

Audit

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Compliance with World Health Organization Surgical Safety Checklist: A Clinical Audit

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ABSTRACT

Background: Proper implementation and adherence to the WHO surgical safety checklist are questionable. This audit aims to assess the checklist's completeness and the effectiveness of an educational intervention to improve adherence to it. **Method:** A prospective audit in a District General Hospital, Sri Lanka, evaluated the WHO surgical safety checklist's use before and after a staff awareness program. The audit assessed the completeness of the sign-in, time-out, and sign-out sections in three phases. The Wilcoxon sign rank test assessed the significance. **Results:** Prior to the intervention, checklists were completed for 21 (22.1%) patients and compliance with 'sign in', 'sign out', and 'time out' on the checklists stood at 49 (51.6%), 34 (35.8%), and 21 (22.1%) respectively. Following the intervention, checklists were completed in 79 (83.2%) and compliance with 'sign in', 'sign out', and 'time out', reached 84 (88.4%), 80 (84.2%), and 83 (87.4%) respectively. Statistically significant improvements were observed in overall checklist completion. ($p < 0.001$). **Conclusion:** Even though the initial compliance with the WHO surgical safety checklist was suboptimal, the implementation of a staff awareness program significantly enhanced compliance rates, thereby reinforcing patient safety protocols within surgical settings.

Keywords: Safe surgery, Safety checklist, Patient's safety

INTRODUCTION

Globally, there is undeniable proof that the overall occurrence of adverse events within a hospital environment is around 10%. Moreover, it has become apparent that half of these incidents could have been prevented (1). Therefore, it is imperative to make enhancements within the healthcare systems to enhance patient safety. In June 2008,

the WHO developed the Surgical Safety Checklist, aimed at enhancing teamwork, ensuring the consistent application of safety procedures within operating rooms (2, 3).

The WHO surgical checklist is designed to be universally applicable to a wide range of surgical procedures. This comprehensive checklist consists



of 19 items and plays a crucial role in promoting consistent care while reducing the occurrence of complications and fatalities (3). It is implemented at three key stages: sign-in, time-out and the sign-out. Each step involves a "read-out" process, fostering active communication among the surgical team and other staff members in the operating theatre (2). Despite its widespread adoption, sinister surgical incidents related to the operating theatre still occur, and some of these issues may be attributed to challenges in adhering to the Surgical Safety Checklist. Numerous studies have pinpointed specific problems, particularly in terms of sign-out compliance (4-6). The literature has also highlighted varying levels of staff engagement with the checklist process and inconsistent delivery of checklist information, as well as instances of missing items (4, 6). These challenges associated with the current format of the Surgical Safety Checklist indicate that there is room for improvement.

The specific unit was selected to conduct this study due to the reporting of an incident of a serious surgery-related adverse effect that has increased patient morbidity in the recent past. Hence, this prospective audit was conducted before and after an awareness program with the aim of assessing compliance with the WHO surgical safety checklist in a District General Hospital in Sri Lanka which handles a high flow of general surgical, ophthalmology, and orthopedic patients.

MATERIAL & METHODS

A prospective audit was conducted in a District General Hospital in Sri Lanka including both elective and emergency surgeries. A total of 95 patients representing general surgery, ophthalmology, and orthopedic surgical lists were included. The study was conducted between September 2023 and December 2023. Data was collected by the corresponding author and co-author, who were trained for this task. The data was collected over three consecutive weeks by these two researchers, who assessed the staff's adherence to the 19-item WHO Surgical Safety Checklist during the three key stages. The evaluation criteria included the occurrence of time-out and sign-out and the completeness of the checklist. The completion of all

three sections of the checklist was considered as "checklist completed".

Following the initial audit, several measures were implemented to enhance adoption and implementation. Surgical safety checklist forms were made readily available in operating rooms to familiarize staff with the details. The Principal Investigator conducted an educational programme aimed at improving surgical safety by training Nursing Officers, Medical Officers in Anaesthesia, and Medical Officers in Surgery on the WHO Surgical Safety Checklist. Twenty Nursing Officers, five Medical Officers in Surgery, and Medical Officers in Anaesthesia participated in the training programme. A mandatory training video was created to provide clear instructions on both the correct and incorrect ways to execute the checklist, with emphasis placed on instilling a sense of responsibility and accountability in all team members for their specific checklist components. The programme focused on the importance of the checklist, its step-by-step implementation, and its advantages, including reducing surgical complications, preventing wrong-site surgeries, and enhancing team communication. Participants were taught how to perform the checklist across three key phases: preoperative, intraoperative, and postoperative and what are the common errors that happens. The training emphasized the checklist's role in improving surgical outcomes, ensuring better preparedness for emergencies, and fostering a culture of patient safety. This initiative equipped healthcare professionals with the skills to adhere to global safety standards, ultimately contributing to higher quality care and fewer avoidable errors.

Three months following the awareness program, between September 2023 and December 2023, a second audit was conducted prospectively utilizing the same methodology. There were 95 patients included, and the proper use of the checklist was assessed. All data were updated into an Excel sheet and analyzed using SPSS software. The Wilcoxon sign rank test was used to assess the significance of the compliance of each section of the checklist before and after the awareness program.

Ethical Considerations

As it was a routine audit for quality improvement, ethics approval was not necessary according to institutional guidelines.

RESULTS

The study involved 95 patients, of which 42 (44.2%) were males and 53 patients (55.8%) were females. The mean age of the study sample was 50.1 years. As mentioned in "Table 01" out of all 95 cases, 51 (53.7%) initially had attached checklists from wards, a figure that improved to 83 (87.4%) after intervention. Prior to the intervention, checklists were completed for 21 (22.1%) patients, which increased to 79 (83.2%) post-intervention. Notably, compliance with 'sign in', 'sign out', and 'time out' on the checklists stood at 49 (51.6%), 34 (35.8%), and 21 (22.1%) respectively initially. However, following the intervention, these figures showed significant improvement, reaching 84 (88.4%), 80 (84.2%), and 83 (87.4%) respectively. Statistically significant improvements were observed in compliance with 'sign in', 'sign out', and 'time out' on the checklists and in overall checklist completion at p value < 0.001 by Wilcoxon sign rank test.

Table 01: Compliance to the surgical safety checklist prior to and after the educational intervention

Variable	Pre-intervention		Post-intervention	
	Yes	No	Yes	No
Checklist attached from the ward				
Checklist attached	51 (53.7%)	44 (46.3%)	83 (87.4%)	12 (12.7%)
Checklist Completed				
Checklist Completed	21 (22.1%)	74 (77.9%)	79 (83.2%)	16 (16.8%)
Sign-in Completed				
Sign-in Completed	49 (51.6%)	46 (48.4%)	84 (88.4%)	11 (11.6%)
Time-out Completed				
Time-out Completed	21 (22.1%)	74 (77.9%)	83 (87.4%)	12 (12.7%)
Sign-out Completed				
Sign-out Completed	34 (35.8%)	61 (64.2%)	80 (84.2%)	15 (15.8%)

DISCUSSION

The purpose of our study was to determine compliance to the WHO Surgical checklist during surgery and to assess the effectiveness of an educational intervention to improve the

compliance with the SSC to improve the peri-operative and post operative patient safety. A systemic review reported a significant enhancement in surgical outcomes with implementation of SSC, with an implementation rate ranging from 90% to 96% (7).

This study involved 95 patients, of which 51 (53.7%) initially had attached checklists from wards and compliance with 'sign in', 'sign out', and 'time out' on the checklists stood at 49 (51.6%), 34 (35.8%), and 21 (22.1%) respectively prior to the intervention which revealed comparatively lower levels of compliance to the 'time out' and 'sign out' sections. A study done in Pakistan showed that sign-in was conducted verbally in 65.2% of cases and read aloud in 13% of cases, while time-out was verbally conducted in 60.9% of cases but read aloud in 4.3% of cases. Sign-out was verbally conducted in 34.8% of cases, but no instances involved reading it aloud (8). Another study done in Pakistan revealed a much lower level of compliance for the time-out and sign-out sections. The time-out checklist, it was fully executed for only 1 out of 39 patients (2.6%), and the sign-out checklist was fully executed for none out of 34 patients (0%) (9). Contrary to these findings, a study done in India reported significantly higher compliance rates of 100%, 78%, and 76.5% for the initial, second, and third segments of the SSC, respectively (10). This might be the reason behind comparatively higher rates of compliance since the above-mentioned Pakistan study also reported a lack of initiation in the process (8).

Similar to our study, a UK study reported a lower level of compliance to sign-out section but contrary to our findings, the compliance to the time-out section was satisfactory. In one study, a time-out was conducted in 87.4% of surgeries, while sign-out procedures were undertaken only in 8.8%. The sign-out process usually occurs during periods of significant workload for theatre nursing and anesthesia personnel, and this might be the reason behind the lack of compliance in the sign out section (4). Another study done in UK demonstrated 97.4% compliance to time-outs section while showing 86.8% compliance to sign-out section (11).

Interestingly, another study conducted in the UK assessed the application of WHO Surgical safety

checklist both in standard practice as well as with the utilization of audio prompt and full audio delivery. The sign-out SSC compliance was increased from 86.8% to 96% and 100% in audio prompting and audio delivery, respectively. Audio prompting might have introduced positive improvements by providing clear and audible cues that encouraged staff to pause their activities and participate (11). Therefore, further studies are required in Sri Lankan context to find the best possible way to improve the compliance of SSC specially in sign out section. However, mere documentation of the SSC won't be enough to ensure patients' safety. In an observational audit, the compliance with the SSC was found to be a mere 3.5%, despite documented claims of 100% compliance (12).

After the intervention, compliance showed statistically significant improvement. Similarly, multiple studies have demonstrated increased compliance to SSC after an intervention. Study in Pakistan, following an educational intervention, there was a significant improvement in compliance with the surgical safety checklist (8). In research conducted in the UK, following the introduction of an educational program, a post-training audit revealed over 96% were using the checklist correctly (13). Another study, sign out showed significant improvement, being verbally communicated, appropriately completed in the theatre, and fully documented in 94% of cases. Overall compliance, demonstrated an average compliance rate of 63.7% in audit one, which significantly increased to 90.4% in audit two (14).

A significant constraint of this study arises from the inability to implement blinding among researchers regarding the intervention utilized, potentially introducing observer bias during data collection. Additionally, the Hawthorne effect, wherein subjects modify their behavior upon realizing they are under observation, might have influenced outcomes as well. Furthermore, the potential surgical outcomes resulted by a lack of compliance with the SSC and the engagement of individual healthcare professionals in the procedure should also be assessed in future studies.

In conclusion, surgical awareness programs can substantially improve the compliance of SSC which

in turn can improve the patient's safety and outcomes of surgery. Further large-scale studies are necessary to implement a most suitable method to improve the compliance in safe surgical procedures in the Sri Lankan context.

Author declaration

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None.

Authors' contributions:

Conceptualization and Design: PGND, AGMO; Data Collection: PGND, AGMO; Manuscript Writing: PGND, AGMO, RJ; Manuscript Preparation: RJ, AW; Supervision: AW.

Conflicts of interest:

The authors declare that there is no financial or non-financial conflict of interest.

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Ethics statement:

Ethical clearance is not obtained as it is not necessary for an audit which was done using secondary data (Institutional policy).

Statement on data availability:

All data generated during this study are available upon request from the corresponding author.

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