

Assessing use of the WHO surgical safety checklist for pediatric surgery in Senegal: A nationwide survey

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ABSTRACT

Introduction: The World Health Organization (WHO) introduced the surgical safety checklist (SSC) to reduce postoperative morbidity and mortality; however, its use in low- and middle-income countries is still low. **Methods:** We conducted a survey from January 2 to 22, 2024, in public hospitals' pediatric surgery departments and units in Senegal to assess the use of the WHO SSC or an adapted version. **Results:** The participation rate was 100% (23 hospitals), with 11 second-level hospitals (47.8%) and 10 (43.5%) having at least two pediatric surgeons. All hospitals had an anesthetist nurse, and 18 hospitals (78.3%) had at least two scrub nurses. For the surgical workload, 14 hospitals (60.9%) had five to 10 surgical interventions weekly. Eleven hospitals (47.8%) had training on use of the SSC, and 8 of the 23 hospitals (34.8%) used the SSC. The WHO SSC nonutilization was mainly due to a lack of training in nine hospitals (60%) and SSC unavailability in five hospitals (33.3%). Members of 22 hospitals (95.6%) were available for training on use of the SSC. **Conclusion:** The WHO SSC is poorly used in pediatric operating rooms of public hospitals in Senegal. The main reasons for nonutilization are remediable.

Keywords: surgical safety checklist, pediatric surgery, public hospitals, Senegal, low and middle income countries (LMICs)

INTRODUCTION

Worldwide, complications arising from a surgical intervention happen in up to 15% of cases, most originating from low- and middle-income countries (LMICs).^[1,2] In LMICs, surgery-related mortality was estimated to be 100 to 1000 times higher than in high-income countries (HICs), with most of the death causes being preventable.^[3,4] In 2008, the World Health Organization (WHO) introduced the surgical safety checklist (SSC), a questionnaire for the verification of information about the patient, the surgical procedure, the anesthetic equipment, and surgical instruments before and after surgical intervention.^[5] The SSC was created to be an aide memoir for the prevention of current surgical mistakes like operating on the wrong patient or the wrong side or doing a nonindicated surgery. Complications, such as textiloma or other forgotten foreign bodies, could also be prevented.^[5,6]

Since the creation of the WHO SSC, evidence has shown that its use results in significantly less intraoperative and surgery-related morbidity and mortality, especially in LMICs where basic systematic checking in operating rooms (ORs) was nonexistent.^[6–8] However, its uptake in different countries widely varies. Although HICs have integrated it into their current practice, many LMICs are still not using it.^[8–10] During the past decade, efforts have been made to popularize and implement the SSC in these countries, with governments and non-governmental organizations (NGOs) developing projects in LMICs.^[2,3,5,11,12]

Along with all surgical conditions, pediatric surgical conditions were not integrated into global health policies until 2015, according to the Lancet Commission on Global Surgery.^[13] Africa is estimated to be 40% of the worldwide pediatric population by 2050. However, two-thirds of children in sub-Saharan Africa have at least one unmet surgical need.^[13] In the past decade, challenges to providing pediatric surgical care were explored, and solutions were progressively provided through governments and NGOs, resulting in the increased pediatric surgical and anesthetic workforce and their distribution, available pediatric surgical training, and better equipment.^[14] When delivery of pediatric surgical care has increased in LMICs, it is essential to ensure its safety, and the use of the WHO SSC is an excellent option to prevent avoidable morbidity and mortality. However, few studies specifically evaluated the use of the SSC in pediatric ORs.

No published study evaluated the use of the SSC in pediatric ORs in Senegal. Considering that SSC-preventable complications have been reported in Senegalese adults and children^[15–18] and some NGO-organized seminars and training in the use of the SSC in some Senegalese hospitals, we aimed to determine the use of the SSC and reasons explaining its nonutilization in pediatric surgical departments and units across Senegal.

METHODS

Taking into account that the survey carries low risk to participants, for whom no personal data were collected, Albert Royer National Hospital Center institutional review board waived the ethical review.

Study Design and Setting

From Jan 2 to 22, 2024, a survey was conducted in public pediatric surgical departments and units in Senegal, a West African country with 18 million people, of whom 7 million

are younger than 15.^[19] The country is divided into 14 regions, each having a regional hospital and another additionally having national and university teaching hospitals, representing the highest referral level. Among the 14 regions, 11 have at least one pediatric surgical department or unit within a regional, national, or university teaching hospital, treating surgical conditions of patients younger than 15 from Senegal and neighboring countries such as the Gambia, Guinea, and Mauritania.

Study Population

We proceeded by exhaustive sampling, including all public pediatric surgical departments and units in Senegal working during the study period. We surveyed each department or unit of pediatric surgery in Senegal by requesting the pediatric surgeon to complete an online questionnaire in concertation with their team members (anesthetist and scrub nurses included). In case there were many surgeons, the chief of unit or department was chosen.

Data Collection

Parameters of interest concerned the hospital (location, level, surgical workforce, and workload) and the SSC (previous seminar or training on its use, the use of a SSC—the WHO model or its adapted version, when it is used, its use frequency, if it is used for emergency surgery, who coordinates its use, if there is interaction between members of the team when using it, reason for its nonutilization, and availability to attend a seminar or training on the use of the SSC).

Through Google Forms, an online questionnaire (see supplement) was sent to 23 pediatric surgeons from the 23 departments and units of pediatric surgery in Senegal. Twenty days were given to complete the form, which was automatically registered as an Excel sheet and imported using Microsoft Office 2020.

Data Analysis

Data were analyzed with SPSS version 26. As all data were categorical, they were expressed in frequency (number and percentage).

RESULTS

The survey had a 100% participation rate by receiving replies from all 23 departments and units of pediatric surgery in Senegal, located in 15 Senegalese cities. There were two first-level hospitals (8.7%), 11 second-level hospitals (47.8%), and 10 tertiary hospitals (43.5%). Concerning the workforce, 10 hospitals (43.5%) had two pediatric surgeons or pediatric surgery senior residents, all hospitals had an anesthetist nurse, and 18 hospitals (78.3%) had at least two available scrub nurses in each operating room. Details of the workforce and workload are displayed in Table 1.

In 11 hospitals (47.8%), training on the use of the SSC has been organized. Among the 23 surveyed hospitals, 8 (34.8%) are using the SSC. Notably, among the 11 hospitals that received training, 6 (54.5%) have adopted its use. Details of SSC use are given in Table 2. In ORs having fewer than two scrub nurses, the use of the SSC is lower (20%) compared with those with at least two scrub nurses in each OR (38.9%).

Among the 15 hospitals not using the SSC, the reasons included lack of training (nine hospitals), unavailability of the SSC (five hospitals), perceptions that the SSC is a waste

Table 1. Workforce qualification and workload of pediatric surgery departments and units included in the study ($N = 23$)

Variables	Frequency (n)	Percent (%)
Number of pediatric surgeons or residents		
1	7	30.5
2	11	47.8
3	2	8.7
4	2	8.7
5	1	4.3
Anesthetist		
Anesthesiologist	22	95.6
Senior resident in anesthesia	7	30.5
Anesthetist nurse	23	100
Availability of at least two scrub nurses in the operating room		
Yes	18	78.3
No	5	21.7
Number of weekly surgical procedures		
< 5	3	13
5–10	14	61
10–15	2	8.7
15–20	3	13
> 20	1	4.3

of time (three hospitals), insufficient workforce to perform the checks (two hospitals), and existence of a similar checking system (two hospitals). In addition, 22 of the 23 surveyed hospitals expressed interest in attending a seminar or training on the SSC.

DISCUSSION

Globally, 2.7 million surgical procedures are performed annually, with complication rates ranging from 15% to 38%,^[1,2] and many of these surgical complications are preventable. To ensure the minimum safety of surgical interventions, the Patient Safety Committee of the WHO introduced the SSC in 2008.^[5,6] Considering that many complications occur in LMICs, countrywide training for implementation of the SSC in the local surgical culture was done, with some success stories.^[2,12] This study aimed to analyze the use and reasons for nonutilization of the SSC in pediatric surgical ORs of public hospitals in Senegal.

The use of the SSC was reported in a third of surveyed hospitals. This is similar to the results of other LMICs.^[3,4,10,11,20] The reason may be attributed to the fact that only half of institutions received training on the SSC. This is reinforced by the fact that among hospitals that benefited from previous training, a greater frequency of SSC use is reported.^[5,21] The use of the SSC is more recent, with most institutions using it since 2023. This may be linked to the fact that in pediatric surgical departments, the SSC was recently popularized, with training performed in several hospitals. However, two-thirds of hospitals use the SSC occasionally. This may be linked to the fact that half of hospitals using the SSC do not perform it for emergency surgery. It has been reported that benefits from the SSC should be expected only by its full-time use.^[22] In addition, emergency surgeries are commonly associated with complications. Using the SSC in such a situation would be beneficial as the checking would decrease the risk of complications by ensuring that the surgical and anesthetic needs are anticipated and surgical errors

Table 2. Information on use of the World Health Organization surgical safety checklist ($N = 8$)

Variables	Frequency (n)	Percent (%)
Since when is it used		
2019	1	12.5
2020	1	12.5
2022	2	25
2023	4	50
Frequency of utilization		
Rarely	1	12.5
Occasionally	5	62.5
Always	2	25
Utilization for surgical emergencies		
Yes	4	50
No	4	50
Coordinator of the checking		
Scrub nurse	4	50
Surgeon	3	37.5
Other	1	12.5
Interaction between teams		
Yes	6	75
No	2	25

such as textiloma, whose frequency is increased in emergency surgery, would ideally be zero.^[15]

Two-thirds of hospitals do not use the SSC, primarily because of a lack of training. This is plausible as in the same population study, hospitals that benefited from training had higher rates of SSC use. In LMICs, implementation of the WHO SSC is mainly done by NGOs in collaboration with stakeholders.^[9,20,23] This training may be individual or team-based. The latter strategy is associated with greater use of the SSC, as all team members feel concerned and know the benefits from SSC use.^[12,21,24,25] However, previous training on SSC use does not guarantee use of the SSC. For example, a survey conducted in Ghana found that only 30% of hospitals continued to use the SSC 1 year after the training.^[11]

Other reasons for SSC nonutilization included unavailability of the SSC in a third of institutions. Many authors perceive this as a lack of interest in practicing SSC, as the WHO version can be found and printed online.^[3] Institution-adapted versions can be printed or painted on the OR walls so that they would always be available.^[26] Twenty percent of institutions consider the SSC as a waste of time. This may be because each of these institutions reported a similar checking system, the SSC was unavailable, or there was a lack of workforce to perform the SSC. In ORs having fewer than two scrub nurses, the use of the SSC is lower (20%) compared with those with at least two scrub nurses in each OR (38.9%). However, as demonstrated by the unavailability of the SSC, the lack of a workforce is not an absolute excuse for not performing the checklist. Anesthetists are used to perform variable checklists before patient anesthesia, such as anesthesia machine checking.^[3] A solution to the lack of workforce would be the scrub to perform the sign-in and the anesthetist to perform the time-out and the sign-out. In this survey, no anesthetist was reported as coordinator of the SSC. The implementation, in a team-training format, would ease the use of the SSC in settings with a reduced workforce.

Among the 23 hospitals, 22 were willing to participate in training on the SSC. This indicates potential for greater adoption of the SSC in pediatric surgical departments. Countrywide training in SSC use should be prioritized, focusing on a team-based strategy. Although the benefits of SSC use are

debated in HICs, its effectiveness is clear in LMICs, where proper implementation has been shown to significantly reduce postoperative complications and mortality.^[9] To help better uptake of the SSC, its benefits in LMICs should be widely exposed, and stakeholders should include the use of the SSC in the criterion of safety evaluation of public ORs.^[7]

Strengths and Limitations

This study has the merit of reporting a countrywide impression of the use of the SSC in sub-Saharan Africa and identifying reasons for its nonutilization. However, we restricted the study to public pediatric surgical institutions. This resulted in a limited population study with 23 hospitals. With such a scale, no statistical test could be performed. In addition, the study does not provide information about correctness and real-time use of the SSC. Future directions would be to organize seminars on the use of the SSC and evaluate its use pre and post seminars by collecting hospital data. It would also be interesting to evaluate the impact of use of the SSC on postoperative outcomes.

CONCLUSION

The SSC is poorly used in Senegalese public pediatric surgical departments and units. The main reasons for nonutilization, including lack of training, unavailability of the SSC, and insufficient workforce, can be addressed through increased training and greater team involvement, particularly from anesthetists. To reinforce SSC use, it should be made mandatory in all pediatric surgery departments and units, with help of the Health Ministry and the local society of pediatric surgery.

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Data Availability

Data to support this study are available upon reasonable request to the corresponding author.

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