudes towards the SSC. The authors further observed that, the intended purpose of the SSC as a team instrument to bolster team work and communication was widely misunderstood by surgical personnel in favour of seeing it as a compliance document (Health Quality and Safety Commission

New Zealand, 2012). Aggarwal, Dhaliwal, & Joshi, (2018) in a related study intended to evaluate the behaviour of operating staff to using the SSC in a major centre of Northern India, the general responds to utilising the SSC was encouraging (>96%). Compliance among operating staff was however 40%. The main reasons for the observed lower compliance were the fact that personnel did not have enough time on their hands and that they were not confident enough (>80%). This result underscores the fact that, acceptability may not necessarily translate to compliance. Hence the importance of exploring other factors, social or cultural that may play a role in a local setting.

In another review of compliance and attitudes towards the SSC, surgical team attitudes led to an improvement in team work, communication, awareness of staff with regards to complications in surgery and safety of patients (Wangoo, Ray, & Ho, 2016b). This finding showed a positive correlation between compliance to the SSC and personnel attitudes, knowledge and training. Even though surgical personnel have a favourable attitude to the WHO checklist, addressing significant barriers would further enhance compliance during its implementation. In North Queensland, a study on staff attitudes and compliance towards the SSC found that, among 205 participants, results indicated that, the strongest hindrance to completion of the SSC was apathy on the part of other personnel as seen by nurses. Nurses also valued the checklist as important and beneficial, more than twice as much as surgeons and anaesthesiologists (Wangoo, Ray, & Ho, 2016a).

Among 6269 healthcare personnel sampled from multiple countries, researchers found that, personnel regarding the SSC as being beneficial, not effective or causing delays

were independently related to the personnel reporting adherence to the SSC (Vohra, Cowley, Bhasin, Barakat, & Gough, 2015). In Brazil, a study showed that, the WHO SSC was considered simple and did not take time to utilize. It also revealed generally positive attitudes and perceptions of the benefits of the SSC in improving patient safety among surgical personnel even though there were still difficulties regarding implementation and use of the SSC (Santana, Rodrigues, & Evangelista, 2016). A study among Swiss surgeons and anaesthesiologists two years post-implementation of the SSC, in which they were asked about their attitudes and adherence to the SSC showed that, attitudes were generally good. The proportion of surgeons and anaesthesiologists who reported taken part in an operation in which a wrong site error occurred was not insignificant (Cullati, Francis, Degiorgi, Hochreutener, Bezzola, Courvoisier, Khabiri, Licker, & Chopard, 2012).

It is important to note that, attitudes and perceptions towards the SSC are vary depending on the surgical specialty which reflects variations in viewpoints (Norton et al., 2016). This study for example, revealed that, nurses were keen to detect errors arising from consent documentation and wrong site markings compared to physicians. Surgeons on the other hand had keen eyes for antibiotic related issues and equipment errors compared to the other personnel. This emphasizes the importance of team work and effective communication whiles using the SSC as a catalyst to improve patient safety.

2.9 Barriers to the use of the SSC

Even though the WHO SSC is known to increase safety of patients during surgical operations, several factors hinder its complete application worldwide (Alnaib, Samaraee, & Bhattacharya, 2017). According to a qualitative study involving nurses, on

the factors influencing application of the SSC, surgical team/working environment, bureaucracy, composition of the SSC, inter-personnel differences among team members, and resistance to change were identified as barriers towards the SSC. On the contrary, previous experience by nurses and doctors, age of surgeons and procedure duration of the working environment facilitated the implementation and adherence to the SSC (Georgiou et al., 2018).

It is noteworthy to indicate that, the commitment of surgeons are vital players for the success of the implementation process of the SSC (Lingard et al 2005). Training of surgeons and young personnel was seen to be strongly correlated to their level of compliance (Walton & Barraclough, 2013). In a similar study, Bergs et al. (2015) revealed that surgeons were more likely to understand the benefits of using the SSC and promote its application in the operating room if they were educated and trained on it. One study (Tostes & Galvao, 2019) reported that, offering education to staff and its acceptance by surgeons were facilitators of SSC whereas lack of administrative and management support, absence of the patient safety unit, introducing the tool abruptly and absence of education were some identified barriers. Based on the above evidence, it is feasible to say that, balancing known barriers with facilitators can help increase adherence and implementation of the SSC.

In a French study, the checklist taking too much time to complete, lack of effective communication between surgeon and anaesthesiologist, repetition of checks with existing tool, poor knowledge and timing of item checks, uncertainty, unaccounted hazards and a conventional power structure in the operating room were barriers to SSC implementation (Fourcade et al., 2012). Based on this, it is safe to say that,

organisational and socio-cultural factors lead to several barriers to SSC (Jochen Bergs et al., 2015).

A report on the implantation of the SSC in Africa revealed that, ambiguity over who to lead, resistance from personnel, and not enough time to utilize the SSC as well as the SSC not appreciated as necessary were identified barriers preventing successful implementation of SSC (Kariyo, Hightower, Bosco, Ii, & Mwikisa, 2013).

CHAPTER THREE

METHODOLOGY

3.1 Study design

This was a descriptive cross-sectional study which was conducted in June 2019. The design was appropriate for this study which sort to describe the acceptability of the SSC among operating staff of KBTH as well as the adherence and determinants to non-utilization of the SSC. This study employed a quantitative method of data collection using a structured questionnaire.

3.2 Study area and population

The study was carried out at the KBTH found in Accra, Ghana. It was commissioned 9th October, 1923 and has expanded over the years into a 2,000-bed capacity hospital. It is the largest tertiary hospital and number one referral facility in Ghana. It is affiliated with the University of Ghana Medical School.

KBTH has 17 different clinical specialties. On the average, 1,500 patients seen and about 250 inpatient admissions are made each day. More than 10,000 surgeries per year are done in the hospital (Korle Bu Teaching Hospital, 2017). It has the capacity for advance investigative procedures. Specialised fields cut across Internal Medicine, General and Allied Surgery, Obstetrics and Gynaecology, Paediatrics, Dentistry, Pathology, Anaesthesia, Radiology and Laboratory Medicine. KBTH currently has three Centres of Excellence, which are the National Cardiothoracic Centre, the Reconstructive Plastic Surgery and Burns Unit as well as Radiotherapy and Nuclear Medicine Centre where advance clinical and diagnostic services are offered to people from the sub-region and beyond.

The study population was the staff of the Surgical Department of the Korle-Bu Teaching Hospital in Accra, Ghana. The surgical department was selected because it performs more than 50% of all surgical procedures in the hospital. Surgical staff were sub-classified into Surgeons (consultants, specialists and residents), Anaesthesiologists (consultants, specialists and residents/medical officers), and Nurses (peri-operative and general nurses) from the Surgical department. The Surgical department of KBTH consists of the following sub-specialties; General surgery, Urology, Neurosurgery, Paediatric surgery and Anaesthesia.

3.3 Inclusion criteria

All surgical staff who met the following criteria were included in the study:

- Must have worked or studied at the facility for at least 6 months,
- Are available during the period of the study (June 2019), and
- Gave written informed consent to take part in the research.

3.4 Exclusion criteria

Consultant surgeons and anaesthesiologists, who worked in the surgical department only for academic purposes for the University of Ghana Medical School, and therefore had not performed surgeries in theatre for more than 2 years, were excluded from the study.

3.5 Sampling and sample size consideration

All surgical staff who met the inclusion criteria were recruited for the study. Questionnaires were administered to the participants, most of them at the weekly departmental clinical meetings. Others were recruited in theatre, on the surgical wards or at the Out Patients Department (OPD).

The official list of surgical staff (surgeons, anaesthesiologists and theatre nurses) indicated a total number of 225. In all, 39 staff were excluded from the study; 28 who

were not physically available (either on annual or study leave), 7 consultants who were no longer active in theatre and 4 surgeons who declined to take part in the study. A total of 186 participants were interviewed.

3.6 Study procedures

3.6.1 Data collection instrument and methods

Quantitative data was collected from respondents using a structured questionnaire. The questionnaire covered four main sections:

- A. socio-demographic characteristics
- B. general information on the WHO SSC
- C. belief of benefits of using the WHO SSC
- D. barriers to using the WHO SSC.

The questionnaire was pretested at the Accra Regional Hospital for validity and reliability.

3.6.2 Study variables

The outcome variable was acceptability of the WHO SSC among surgical personnel in Korle-Bu Teaching Hospital. The level of acceptance of the WHO SSC was assessed with recourse to the methods employed by Hurtado et al. (2012). This included personal beliefs of benefits of using the checklist, satisfaction with, and use of the checklist.

Adherence to the safety checklist was measure using a binary variable frequency of use “always” & “not always”. A logistic regression analysis was ran to determine factors that influence utilization of the checklist.

The explanatory variables were:

- I. Socio-demographic characteristics – age, sex, education, kind of surgical personnel, years of surgical experience, rank and sub-specialty.
- II. Knowledge of the SSC – awareness, knowledge of features and correct use of the checklist.
- III. Determinants to use of the SSC – lack of leadership, staff resistance, insufficient time, checklist not a priority, ambiguity of the SSC, staffs' attitude to questions, unaccounted risks in the SSC, duplicates with existing checks.

3.7 Data handling

All questionnaires from the field were checked for completeness and internal errors during data collection. Questionnaires were sorted, numbered and kept in files and labelled. The data was entered into Microsoft Excel 2016. Progress of work was assessed every week by checking the recruitment figures and reviewing the data collected.

3.8 Data analysis and statistical considerations

Data was analysed using the statistical software package Stata/IC version 15 (StataCorp. Released 2017, 2017). Summary statistics were presented in numerical measures, tables and figures (pie-charts and bar graphs). Background characteristics, knowledge and use of SSC were presented as mean $\pm$ standard deviation (SD) for continuous variable and percentages for categorical variables. Statistical associations were tested using Chi-square or Fisher's Exact test (categorical) where applicable. Univariable logistic regression models were fitted to assess association between adherence and explanatory variables. Factors which were associated with adherence with a p-value of 0.2 or less were included in a multivariable logistic regression model to determine the factors

associated with adherence. At each stage of the model building, the factors whose p-value was greater than 0.05 were excluded sequentially from the model, taking out the one with the highest p-value at each stage until all the terms in the model were significant. All statistical tests were conducted at a significance level of $p < 0.05$.

3.9 Limitations of the study

Due to the limited time at hand, this study was conducted in only one facility, KBTH, which is a public, tertiary-level, and teaching hospital; hence the likelihood of selection and information bias.

CHAPTER FOUR

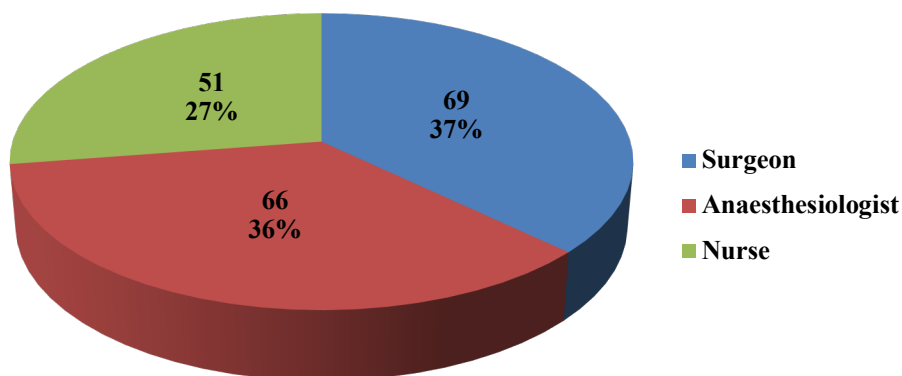
RESULTS

4.1 Background characteristics

Table 4.1 and Figure 4.1 shows the background characteristics of respondents involved in this study. In total, 190 surgical personnel were recruited out of which 186 consented and participated in the study, giving a response rate of 97.9%. As shown in Figure 4.1, 37% of the respondents were surgeons whereas 36% and 27% were anaesthesiologists and nurses respectively.

Figure 4.1: Type of surgical personnel

□



As shown in Table 4.1, the mean (sd) age of the respondents was 36 (6.6) years, and almost half (50.5%) were within the age range of 25-34years. The mean age of the respondents was higher among surgeons, 38(6.3) years and lowest among nurses, 33(4.1) years. The proportion of respondents who were 45 years or older was highest among surgeons and lowest among nurses; 15.9% and 2.0% respectively. Ninety-eight

respondents, representing 52.7% were men. Most of the surgeons (88.4%) were men whereas majority of the anaesthesiologists (59.1%) and nurses (80.4%), were women.

Christianity was the most cited religion among respondents. About 48% had a bachelor's degree whereas 37.6% had a postgraduate degree. The levels of education varied among the various personnel. Among surgeons, 53.6% had a postgraduate degree whereas 46.4% had a bachelor's degree. Among anaesthesiologists, the majority (52.5%) had a bachelor's degree while 48.5% had a postgraduate degree. Diploma was the most cited (52.9%) educational status among the nurses. About 37% of respondents worked in the General Surgery unit whereas about 6%, 12% and 9% worked in the Urology, Neurosurgery and Paediatric Surgery units respectively. The remaining 35% of respondents worked in the Anaesthesia unit.

Majority (51.5%) of anaesthesiologists were residents/medical officers whilst 19.7% and 28.8% were specialists and consultants respectively. Among surgeons, 47.8% were residents, 23.2% were specialists and 29.0% were consultants. There were more general nurses (56.9%) than peri-operative nurses (43.1%). The mean (sd) number of years spent working and/or studying at the hospital was 7.1 years (5.4) and it was higher among anaesthesiologist, 7.6 years (5.9) and lowest among nurses, 6.4 years (4.2). Overall, most of the respondents (91.8%) were satisfied with their current profession as illustrated in Table 4.1

Table 4.1: Background characteristics of respondents

Variable	Type of personnel			
	Total	Surgeons	Anaesthesiologists	Nurses
	N (%)	n (%)	n (%)	n (%)
Age (years)				
– 25-34	94 (50.5)	25 (36.2)	33 (50.0)	36 (70.6)
– 35-44	72 (38.7)	33 (47.8)	25 (37.9)	14 (27.5)
– ≥ 45	20 (10.8)	11 (15.9)	8 (12.1)	1 (2.0)
<i>Mean age (sd) (in years)</i>	36 (6.6)	38 (6.3)	36 (7.5)	33 (4.1)
Sex				
– Men	98 (52.7)	61 (88.4)	27 (40.9)	10 (19.6)
– Women	88 (47.3)	8 (11.6)	39 (59.1)	41 (80.4)
Religion				
– Christian	170 (91.4)	63 (91.3)	63 (95.5)	44 (86.3)
– Islamic	15 (8.1)	5 (7.2)	3 (4.5)	7 (14.7)
– Other	1 (0.5)	1 (1.4)	0 (0.0)	0 (0.0)
Educational status				
– Diploma	27 (14.5)	0 (0.0)	0 (0.0)	27 (52.9)
– Bachelor degree	89 (47.8)	32 (46.4)	34 (51.5)	23 (45.1)
– Postgraduate degree	70 (37.6)	37 (53.6)	32 (48.5)	1 (2.0)
Surgical Unit				
– General Surgery	69 (37.1)	42 (60.9)	0 (0.0)	27 (52.9)
– Urology	11 (5.9)	11 (15.6)	0 (0.0)	0 (0.0)
– Neurosurgery	23 (12.4)	8 (11.6)	0 (0.0)	15 (29.4)
– Paediatric Surgery	17 (9.1)	8 (11.6)	0 (0.0)	9 (17.6)
– Anaesthesia	66 (35.5)	0 (0)	66 (100.0)	0 (0.0)

Variable (cont.)	Type of personnel			
	Total	Surgeons	Anaesthesiologists	Nurses
	N (%)	n (%)	n (%)	n (%)
Level of specialization				
– Consultant	39 (21.0)	20 (29.0)	19 (28.8)	0 (0.0)
– Specialist/Snr. Resident	29 (15.6)	16 (23.2)	13 (19.7)	0 (0.0)
– Resident/Medical Officer	67 (36.0)	33 (47.8)	34 (51.5)	0 (0.0)
– Peri-operative nurse	22 (11.8)	0 (0.0)	0 (0.0)	22 (43.1)
– General nurse	29 (15.6)	0 (0.0)	0 (0.0)	29 (56.9)
Years spent in studying or working at the hospital [Mean (SD)]	7.1 (5.4)	7.2 (5.7)	7.6 (5.9)	6.4 (4.2)
Satisfied with current profession				
– Very satisfied	7 (3.8)	1 (1.5)	3 (4.5)	3 (6.0)
– Satisfied	162 (88.0)	63 (92.6)	56 (84.8)	43 (86.0)
– Neither	12 (6.5)	3 (4.4)	6 (9.1)	3 (6.0)
– Unsatisfied	3 (1.6)	1 (1.5)	1 (1.5)	1 (2.0)

4.2 General information on the WHO SSC

Table 4.2 presents results of the level of awareness, knowledge and use of WHO SSC among hospital staff. All the theatre staff interviewed were aware of the WHO SSC and almost all, with the exception of one surgeon (1.5%) and one nurse (2.0%) utilize the WHO SSC. With regards to the extent of use, majority (54.4%) of the respondents use the SSC most of the time whilst 30.4% use the SSC all the time. Proportionately more nurses (40.0%) use the SSC always than anaesthesiologist (27.3%) and surgeons (26.5%). Conversely, about 43% of respondents who infrequently use the SSC were surgeons. About two-thirds (67.7%) of respondents said they had not received training on the use of the SSC. The difference in training

status among the different categories of surgical personnel was statistically significant ($\chi^2 = 12.28$, $p < 0.01$). The proportion who had not received training was significantly highest among surgeons (81.2%) followed by anaesthesiologists (66.7%) and nurses (51.0%).

Tale 4.2: Reported knowledge, awareness and utilization of the surgical safety checklist among surgical staff

Variable	Total N (%)	Surgical personnel			χ^2	p-value
		Surgeons n (%)	Anaesthesiologists n (%)	Nurses n (%)		
Awareness of the WHO SSC						-
- Yes	186 (100.0)	69 (100.0)	66 (100.0)	51 (100.0)		
Use the WHO SSC						1.189
- Yes	184 (98.9)	68 (98.6)	66 (100.0)	50 (98.0)		0.559
- No	2 (1.1)	1 (1.4)	0 (0.0)	1 (1.1)		
How often WHO SSC is used						3.436
- Always	56 (30.4)	18 (26.5)	18 (27.3)	20 (40.0)		0.097
- Mostly	100 (54.3)	38 (55.9)	39 (59.1)	23 (46.0)		
- Sometimes	28 (15.2)	12 (17.6)	9 (13.7)	7 (14.0)		
Had training on use of SSC						12.27
- Yes	60 (32.3)	13 (18.8)	22 (33.3)	25 (49.0)		<0.001
- No	126 (67.7)	56 (81.2)	44 (66.7)	26 (51.0)		
Knowledge of SSC						3.409
- Very good	54 (29.0)	16 (23.2)	22 (33.3)	16 (31.4)		0.498
- Good	90 (48.4)	37 (53.6)	27 (40.9)	26 (51.0)		
- Average	42 (22.6)	16 (23.2)	17 (25.8)	9 (17.6)		

About half (48%) of the surgical personnel described their knowledge of the SSC as good whereas only 29% reported their knowledge as very good. The proportion who perceived their knowledge to be very good was highest in anaesthesiologist (33.3%) and lowest in surgeons (23.2%). The differences in the perception of knowledge of the SSC among the different surgical personnel was however not statistically significant ($\chi^2 = 3.41$; $p=0.498$).

4.3 Perception on benefit of using the WHO SSC

Table 4.3 below presents results of the respondents' thoughts on the advantages of utilizing the WHO SSC among surgical personnel. Generally, most of the respondents had positive perceptions of the benefits of the SSC. Using a response scale of 1 to 5, the mean responses indicated that most of the respondents strongly agreed to the assertions about the benefits of using the SSC. Almost all surgical personnel agreed that implementation of the SSC was a good decision (99.46%)*, improves communication among team members (98.92%)*, reduces human errors (98.92%)* and was easy to use (94.05%)*. All respondents agreed that the SSC improves patient safety and would like surgical personnel to use the SSC if they were undergoing surgery. With the exception of the belief of the easiness of use of the SSC, none of the perceptions was statistically different among the various surgical personnel in this study. The mean response on the easiness of use of the SSC was lowest among anaesthesiologists, 1.35 ± 0.60 and highest among the Nurses, 1.73 ± 0.80 , indicating that more anaesthesiologist thought it was easy to use the SSC compared to surgeons and nurses.

* Not shown in table

Table 4.3 Beliefs of benefit of using the WHO SSC checklist among surgical personnel

Benefits of using the SSC	Surgical personnel				p-value
	Total	Surgeons	Anaesthesiologists	Nurses	
	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	
Implementing the SSC was a good decision	1.25±0.44	1.35±0.51	1.20±0.40	1.18±0.39	0.074
SSC stimulates communication among team members	1.40±0.51	1.51±0.53	1.32±0.50	1.37±0.48	0.079
SSC helps reduce human errors.	1.32±0.49	1.41±0.50	1.23±0.56	1.33±0.52	0.066
SSC improves patient safety	1.26±0.44	1.32±0.47	1.17±0.38	1.29±0.46	0.104
If you were undergoing surgery, you would like the personnel to use SSC?	1.15±0.35	1.19±0.39	1.09±0.29	1.16±0.37	0.266
It is easy to use the WHO SSC.	1.54±0.71	1.58±0.69	1.35±0.60	1.73±0.80	0.011

Response scale: 1=strongly agree; 2=agree; 3=neutral; 4=disagree; 5=strongly disagree

4.4 Determinants of non-use of WHO SSC among surgical personnel

Table 4.4 below shows results of the perceptions of surgical personnel on the determinants of utilizing the WHO checklist. The mean responses indicate that most respondents disagreed that the SSC is unnecessary (4.55 ± 0.62), a waste of time (4.61 ± 0.56) and difficult to incorporate in their daily preoperative routine (4.14 ± 0.75). On the other hand, majority of the respondents agreed that theatre staff needed to be trained in using the checklist (1.68 ± 0.62).

The results further show that most respondents agreed that theatre personnel support utilization of the checklist as depicted by mean responses in Table 4.4. Among the categories of theatre personnel, nurses (1.82 ± 0.76) were most supportive whereas surgeons (2.22 ± 0.94) were least supportive of the SSC.

The results also demonstrate significant differences in the perceptions of determinants of utilizing the SSC among theatre personnel. The perception of poor communication between anaesthesiologists and surgeons, the perception that SSC was a waste of time and support for the utilization of the checklist by the personnel and management of the hospital were significantly different among surgical personnel.

Table 4.4: Determinants of non-use of WHO SSC among surgical personnel

Determinants of non-use of the SSC	Surgical personnel				p-value
	Total	Surgeons	Anaesthesiologist	Nurses	
	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	
The SSC takes too long to complete	3.76±0.91	3.84±0.82	3.76±0.99	3.67±0.93	0.585
The SSC duplicates with other existing checks	3.42±0.94	3.43±0.95	3.58±0.95	3.20±0.88	0.110
There is poor communication between anaesthetist and surgeon	3.65±0.99	3.91±0.82	3.50±1.06	3.47±1.08	0.031
It is unnecessary to use the SSC	4.55±0.62	4.43±0.65	4.62±0.65	4.63±0.53	0.063
The SSC is a waste of time	4.61±0.56	4.52±0.48	4.77±0.42	4.53±0.64	0.016
The SSC is difficult to incorporate into my perioperative routine	4.14±0.75	4.16±0.56	4.35±0.48	3.84±1.12	0.065
The SSC does not cover all risks e.g. skin preparation and postoperative pain prevention	2.33±0.82	2.25±0.76	2.20±0.99	2.47±0.99	0.516
It is difficult to find a coordinator for the checklist	3.40±1.05	3.45±1.04	3.47±0.98	3.25±1.15	0.571
I know whose responsibility it is to initiate the checklist	2.50±0.90	2.52±0.98	2.56±0.95	2.41±0.84	0.561

Determinants of non-use of the SSC (cont.)	Surgical personnel				p-value
	Total	Surgeons	Anaesthesiologist	Nurses	
	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	
Staff needs to be trained in using the checklist	1.68±0.62	1.71±0.71	1.67±0.56	1.67±0.55	0.991
Team members attitude towards the questions on the checklist is not encouraging	2.87±1.11	2.97±1.03	2.73±1.14	2.90±1.12	0.449
Surgical personnel (surgeon) support the use of the checklist	2.22±0.94	1.99±0.87	2.59±1.05	2.04±0.70	<0.001
Anaesthetic personnel support the use of the checklist	1.86±0.78	1.91±0.84	1.59±0.58	2.14±0.87	<0.001
Nursing personnel support the use of the checklist	1.82±0.76	1.86±0.79	1.86±0.67	1.71±0.83	0.129
Management support the use of the checklist	2.36±0.85	2.52±0.87	2.55±0.75	1.90±0.78	<0.001

Response scale: 1=strongly agree; 2=agree; 3=neutral; 4=disagree; 5=strongly disagree

Table 4.5 Association between educational level, sub-specialty and experience, and knowledge and training on SSC

Variables	Knowledge of SSC			χ^2	p-value	Training on SSC		χ^2	p-value
	Very good	Good	Average			Yes	No		
	N (%)	N (%)	N (%)			N (%)	N (%)		
Educational status				17.099	0.002			2.187	0.348
– Diploma	2 (7.4)	17 (63.0)	8 (29.6)			10 (37.0)	17 (63.0)		
– Bachelor degree	22 (24.7)	41 (46.1)	26 (29.2)			24 (27.0)	65 (73.0)		
– Postgraduate degree	30 (42.9)	32 (45.7)	8 (11.4)			26 (37.1)	44 (62.9)		
Surgical Unit				21.832	0.002			11.444	0.030
– General Surgery	11 (15.9)	42 (60.9)	16 (23.2)			18 (26.1)	51 (73.9)		
– Urology	1 (9.1)	6 (54.5)	4 (36.4)			2 (18.2)	9 (81.8)		
– Neurosurgery	11 (47.8)	7 (30.4)	5 (21.7)			14 (60.9)	9 (39.1)		
– Paediatric Surgery	9 (52.9)	8 (47.1)	0 (0.0)			4 (23.5)	13 (76.5)		
– Anaesthesia	22 (33.3)	27 (40.9)	17 (25.8)			22 (33.3)	44 (66.7)		
Years spent in studying or working at the hospital	9.81±5.7	6.69±5.0	4.52±4.5	13.309	<0.001	8.58±5.6	6.40±5.2	6.761	0.010

4.5 Association between educational level, sub-specialty, and experience and knowledge and training on SSC

Table 4.5 above represents the relationship between educational status, sub-specialty (surgical unit) of respondents, years spent in studying and/or working at the hospital with knowledge and training on SSC. This study found a significant relationship between educational status and knowledge ($\chi^2=17.099$; $p=0.002$) of respondents but not with training ($\chi^2=2.187$; $p=0.348$) of respondents on SSC. Majority (42.9%) of the respondents who had very good knowledge of SSC were postgraduate degree holders whereas the least proportion (7.4%) of respondents who had very good knowledge of SSC had diploma certificates.

The study also observed a significant association between surgical sub-specialty of respondents and their knowledge of SSC ($\chi^2=21.832$; $p=0.002$) and training on SSC ($\chi^2=11.444$; $p=0.030$). Regarding knowledge on SSC, the highest proportion (52.9%) of participants who had very good knowledge worked in the Paediatric surgical unit whereas 9% worked in the Urology unit. This was somewhat different when it comes to the training of respondents on SSC as the highest proportion of participants who had training on SSC were from the Neurosurgery unit.

Lastly, this study found that the years of studying and/or working was also significantly associated with knowledge of the SSC ($\chi^2=13.309$; $p<0.0001$) and training on SSC ($\chi^2=6.761$; $p=0.010$). Those who had very good knowledge of the SSC were mostly personnel who had spent almost 10 years working and/or studying in KBTH whereas those with average knowledge were personnel who had spent about 5 years working and/or studying in KBTH. Regarding training on SSC, those who had had training on the SSC were on the average personnel who had spent about 9 years working and/or

studying in KBTH compared to 6.4 years of working and/or studying for those who had had no training on the use of the SSC.

Figure 4.2 below shows the association between training of respondents and their knowledge of the SSC. Among those who had training on the WHO SSC, 48.3% had a very good knowledge of the SSC whereas 11.7% had average knowledge. On the other hand, among those with no training, 19.8% had very good knowledge whilst 27.8% had average knowledge of the SSC.

Figure 4.2: Clustered bar chart showing the effect of training on knowledge of the SSC.

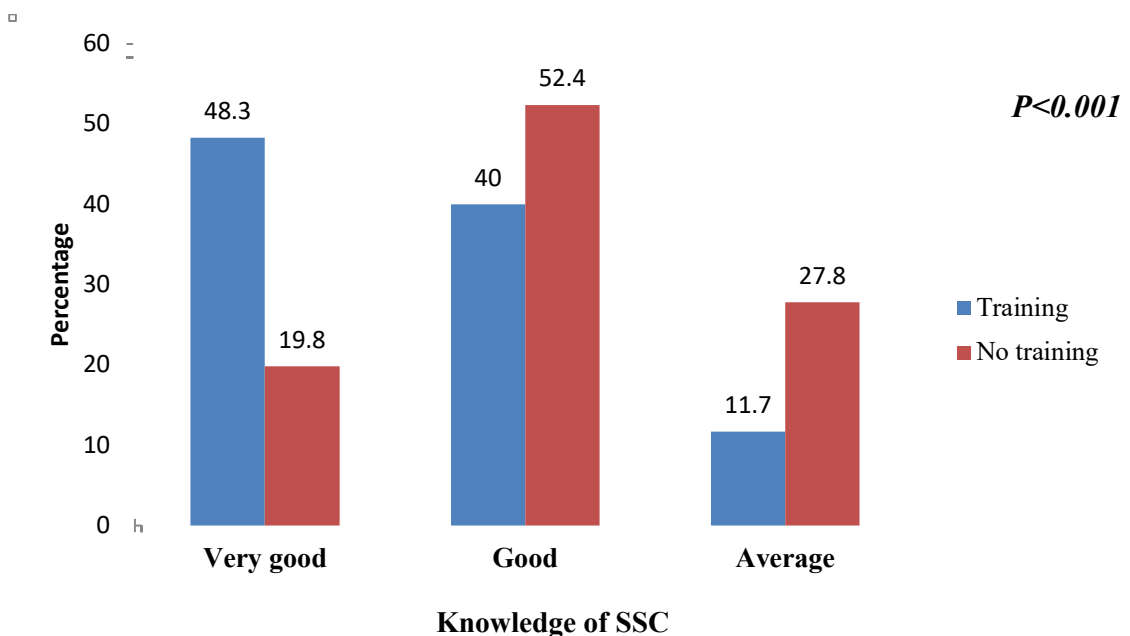


Table 4.6 below shows the results of factors related to frequent utilization of the checklist among theatre staff. In the univariable analysis, having had training on SSC and sub-specialty of personnel were significantly associated with using the SSC always. These were still significant adjusting for other confounders in a multivariate analysis. In the adjusted logistic regression analysis, personnel who worked in the Neurosurgery unit were 4.86 times likely to always use the SSC compared to personnel in the General surgery unit (OR, 95% CI; 4.86, 1.57-15.04; $p=0.006$). Having had no training on use of the SSC was also associated with 54% lower odds of always using the SSC (OR, 95% CI; 0.46, 0.22-0.98; $p=0.043$)

Table 4.6 Logistic regression analysis of factors associated with frequent use of the SSC

Variable	Univariable		Multivariable	
	OR [95% CI]	p-value	OR [95% CI]	p-value
Age	0.98 [0.93, 1.03]	0.461	-	-
Sex				
– Men (ref)	1.00		-	
– Women	1.17 [0.62, 2.19]	0.625	-	-
Educational status				
– Diploma (ref)	1.00		-	
– Bachelor degree	1.33 [0.50, 3.53]	0.562	-	-
– Postgraduate degree	1.09 [0.40, 2.98]	0.873	-	-
Surgical Unit				
– Gen. Surgery (ref)	1.00		1.00	
– Urology	0.71 [0.14, 3.62]	0.679	0.67 [0.12, 3.64]	0.645
– Neurosurgery	5.98 [2.14, 16.67]	0.001	4.52 [1.57, 13.03]	0.005
– Paediatric Surgery	1.32 [0.41, 4.34]	0.639	1.31 [0.39, 4.42]	0.668
– Anaesthesia	1.19 [0.55, 2.61]	0.654	1.08 [0.48, 2.45]	0.845
Years spent in studying or working	1.04 [0.98, 1.10]	0.200	1.02 [0.96, 1.09]	0.470
Satisfied with current profession				
– Very satisfied (ref)	1.00		-	
– Satisfied	0.57 [0.12, 2.65]	0.475	-	-
– Neither	0.44 [0.06, 3.24]	0.424	-	-
– Unsatisfied	0.67 [0.04, 11.28]	0.779	-	-
Had training on SSC				
– Yes (ref)	1.00		1.00	
– No	0.33 [0.17, 0.64]	0.001	0.43 [0.21, 0.88]	0.020

OUTCOME=Always use the SSC

CHAPTER FIVE

DISCUSSION

5.1 Acceptability of the WHO SSC among surgical personnel.

Results of this study indicates very high acceptability of the WHO SSC by theatre personnel (surgeons, anaesthesiologists and nurses) at KBTH. Out of the total 186 personnel interviewed, 98.9% (185) thought that the SSC stimulated communication and prevented human errors in the operating room. All respondents agreed that, the SSC improved patient safety and would like surgical personnel to use the checklist if they happened to be undergoing surgery.

This is consistent with findings in a study done in two Swedish hospitals where 80.2%, 84.8% and 78.6% of personnel thought the checklist improved operating room safety, communication and prevented errors in the operating room respectively (Nilsson, Lindberget, Gupta, & Vegfors, 2010). In another study, 97% of personnel sampled from 238 hospitals in the United Kingdom thought the checklist could prevent errors (Sivathanan, Rakowski, Robertson, & Vijayarajan, 2010). However, according to another study that reported on the acceptance of the WHO SSC using data from 136 participants, 11% of respondents disclosed that the checklist was not well accepted and another 63% said they did accept it but ‘with reservations’ (Pat, 2009). This study also found that, all the respondents involved in the study were aware of the WHO SSC whereas 98.9% of the respondents had utilized the WHO SSC. This result confirms the findings from a study conducted in Guatemala which found that, among 147 participants, 93.8% were aware of the SSC and between 73-100% of nurses in private and public facilities had utilized the questionnaire respectively (Hurtado et al., 2012).

It was noted from this study that, 32.3% and 67.7% of the respondents had very good and good knowledge of the SSC respectively. These proportions are however lower compared to observations among surgical personnel in a study conducted in Guatemala City (88.8%) (Hurtado et al., 2012). The differences in knowledge can be attributed to the kind of personnel interviewed, educational background of the respondents as well as the sample size of the two studies. This nonetheless indicates that, the knowledge of surgical staff regarding the SSC is quite high although differences exist.

The WHO SSC was mostly used among 54.3% of the surgical staff in KBTH and always used by 30.4%. It is believed that this could even be improved when the checklist is contextualized to the hospital's operating procedures. In a multicentre study that examined the interacting factors influencing utilization of the WHO SSC, it was observed that a little modification of the WHO SSC in the context of local hospitals operating procedures will help increase use and also make it easier to accommodate the checklist (Gagliardi et al., 2014). Few physicians in that study even suggested a checklist that is readily adaptable to fit different surgeries to increase utilization.

Majority of respondents had positive perceptions of the benefits of using the SSC. Although not statistically significant, mean responses indicated that most of the respondents strongly agreed to the assertions about the benefits of using the SSC. With the exception of the belief of the easiness of use of the SSC, none of the perceptions was significantly different among the various surgical personnel in this study. Research on attitudes towards the SSC and its use in operating theatres reveals that, theatre personnel across professions and specialties hold different attitudes towards the checklist and engage with it on different levels (Health Quality and Safety Commission-New Zealand, 2012). This same study also found that, whilst most operating staff see the undeniable benefits of the checklist to the patient, others see benefits to their individual practice and

profession. It was therefore concluded that surgical personnel who are less positive about the checklist are those who view it as challenging their practice and expertise, therefore impacting efficient utilization of the SSC.

In another research conducted in India, respondents saw the benefits of the SSC as positive (>96%) leading to a compliance of 40% among operating staff (Aggarwal et al., 2018). The reasons stated for lower compliance were lack of time and lack of assertiveness of staff (>80%). This result indicates that, even an overwhelmingly positive attitude by staff does not ensure compliance. There is therefore the need to address sociocultural issues in an individual set up. Thus, even though surgical teams have positive attitudes towards the SSC, resolving key barriers will improve compliance across all phases of SSC implementation.

A multinational study involving 69 countries, the SSC was seen as useful, did not work or caused delays during surgical procedure (Vohra et al., 2015). In Brazil, a study showed that, the SSC was regarded as simple and straightforward (Santana, Rodrigues, & Evangelista, 2016). These support findings of my study.

5.2 Determinants of non-use of the WHO SSC

In order to determine the influencing factors associated with acceptance and utilization of the SSC among surgical personnel at the KBTH, participants were interviewed on potential determinants regarding the utilization of the SSC. We found that poor communication between anaesthesiologists and surgeon ($p=0.031$) and the perception that SSC is time wasting ($p=0.016$) were significant determinants towards the use of the SSC.

According to a study among nurses, surgical team/working environment, bureaucracy, structure and content of the SSC, interpersonal relationships within the surgical team and resistance to change were identified as barriers towards the SSC (Georgiou et al., 2018). This is somewhat consistent with my study findings indicating that surgical team/working environment reflect communication between team members. A study that synthesized evidence from 18 qualitative studies (Bergs et al., 2015) indicated that, the required safety checks which disrupt conflicting priorities and different perspectives and motives and cooperation between surgeons, anaesthesiologists and nurses is often not addressed, reducing the checklist to a tick-box exercise and lower levels of utilization. Another study also found that, the lack of administrative and management support, absence of the patient safety nucleus, abruptly introduced list and absence of education were identified barriers to the use of the SSC (Tostes & Galvao, 2019). In my study, lack of encouragement among team members towards the checklist was not a significant barrier towards SSC utilization among surgical staff as most of them agreed that management and other theatre personnel support the use of the checklist.

In another study that explored the barriers to the adoption of the WHO SSC (Fourcade et al., 2012), the main barriers towards use of the SSC were checklist taking too much time to complete, lack of effective communication between surgeon and anaesthesiologist, repetition of items with existing checklist, poor knowledge and timing of item checks, uncertainty, unaccounted hazards and a conventional power structure in the operating room. Findings from this study further corroborate a study on the use of the SSC in African countries that also found insufficient time to use the checklist as a barrier towards implementation of the SSC (Kariyo et al., 2013).

5.3 Knowledge and use of the SSC among surgical sub-specialties

This study found a significant association between surgical sub-specialties of respondents and their knowledge of the SSC ($p=0.002$) as well as training on use of the SSC ($p=0.030$). The proportion who had very good knowledge of SSC was highest among the Paediatric Surgery subspecialty (52.9%), followed by Neurosurgery (47.8%) and Anaesthesia (33.3%) whereas General Surgery and Urology had <20% with very good knowledge of SSC. Majority of the study participants who had very good knowledge of the SSC were from the paediatric surgical unit whereas most participants with training on SSC were from the neurosurgery unit. In a logistic regression analysis, personnel in the Neurosurgery subspecialty had higher odds of always using the SSC as compared to the General surgery subspecialty. Findings from this study corroborate that of a study conducted among 10 hospitals in Colorado to assess the compliance with surgical checklist among different subspecialties (Biffl, Gallagher, Pieracci, & Berumen, 2015). Although there was generally suboptimal compliance with the checklist, the study observed significant differences among surgical specialty groups. Findings of this study is however not consistent with a study involving surgeons and anaesthetists which found that, the proportion of surgeons and anaesthesiologists who had knowledge on the SSC were not significantly different (Cullati et al., 2012).

5.4 Knowledge and use of SSC among surgical personnel

This study also assessed the differences in knowledge, utilization and awareness of the SSC among different surgical personnel. It was found that awareness was universal among all surgical personnel and all anaesthesiologists had utilized the SSC. However, nurses were more likely to most frequently (always) use the SSC compared to surgeons and anaesthesiologists. Regarding knowledge, more anaesthesiologists had very good knowledge of the SSC compared to the other personnel; whereas surgeons had the

lowest proportion with very good knowledge of the SSC. Similarly, a study by Hurtado and colleagues found differences in the knowledge of the WHO SSC among theatre personnel (Hurtado et al., 2012). Their study however found that more nurses other than the other personnel had very good knowledge of the SSC.

This study also found a significant association between educational status, and knowledge of SSC. Those who had postgraduate degrees had very good knowledge of the SSC compared to those with diploma and bachelor's degrees. It was observed that, the sub-specialty of respondents and years spent on education and/or work were significantly associated with very good knowledge of and training on the SSC. Similarly, a study of the facilitators of the SSC found a statistical significant difference between education of staff and acceptance of the SSC; thus being a surgeon; which requires several years of education was a facilitator of the use of the SSC (Tostes & Galvao, 2019). Training of theatre staff could therefore improve their knowledge of SSC.

Bergs et al (2015) revealed that education and training during SSC implementation enabled surgeons to comprehend the importance of the SSC adoption and to ignore certain non-technical items, such as confirmation of existing procedures in the operating room. In their study, having a postgraduate degree was associated with very good knowledge. A study conducted in England also found that, promoting a dynamic leadership, adapting the SSC, auditing of local data, periodic training, and promoting ownership (Russ et al., 2015).

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

In conclusion, this study observed a high level of acceptance to the WHO SSC among theatre staff at the KBTH in Ghana. All theatre staff of the Surgical Department of KBTH interviewed in the study were aware and almost all had ever utilized the SSC. Despite the universal acceptance and awareness observed, there is a gap in utilization and knowledge of the SSC among surgical personnel at the KBTH in Ghana. Significantly, this gap in knowledge and utilization also exist among the various surgical sub-specialties. There is therefore the need to address sociocultural issues in each individual set up.

Nurses were more likely to always use the SSC compared to surgeons and anaesthesiologists. Compared to the other sub-specialties, surgical personnel working in the Neurosurgery unit had higher odds of always using the SSC. Furthermore, poor communication between anaesthesiologists and surgeons was a perceived barrier among the theatre staff with significant differences among surgical personnel. Finally, the knowledge of and training on the SSC differed significantly among various surgical subspecialties. Paediatric surgery and neurosurgery units had the highest proportion of personnel with very good knowledge and training on the SSC respectively which could explain why adherence was higher compared to the other units.

6.2 Recommendations

Based on the findings of this study, these recommendations are made to improve the use of the WHO SSC among surgical personnel in Ghana:

I. Hospitals and facilities

- From this study, training of theatre personnel was associated with improved knowledge and adherence to the SSC. This study therefore recommends periodic training for surgical staff to enhance their knowledge and utilization of the checklist. Training could be incorporated into the annual continuous professional development (CPD) program for surgical personnel.
- This study observed differences in the frequency of use of the SSC among different surgical subspecialties. It is recommended that the surgical checklist be modified to the needs of the surgical sub-specialty and team as well as to the particular protocol at the hospital to enhance acceptance and utilization of the checklist. In addition, the SSC should be integrated into the routine of current surgical protocols at the hospitals – that way they are seamlessly part of the daily routine, and do not appear as a separate or extra set of chores.
- Poor communication between anaesthesiologists and surgeons is a perceived barrier to the use of the SSC in this study. This study recommends that personnel training in the effective use of the SSC highlights clearly the roles of each team member and achieving effective communication among surgeons and anaesthesiologists. Also, anaesthesiologists where possible should be assigned to work with specific teams rather than operating rooms which is the case currently. In doing so, anaesthesiologists and surgeons will

get to work together and interact more both in and out of the operating room which will promote effective communication between the two groups.

- The management of health facilities should establish a SSC audit team to periodically check personnel compliance to the SSC and address challenges that may arise.

II. Ministry of Health and its agencies (GHS, CHAG)

- This study recommends that, authorities at the national, regional and district levels incorporate indicators that assess adherence to the SSC into the annual peer review program. These indicators should also be assessed during the half-year and annual performance reviews.

III. Further study is recommended to explore the sociocultural factors that account for low adherence despite high acceptability of the SSC among surgical personnel in Ghana.

- A qualitative study is needed to explore the barriers and facilitators that influence adherence to the checklist.
- Since there is a difference in reported and observed utilization of the checklist an observational study is needed to assess adherence to the SSC.

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APPENDIX A - STUDY QUESTIONNAIRE

Title: *The World Health Organization's Surgical Safety Checklist: Acceptability Among Surgical Personnel in Korle Bu Teaching Hospital in Accra.*

I kindly ask you to answer the following questions and statements regarding the use of the WHO Surgical Safety Checklist. By doing so you contribute to a better scientific understanding of the topic above and improvement in surgical safety. Information provided will be kept strictly confidential. Thank you.

Date of interview:

<u>SECTION A: DEMOGRAPHIC CHARACTERISTICS</u>		
1.	Age in years	
2.	Sex	01. Male () 02. Female ()
3.	Religion	01. Christianity () 02. Islamic () 03. Traditional () 04. Other (please specify)
4.	Educational status	01. Diploma () 02. Bachelor's degree () 03. Post-graduate degree ()
5.	Surgical Unit	01. General Surgery () 02. Urology () 03. Neurosurgery () 04. Paediatric Surgery () 05. Anaesthesia () Other (please specify)
6.	Surgical team (if applicable for surgeons)	Please state:

7.	Type of Surgical Personnel	01. Surgeon () 02. Anaesthesiologist () 03. Nurse ()
8.	Level of specialization	01. Consultant () 02. Specialist/Snr. Resident () 03. Resident/Medical Officer () 04. Peri-operative nurse () 05. General nurse () 06. Student nurse ()
9.	Years spent in studying or working at the hospital	
10.	Satisfied with current profession	01. Very satisfied () 02. Satisfied () 03. Neither () 04. Unsatisfied () 05. Very unsatisfied ()

B. GENERAL INFORMATION ON THE WHO SSC

11.	Are you aware of the WHO SSC?	01. Yes () 02. No ()
12.	Do you use the WHO SSC?	01. Yes () 02. No ()
13.	If YES, how often do you use the WHO SSC?	01. Always () 02. Mostly () 03. Sometimes () 04. Rarely ()
14.	Have you had training on the use of the SSC?	01. Yes () 02. No ()
15.	How would you describe your knowledge of the SSC?	01. Very good () 02. Good () 03. Average () 04. Bad () 05. Very bad ()

C. BELIEFS OF BENEFIT OF USING THE SURGICAL SAFETY CHECKLIST (SSC)						
		Strongly agree	Agree	Can't tell	Disagree	Strongly disagree
16.	Implementing the SSC was a good decision					
17.	SSC stimulates communication among team members					
18.	SSC helps reduce human errors.					
19.	SSC improves patient safety					
20.	If you were undergoing surgery, you would like the personnel to use SSC?					
21.	It is easy to use the WHO SSC.					
D. BARRIERS TO THE USE OF WHO SSC						
The under listed factors does not allow you to effectively use the SSC (kindly tick)						
		Strongly agree	Agree	Can't tell	Disagree	Strongly disagree
22.	The SSC takes too long to complete					
23.	The SSC duplicates with other existing checks					
24.	There is poor communication between anaesthetist and surgeon					
25.	It is unnecessary to use a SSC					
26.	The SSC is a waste of time					

		Strongly agree	Agree	Can't tell	Disagree	Strongly disagree
27.	The SSC is difficult to incorporate into my perioperative routine					
28.	The SSC does not cover all risks e.g. skin preparation and postoperative pain prevention					
29.	It is difficult to find a co-ordinator for the checklist					
30.	I know whose responsibility it is to initiate the checklist					
31.	Staff needs to be trained in using the checklist					
32.	Team members attitude towards the questions on the checklist is not encouraging					
33.	Surgical personnel (surgeon) support the use of the checklist					
34.	Anaesthetic personnel support the use of the checklist					
35.	Nursing personnel support the use of the checklist					
36.	Management support the use of the checklist					

THANK YOU

APPENDIX B - ETHICAL APPROVAL

In case of reply the number
And the date of this
Letter should be quoted

My Ref. No. *KBTH/IRB/193/19*
Your Ref. No.



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9th April, 2019

DR. EYRAM CYRIL BANSAH
DEPT. OF EPIDEMIOLOGY
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**THE WORLD HEALTH ORGANIZATION'S SURGICAL SAFETY CHECKLIST:
ACCEPTABILITY AMONG SURGICAL PERSONNEL IN KORLE BU TEACHING
HOSPITAL IN ACCRA**

KBTH-IRB /00008/2019

Investigator: Dr. Eyram Cyril Bansah

The Korle Bu Teaching Hospital Institutional Review Board (KBTH IRB) reviewed and granted approval to the study entitled "The World Health Organization's surgical safety checklist: Acceptability among surgical personnel in Korle Bu Teaching Hospital in Accra"

Please note that the Board requires you to submit a final review report on completion of this study to the KBTH-IRB.

Kindly, note that, any modification/amendment to the approved study protocol without approval from KBTH-IRB renders this certificate invalid.

Please report all serious adverse events related to this study to KBTH-IRB within seven days verbally and fourteen days in writing.

This IRB approval is valid till 30th February, 2020. You are to submit annual report for continuing review.

Sincere regards,

DR DANIEL ANKRAH
VICE CHAIR (KBTH-IRB)
FOR: CHAIR (KBTH-IRB)

Cc: The Chief Executive Officer
Korle Bu Teaching Hospital

APPENDIX C – WHO SURGICAL SAFETY CHECKLIST

 SURGICAL SAFETY CHECKLIST (FIRST EDITION)		
Before induction of anaesthesia ▶▶▶▶▶▶▶▶▶▶ Before skin incision ▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶ Before patient leaves operating room		
SIGN IN ☐ PATIENT HAS CONFIRMED • IDENTITY • SITE • PROCEDURE • CONSENT ☐ SITE MARKED/NOT APPLICABLE ☐ ANAESTHESIA SAFETY CHECK COMPLETED ☐ PULSE OXIMETER ON PATIENT AND FUNCTIONING - DOES PATIENT HAVE A: - KNOWN ALLERGY? ☐ NO ☐ YES - DIFFICULT AIRWAY/ASPIRATION RISK? ☐ NO ☐ YES, AND EQUIPMENT/ASSISTANCE AVAILABLE - RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)? ☐ NO ☐ YES, AND ADEQUATE INTRAVENOUS ACCESS AND FLUIDS PLANNED	TIME OUT ☐ CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE ☐ SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM • PATIENT • SITE • PROCEDURE - ANTICIPATED CRITICAL EVENTS ☐ SURGEON REVIEWS: WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS? ☐ ANAESTHESIA TEAM REVIEWS: ARE THERE ANY PATIENT-SPECIFIC CONCERNS? ☐ NURSING TEAM REVIEWS: HAS STERILITY (INCLUDING INDICATOR RESULTS) BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS? - HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES? ☐ YES ☐ NOT APPLICABLE - IS ESSENTIAL IMAGING DISPLAYED? ☐ YES ☐ NOT APPLICABLE	SIGN OUT - NURSE VERBALLY CONFIRMS WITH THE TEAM: ☐ THE NAME OF THE PROCEDURE RECORDED ☐ THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE) ☐ HOW THE SPECIMEN IS LABELLED (INCLUDING PATIENT NAME) ☐ WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED ☐ SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT

THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADDITIONS AND MODIFICATIONS TO FIT LOCAL PRACTICE ARE ENCOURAGED.