

Determinants of the world health organization surgical safety checklist use among clinicians at Kenyatta National Hospital Nairobi, Kenya

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Author's Contribution

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A B S T R A C T

Introduction: The World Health Organization Surgical Safety Checklist (SSC) minimizes harm to patients. Clinicians use the checklist to confirm and ensure that the correct surgical operation is performed on the correct patient at the correct location. There are limited studies done to assess the effectiveness of using SSC in the operating rooms at Kenyatta National Hospital (KNH) since its adoption in 2012.

Objective: The broad objective of the study was to determine SSC use among clinicians at Kenyatta National Hospital in Nairobi, Kenya; and determine clinicians' and institutional-related factors influencing its use at the same hospital.

Methodology: A cross-sectional study was conducted in the operating theatres at KNH. The study recruited 178 consented clinicians who use SSC and excluded those on leave based on the multi-stage sampling technique and Yamane's formulae. Collected data were processed using IBM SPSS version 20.

Results: About 98% of the respondents were aware of SSC with 95% reporting its use during the interview day. Around 52% of the respondents had the clinical experience of over 10 years with 46% having theatre experience of over 10 years. Almost 95% of the respondents reported availability and its use with 99% confirming its mandatory usage in the operating theatres. Training and sensitization of clinicians on the use of the checklist were at 62% and 70%, respectively.

Conclusion There was a recommendable utilization level of SSC at 95% influenced by clinicians' and institutional related factors at Kenyatta National Hospital.

Keywords: Clinicians, Operating theatres, Surgical safety checklist, Surgical operation.

Introduction

Patient safety, a global health priority, and the core value of the Joint Commission for International Accreditation is a process described as preventing errors and adverse effects for patients associated with healthcare.¹ This is why the World Health Organization inspired the start of the safe surgery save the lives program in 2007. The initiative aimed at minimizing surgical harm and adverse surgical outcomes such as deaths and disabilities across the world. Subsequently,

ten necessary objectives for the safe surgery saves life program was established and compiled into the World Health Organization Surgical Safety Checklist (SSC), introduced in 2008. The checklist serves as a reinforcement tool for accepted surgical safety checks and cultivates better communication and teamwork by the surgical teams. The adoption and usage of the checklist have been associated with reduced postoperative

morbidity and mortality rates in different healthcare institutions.^{2,3}

Kenyatta National Hospital adopted and localized it into its intraoperative notes around 2012 as part of the requirements for ISO certification to document the intraoperative processes and improve surgical outcomes.³ Before then, surgical teams performed surgeries based on their own expert opinion and experience in the hospital.

The checklist has been an important tool in complementing safety checks among other tools. This tool introduces necessary repetitive surgical safety checks thereby reinforcing good surgical practices. This in turn contributes to good surgical outcomes. Surgeons, anesthesiologists/anesthetists, and nurses use the checklist to confirm and ensure that the correct surgical operation is performed on the correct patient at the correct location, among other checks.^{4,5} Compliance with the usage of the checklist differs across healthcare institutions. The limited usage may be associated with adverse surgical outcomes still being reported in places where it has been adopted. For instance, the recent media report on the wrong patient operated in a Kenyan hospital in 2018 among other adverse surgical outcomes might be linked to poor adherence to the checklist.^{6,7}

Kenyatta National Hospital offers leadership in healthcare services, policy formulation, and implementation not only in Kenya but also in East and Central Africa. Subsequently, documentation and reports regarding the use of WHO SSC in the operating rooms in this premier hospital are essential in promoting positive surgical outcomes to healthcare facilities dependent on its guidance. There are limited publications detailing the utilization of WHO SSC in Kenya, aside from anaesthesiologists reporting varying utilization levels of the checklist at Kenyatta National Hospital among other healthcare institutions in East Africa; though the checklist requires teamwork utilization involving surgeons, nurses, and anaesthesiologists/anesthetists.⁸ Furthermore, the tenth objective of the World Health Organization's safe surgery saves live program, requires all healthcare organizations to do routine surveillance of surgical outcomes and share the same with others through publication. Good surgical practices as detailed by such reports are expected to facilitate other healthcare

institutions to learn and embrace.^{3,9} Thus, necessitating a study on the use of SSC by clinicians in the operating rooms at Kenyatta National Hospital.

This study endeavored to find out the utilization level of the checklist in the operating theatres as well as factors determining its use at Kenyatta National Hospital. This was to inform any need to develop further education and training programs to improve clinicians' knowledge of surgical safety practices in operating theatres. This would also serve as a baseline study on the use of the checklist by clinicians at Kenyatta National Hospital, with subsequent studies to be done in view of the gaps identified by this study for the overall improvement in patient management in the operating rooms.

Methodology

Study Design and Setting

A descriptive cross-sectional study was conducted at Kenyatta National Hospital in Nairobi, Kenya. This is the largest and oldest public hospital in Kenya, serving as a regional referral hospital. It receives referred patients from all 47 Kenyan counties as well as those from East and Central Africa. The hospital has 24 specialized theatres, and 12 of these are the main ones referred to as main theatres. The specialties include cardiothoracic, plastic and reconstruction, pediatrics, orthopedic, oral maxillofacial, ear nose and throat, nephrology, neurosurgery, obstetrics, gynecology, and general surgery among others. Elective surgeries are done from Monday to Friday while emergency surgeries are done throughout. The study was carried out in the operating rooms of all theatres where the World Health Organization Surgical Safety Checklist is routinely used.

Sample Size Determination

The recruitment of study clinicians was based on multi-stage sampling techniques, with the clocking register utilized as a sampling frame to gather data from 21 operating theatres. The study sample size was calculated using Fisher's formula and since the target population was less than 10,000 the sample size determination was done using Yamane's formula.¹⁰ With a 95% confidence interval and a 5% degree of precision, a minimum sample size of 178 was reached. The study population comprised all consented clinicians working in

the operating rooms that use SSC and excluded those that were on leave. Multi-stage sampling techniques were used to acquire a representative sample from all the clinicians with a large number of nurses as they were more and were also the designated coordinators of theatre activities. Study clinicians were categorized into three groups: nurses, anaesthesiologists/anaesthetists, and surgeons. Study nurses were sampled as follows, the main theatre (60/80) and maternity theatre (30/40) based on clocking registers at each station. The study sampled 4 surgeons from each of the 11 specialties (pediatrics, cardiothoracic, neurosurgery, orthopedic, obstetrics and gynecology, oral maxillofacial, plastic and reconstructive, ophthalmology, ear nose and throat, general surgery and urology) until the representative sample was obtained, while 44 anaesthesiologists/anaesthetists were sampled using the same technique based on their allocation rota.

Data Collection Tools

A self-administered structured questionnaire was used to collect data from study clinicians to find out their level of experience and any factors affecting the use of the checklist in the operating rooms. The Questionnaire had closed-ended questions whereby clinicians selected responses from the given options closely matching their answers. Additionally, the questionnaire included multiple-choice questions which allowed respondents with two options to express a range of views and dichotomous questions. The attitude of the clinicians towards the use of the checklist in the questionnaire was graded from strongly agree (4), agree (3), disagree (2), and strongly disagree (1). The mean and standard deviation of the above were calculated.

Ethical Consideration

The study protocol was reviewed and approved by Mount Kenya University Institutional Ethics and Research Committee (845), Kenyatta National Hospital-University of Nairobi Ethics and Research Committee (P242/04/2021), and Kenya’s National Commission of Science, Technology, and Innovation (463808). Permission to conduct the study was also sought from the County Commissioner, Nairobi City County, The Governor, Nairobi City County (004-07-04-2021), the Regional Director of Education, Nairobi City County (RDE/NRB/RESEARCH/1/65 Vol.1). Data collection

permit from the studied institution was received from the Head of Department Research and Programmes, Anaesthesia theatres, Kenyatta National Hospital (11461/2021).

Data Analysis and Presentation

Raw data was cleaned and reviewed for completeness before analyses using IBM SPSS version 20. The descriptive analysis was performed using frequencies and percentages for the demographic variables.

Results

Findings on Utilization level, Clinicians’ and Institutional related factors influencing the use of the World Health Organization Surgical Safety Checklist

Approximately 95% of the respondents reported the availability of standard operating procedures on the use of SSC with 99% confirming its mandatory use in the operating theatres (Table 1).

Table 1: Utilization level, Clinicians’ and Institutional related factors influencing the use of Checklist

Use of checklist on the interview day	Frequency (n=178)	Percent (100)
Yes	169	94.9
No	9	5.1
Length of time worked as a clinician (Years)		
0 to 2	3	1.7
3 to 5	42	23.6
6 to 10	41	23.0
Above 10 years	92	51.7
Length of time worked in the theatres (Years)		
Less than 1year	13	7.3
1to 2	26	14.6
3 to 5	58	32.6
6 years above	81	45.5
Level of Education		
Masters and above	78	43.8
Bachelor’s	26	14.6
Diploma	74	41.6
Awareness about checklist		
Yes	175	98.3
No	3	1.7
Use of checklist during surgical operations		
Yes	175	98.3
No	3	1.7

Training on the use of a checklist		
Yes	111	62.4
No	67	37.6
Standard operating procedures on the use of a checklist		
Yes	170	95.5
No	8	4.5
Availability of checklist for use in operating theatres		
Yes	177	99.4
No	1	0.6
Mandatory to use of the checklist in operating theatres		
Yes	169	94.9
No	9	5.1
Sensitization on the use of the checklist in operating theatres		
Yes	125	70.2
No	53	29.8

Results on the attitude of Clinicians towards the use of the World Health Organization Checklist

Study clinicians on average had a positive attitude toward the use of checklists with the majority emphasizing its use in the operating theater, hence ranked highest (Table 2).

Table 2: Attitude of study Clinicians towards the use of the WHO Surgical Safety Checklist

Clinicians' attitude toward the use of a checklist	Strongly agree	Agree	Disagree	Strongly disagree	Mean \pm SD	Rank
The WHO Surgical safety checklist should be used in the OR during surgery	167	10	0	1	3.93 \pm 0.319	1
All Clinicians in theater should be trained on the use of the WHO surgical safety checklist	161	16	0	1	3.89 \pm 0.360	2
A confidential reporting system that documents medical errors is important for safety	130	43	4	1	3.70 \pm 0.510	3
I find the use of the WHO surgical safety checklist relevant	126	50	1	1	3.69 \pm 0.540	4
I feel confident on my ability to use the WHO surgical safety checklist	122	50	5	1	3.65 \pm 0.566	5
I understand the components of the WHO surgical safety checklist	122	51	2	3	3.64 \pm 0.597	6
I have adequate time to participate in the use of the WHO surgical safety checklist	105	61	9	3	3.51 \pm 0.674	7
I am encouraged by my leaders and co-workers to report any incidents I may observe	97	66	13	2	3.45 \pm 0.681	8

Discussion

Utilization level of the World Health Organization Surgical Safety Checklist

This study found that 95% of the respondents were using the World Health Organization Surgical Safety Checklist in operating theatres. This is strongly recommendable and may have been supported by the 62% training and 70% sensitization of study clinicians on the use of SSC (Table 1). This varied from the study conducted in Nigeria,¹¹ where only 57% of the respondents were using SSC, while a study on point prevalence of surgical safety checklist use in Europe showed that the overall prevalence usage in the European population was at 67.5%, with marked variation between countries from 0 to 99.6%.¹² Existential variations in the implementation of the checklist cited above may be the source of adverse surgical-associated outcomes.¹³

Socio-demographic characteristics of the study Clinicians

About 52% of the respondents in this study had a clinical experience of over 10 years. Additionally, 46% of the respondents had general theatre experience of over 10 years. Moreover, the study observed varying levels of education ranging from master's and above to diplomas and below. Out of that 42 % of the respondents had a diploma and below as an educational qualification and 44% had a master's degree and above (Table 1). Hence, more clinical and theatre experience together with more educational qualifications increase the chances of applying the clinical practices envisaged in the SSC. These findings agreed with a study in Nigeria, in which clinical and professional experience were observed as good predictors of safety practices by the preoperative nurses.¹¹

Awareness and use of the World Health Organization Surgical Safety Checklist

The majority 98% of the respondents were aware of and reported the use of SSC during surgery. This implies that the surgical team members understood their roles and responsibilities, thereby boosting and improving their knowledge of the surgical team members.¹⁴ This diverged from the Nigerian study where only 57% of the respondents were aware of SSC and its usage in the

operating theatres by the preoperative nurses was at 91%.¹¹ On the other hand, more than half 62% of the respondents had been trained on the use of the checklist (Table 1). This implies that a larger number of clinicians were aware of and use the checklist without prior training. This may explain why the utilization level of SSC was not 100%, agreeing with Guatemala investigators who concluded that poor knowledge and lack of training sessions are associated with limited usage of the Checklist.¹⁵

Institutional factors influencing the use of the World Health Organization Surgical Safety Checklist

About 95.5% of the study respondents confirmed that there was a standard operating procedure for the use of the Checklist (Table 1). This indicates that theatre management had ensured that the processes and services are documented for uniformity. Similar conclusions were drawn by a Japanese investigator who held that there is an absolute need for staff to ensure that important documents are available for use in their operation areas.¹⁶

The majority of the clinicians 94.9% who participated in the study confirmed that the checklist was mandatory to use in the operating theatres (Table 1). This implies that the hospitals' policies are being adhered to. This is in tandem with the Vanderbilt University Medical Centre and Massachusetts General Hospital investigators in the United States of America who confirmed that staff should operate in line with the required standards, regulations, and their professional body.¹⁷ About 70% of the study participants had been sensitized to the use of the Checklist. Thus, the hospital management ensured their staff was informed of the safety measures in place. Nevertheless, about 30% of the respondents who reported not having been sensitized on its usage in this study may be a result of their failure of themselves to avail of occasional sensitization sessions. And this may explain the failure of 100% usage of SSC in the operating theatres.

Attitude toward the use of the World Health Organization Surgical Safety Checklist

Study clinicians on average had a positive attitude toward the use of SSC in the operating rooms. The majority of respondents emphasized the use of a

Checklist in the operating rooms, hence ranked highest among other safety measures. This positive attitude encourages team members to incorporate instinctively their surgical plans to use the checklist and become more familiar with it.¹⁸ The finding also agreed with 95% usage of the SSC. In contrast, the least importance was put on, the encouragement of junior clinicians to report any incidents observed and the lack of adequate time to participate in the use of the Checklist (Table 2). The above attitude may be associated with the failure of 100% usage of SSC in the operating theatres as some of the observed emerging issues are not reported, and hence not addressed. Furthermore, inadequate time to participate in the use of the checklist by the study clinicians may imply that there could have been low staffing levels or high workload, as observed by the Finland investigators that quality hospital services such as surgical operations have been shown to improve with a higher proportion of hospital staff.¹⁹

Limitation

The study findings might not be generalized to other health facilities due to different institutional factors. Moreover, the Hawthorn effect was expected to occur as the study participants might change their behavior with the knowledge that they are being interviewed and their practices observed.²⁰

Conclusion

The studied institution had a recommendable higher utilization level of the World Health Organization Surgical Safety Checklist. This could have been boosted by training, sensitization, and strong institutional factors. Furthermore, there was a generally positive attitude toward the use of the checklist. However, the discouragement of junior clinicians to report any incidents observed during surgery may be a contributing factor to the failure of the hospital to achieve 100% usage of SSC. This study recommends the following based on its conclusion:

1. The theater management to enhance the use of the checklist to 99% from the current 95 % by having it as a clinical indicator of quality and performance contract indicator of leadership.
2. New staff in the theatres be encouraged to use the WHO patient protection checklist to sustain the high

utilization level through continuous participation in training and sensitization.

3. The hospital management should continuously review the use of the WHO SSC which will in turn create awareness leading to improvement of surgical practices.
4. Clinicians should be encouraged to report, and record incidences and near misses since it helps in the continuous improvement of surgical safety practices.
5. Further studies are done by the clinicians or students from learning institutions to find out why the checklist is not utilized 100% because of its importance in averting mistakes that may lead to morbidity and mortality of surgical patients

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