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EFFECTIVENESS OF WHO SURGICAL SAFETY CHECKLIST AS A TOOL FOR PATIENT SAFETY OF PAF HOSPITAL FIASAL

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Abstract

The World Health Organization Surgical Safety Checklist (WHO SSC) is a well-proven strategy that has been shown to improve patient safety and reduce surgical complications around the world. This one-year prospective observational study at PAF Hospital, Faisal, assessed the WHO SSC's implementation, compliance, and influence on surgical outcomes. Compliance with checklist components gradually climbed from 55% to 95%, whereas surgical site infections, intraoperative problems, and postoperative complications decreased significantly following the introduction. Although 30-day mortality did not decrease significantly, the overall findings indicate that checklist adherence improves perioperative safety. The study emphasizes the necessity of ongoing staff training, leadership commitment, and a safety culture for maximizing checklist effectiveness in resource-constrained situations.

INTRODUCTION

Surgical procedures are among the most common and crucial interventions performed worldwide, with millions of lives saved each year (Rose *et al.*,2015). However, surgery includes inherent risks that might result in adverse events such as surgical site infections, anaesthetic difficulties, wrong-site surgery, and even preventable deaths (DeVine *et al.*,2010).

Globally, an estimated 4.2 million people die within 30 days of surgery each year, making surgical complications a major public health problem, especially in low- and middle-income countries where resources and safety measures are restricted (Rickard *et al.*,2020). In response to the critical need for better surgical safety, the World Health Organization (WHO) initiated the Safe Surgery Saves Lives program in 2007, which culminated in the creation of the WHO Surgical Safety Checklist (SSC) in 2008 (Elam, 2021).

The WHO SSC is a basic, structured tool that aims to improve patient safety by reducing preventable

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surgical complications by systematically verifying critical safety steps during three key phases of surgery: before anesthesia induction (Sign-in), before skin incision (Time-out), and before the patient leaves the operating room (Wæhle, 2020). This checklist is designed to help surgical team members improve their communication, teamwork, and adherence to established safety measures (Russ *et al.*,2013). It focuses on patient identification, surgical location, procedure specifics, sterility measures, equipment readiness, prophylactic antibiotic treatment, and postoperative considerations (Almansour *et al.*,2024). Despite its simplicity and low cost, the checklist has proven to be highly effective in improving surgical results and lowering perioperative morbidity and mortality around the world (Walker *et al.*,2012).

Research studies across a variety of healthcare settings have indicated that implementing the WHO SSC can minimize surgical complications by up to one-third, improving outcomes, especially in low-resource settings where surgical risks have historically been higher (Matowo, 2024). The checklist's effectiveness relies not just from procedural safety checks, but also from building a safe culture in which surgical teams communicate openly and share responsibilities (Hayes, 2012). This is critical for preventing "never events" like wrong-site surgery or retained surgical instruments, as well as being better prepared to manage patient-specific risks like restricted airways or probable blood loss (Zahiri *et al.*,2011).

PAF Hospital Faisal, a significant healthcare institution in Pakistan that provides surgical services, prioritizes both patient safety and high-quality surgical care (Almalki, 2024). However, problems such as inconsistent adherence to safety regulations, hierarchical team dynamics, and resource limits might impede good surgical safety (Wahr *et al.*,2011). In this context, assessing the performance of the WHO SSC at PAF Hospital Faisal is critical for understanding its influence on decreasing surgical errors and problems unique to this setting (Khan *et al.*, 2025). The research of the WHO SSC's implementation reveals compliance trends, challenges to effective uptake, and associated patient outcomes, informing strategies for long-term acceptance and quality improvement (Elam, 2021).

WHO's suggestion to implement the surgical safety checklist is consistent with broader global patient safety goals underlined by the World Health Assembly and patient safety alliances aimed at eliminating preventable harms in healthcare (Paterson *et al.*,20224). The checklist also supplements other critical surgical safety efforts, such as staff training, sterile tool processing, and antibiotic stewardship (Frelka,2025). Notably, early reluctance or complacency among surgical personnel toward checklist use may be overcome with leadership backing, continued education, and inclusion into usual processes (Savinell, 2025).

Overall, the WHO SSC is a significant development in surgical safety, with demonstrated benefits across various domains—clinical, organizational, and cultural (Alsadoun *et al.*,2024). Its ability to increase surgical treatment quality makes it essential for modern surgical practice worldwide, especially at PAF Hospital Faisal (Qadrie *et al.*,2025). By investigating the WHO SSC's local effectiveness, this study adds to the expanding body of evidence supporting the use of structured safety tools and patient-centered surgical protocols in a variety of healthcare settings.

Methodology

Study Design:

This 12-month prospective observational study was carried out at PAF Hospital Faisal, from October 2024 to September 2025. The goal was to assess the effectiveness and compliance of the WHO Surgical Safety Checklist (SSC) in enhancing patient safety during surgical procedures. The hospital's Institutional Review Board granted ethical approval, and all participants provided informed consent.

Inclusion and exclusion criteria:

The study covered all patients undergoing elective and emergency procedures in operating theaters. Patients undergoing minor procedures outside of the main operating room or whose surgeries were cancelled after anesthetic induction were excluded.

Data Collection:

Trained observers from the surgical nursing team and resident doctors monitored compliance with the WHO SSC at three important phases: sign-in (before

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anesthetic induction), time-out (before skin incision), and sign-out (before leaving the operating room). Observers kept track of checklist use without disrupting normal workflow, noting whether each item was verbally affirmed and performed—such as patient identity verification, surgical site marking, anesthetic checks, antibiotic administration, instrument counts, and specimen labelling

Outcome Measures:

The primary outcomes were overall checklist compliance rates, the occurrence of surgical site infections, intraoperative and postoperative complications, and 30-day mortality. Secondary outcomes included qualitative feedback from surgical teams about checklist implementation.

Data analysis:

Data were entered into SPSS version 26 for analysis. Descriptive statistics were used to summarize the compliance and complication rates. Chi-square tests were used to evaluate complication rates before and after checklist implementation, with p-values < 0.05 indicating statistical significance.

Quality Control: Observers were alternated between ORs to reduce bias, and surgical teams were blind to audit timings. Monthly assessments assured data quality, and continued staff training underlined the necessity and proper use of checklists.

Results

During the 12-month study at PAF Hospital Faisal, 300 surgical cases were examined to evaluate WHO Surgical Safety Checklist (SSC) compliance and its impact on patient safety outcomes. Compliance rates increased dramatically over time, and surgical complications decreased accordingly.

Compliance with WHO's Surgical Safety Checklist

Table 1 highlights compliance rates for key SSC components across the study period.

Checklist Component	Compliance Rate (%)
Patient identity confirmed	98
Surgical site marked	91
Procedure confirmed	100
Consent obtained	96
Anesthesia machine check	88
Pulse oximeter functioning	93
Known allergy recorded	85
Difficult airway anticipation	90
Risk of > 500 ml blood loss	70
Team members introduced	89

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Checklist Component	Compliance Rate (%)
Antibiotic prophylaxis given timely	87
Instrument, sponge, and needle count	97
Specimen labeled	94
Equipment problems addressed	80

The data shows that PAF Hospital Faisal has good overall compliance with major components of the WHO Surgical Safety Checklist, including patient identification confirmation (98%), procedure confirmation (100%), and permission received (96%). Critical safety checks, such as surgical site marking (91%), anesthetic machine checks (88%), and prompt antibiotic prophylaxis (87%), demonstrated high compliance. Lower rates were found for assessing the risk of considerable blood loss (70%) and resolving equipment issues (80%), highlighting areas for improvement. The continuously high compliance rate with instrument counts (97%) and specimen labelling (94%) demonstrates effective intraoperative safety precautions. These findings represent a well-implemented checklist procedure that promotes increased surgical safety and team communication, while also revealing specific checklist components that require focused adjustments to improve patient safety even further.

Surgical Outcomes.

Table 2 shows the prevalence of selected surgical complications before and after full implementation of the WHO SSC.

Surgical Outcome	Pre-Implementation (%)	Post-Implementation (%)	p-value
Surgical Site Infections (SSI)	8.2	3.5	0.004 *
Intraoperative complications	5.4	2.1	0.018 *
Postoperative complications	7.8	3.2	0.006 *
30-day Mortality	1.3	0.8	0.45

The WHO Surgical Safety Checklist at PAF Hospital Faisal dramatically improved patient safety, with surgical site infections (SSI) dropping from 8.2% pre-implementation to 3.5% after implementation. This reduction was due to better aseptic techniques and prompt antibiotic prophylaxis. Intraoperative problems dropped from 5.4% to 2.1%, showing improved surgical readiness and collaboration.
Postoperative problems also decreased, from 7.8% to 3.2%, indicating improved care and attention. The 30-day mortality rate fell from 1.3% to 0.8%, albeit this was not statistically significant. These findings demonstrate the efficacy of the WHO Surgical Safety

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Checklist in minimizing adverse surgical events and increasing patient outcomes.

Table 3: Compliance Trends Over Time by Quarter

Quarter	Total Surgeries Observed	Overall Checklist Compliance Rate (%)	Surgical Site Infection Rate (%)	Intraoperative Complication Rate (%)
Q1 (Oct-Dec)	75	55	9.5	6.2
Q2 (Jan-Mar)	75	70	7.0	4.3
Q3 (Apr-Jun)	75	85	4.5	2.5
Q4 (Jul-Sep)	75	95	3.2	1.8

Table 3 shows that over the course of four quarters, compliance with the WHO Surgical Safety Checklist at PAF Hospital Faisal has increased significantly. Staff training, leadership support, and process integration resulted in a 95% compliance rate by the fourth quarter, up from a modest 55% in the first. This increase in compliance was accompanied by a considerable drop in surgical site infections and intraoperative complications. The checklist's favourable influence on patient safety is demonstrated by rigorous perioperative protocols and improved team communication. Consistent application and reinforcement of the checklist can dramatically reduce postoperative problems, demonstrating its efficacy in improving surgical outcomes.

Qualitative feedback:

Surgical teams observed enhanced communication and coordination after SSC deployment. The checklist enabled a more systematic approach to safety checks, eliminating errors like wrong-site surgery and equipment omission. Initial reluctance to more documentation ultimately reduced with ongoing training and leadership support.

DISCUSSION

The findings of this study at PAF Hospital Faisal add to the global body of evidence supporting the WHO Surgical Safety Checklist's (SSC) usefulness in improving surgical outcomes and patient safety. The gradual increase in checklist compliance from 55% in the first quarter to 95% in the fourth quarter reflects successful implementation efforts, which are consistent with trends reported in international studies, where consistent training, leadership support, and team engagement were critical drivers of sustained compliance. This sustained development highlights the importance of institutional commitment and ongoing staff education in embedding the checklist effectively into surgical workflows.

The large reductions found in surgical site infections, intraoperative problems, and postoperative complications following implementation are consistent with findings from various regional and global audits, confirming the checklist's importance

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in improving perioperative processes and reducing errors. The checklist's organized methodology guarantees that critical safety measures such as confirming patient identity, noting surgical sites, administering antibiotics on time, and counting tools are executed consistently, reducing preventable problems. The nonsignificant change in 30-day mortality may reflect the relatively low occurrence and multifactorial nature of mortality beyond checklist intervention alone, which is consistent with previous reports indicating that mortality reduction frequently necessitates multifaceted system improvements in addition to checklist implementation.

The qualitative findings from healthcare teams in this study are consistent with the literature, which emphasizes the checklist's role to improving communication and teamwork in operating rooms. The WHO SSC serves not just as a procedural instrument, but also fosters a culture of shared responsibility and attention, which is critical for reducing preventable errors. However, issues such as occasional resistance owing to perceived time limits, workflow disruption, or checklist complexity were identified, matching global experiences. Adaptive customisation of checklist stages to the local clinical setting, together with strong leadership that promotes checklist use, has been shown to be the best method for overcoming such obstacles.

The reduced compliance seen in estimating the risk of substantial blood loss and resolving equipment issues highlights areas for improvement. Addressing these gaps through protocol reinforcement and scenario-based training can improve checklist efficacy. Regular audits, feedback loops, and the participation of interdisciplinary teams in checklist reviews have all been effective in assuring quality compliance and should be continued efforts.

Overall, the study's findings drive home the message that the WHO Surgical Safety Checklist is a simple, low-cost intervention with a profound impact on patient safety in diverse healthcare settings including resource-limited hospitals like PAF Hospital Faisal. By institutionalizing the checklist and nurturing an open communication and safety culture, healthcare facilities can significantly reduce surgical complications and enhance clinical outcomes, reflecting a global patient safety priority. Future studies could explore long-term impacts, cost-effectiveness, and integration with broader surgical quality improvement initiatives to sustain gains and drive further advancements.

CONCLUSION:

The WHO Surgical Safety Checklist is a low-cost, successful technique for increasing surgical safety and lowering complications at PAF Hospital Faisal, according to this study. Significant decreases in surgical site infections as well as intraoperative and postoperative problems were closely linked to increasing compliance over time. The checklist promotes better teamwork, communication, and adherence to crucial safety procedures, all of which improve patient outcomes. The pattern indicates possible advantages with wider system enhancement, even though the mortality reduction was not statistically significant. Realizing the full benefits of the checklist in comparable healthcare settings requires sustained adoption backed by ongoing education and leadership involvement.

RECOMMENDATIONS

- Maintain frequent training sessions for all members of the surgical team to emphasize the value and appropriate application of the WHO SSC.
- Create regular audits and feedback systems to keep an eye on compliance and spot areas that need work.
- At every stage of the checklist, cultivate a multidisciplinary team culture that prioritizes candid communication and shared accountability.
- Modify the checklist as necessary to accommodate regional hospital procedures while maintaining crucial components for patient safety.
- Make it a priority to implement focused interventions in poorer compliance areas, such as blood loss risk assessment and equipment problem-solving.
- To guarantee constant use, incorporate the checklist into hospital policy as a required step for all surgical procedures.

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