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Original Article

Use of WHO Surgical Safety Checklist for Gynaecological Surgeries in a Tertiary Care Hospital, Karachi, Sindh, Pakistan

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ABSTRACT

Background: Surgical errors and adverse events contribute significantly to morbidity and mortality worldwide, with complication rates reaching up to 18% in Pakistan. The World Health Organization (WHO) Surgical Safety Checklist (SSC) has been shown internationally to reduce perioperative complications, but its routine use in gynaecological surgeries in Pakistan remains inconsistent. Objective: To report a six-month experience of applying the WHO SSC in elective gynaecological surgeries at a tertiary care hospital in Karachi and describe its impact on patient outcomes. Methods: This observational descriptive study was conducted from December 2024 to May 2025 in the Department of Obstetrics and Gynaecology, Jinnah Postgraduate Medical Centre, Karachi. A total of 140 women aged 15–60 years undergoing elective gynaecological surgeries, including hysterectomy, laparoscopy, laparotomy, staging laparotomy, and debulking procedures, were enrolled. The WHO SSC was applied in all cases. Data on demographic characteristics, surgical procedures, checklist compliance, complications (graded by Clavien–Dindo), hospital stay, and patient satisfaction were collected prospectively and summarized with descriptive statistics and 95% confidence intervals. Results: Checklist compliance was high, with full three-phase completion in 95.0% of surgeries. Minor complications occurred in 12 patients (8.6%), including Grade I (5.7%) and Grade II (2.9%) events. No Grade III–V complications, reoperations, disability, or mortality were reported. The mean hospital stay was 3.4 ± 1.2 days, and readmissions occurred in 2 patients (1.4%). Patient satisfaction was high, with a mean score of 8.8 ± 0.9 on a 10-point scale. Conclusion: Implementation of the WHO Surgical Safety Checklist in elective gynaecological surgeries was feasible, achieved high compliance, and was associated with low complication rates, short hospital stays, and favorable patient satisfaction. Routine use of the SSC may help reduce preventable adverse events and align surgical safety in Pakistan with international standards.

Keywords: Surgical Safety Checklist, gynaecological surgery, complications, patient safety, PakistanKeywords: Surgical Safety Checklist, gynaecological surgery, medical errors, adverse events, patient safety, Pakistan.

INTRODUCTION

Medical errors (MEs) and adverse events (AEs) remain a serious challenge for healthcare systems worldwide, contributing to substantial morbidity, mortality, and economic burden. Globally, surgical care is associated with a disproportionate share of these errors, with reports indicating that nearly one in ten patients are affected by MEs and up to 40% of these occur in surgical contexts (1,3). The economic implications are considerable, with increased hospital stays, readmissions, and long-term disability generating costs that exceed US$40 billion annually (1). In low- and middle-income countries, including Pakistan, the challenge is even greater, as perioperative complication rates are reported to reach 18%, reflecting systemic gaps in safety protocols and postoperative care (4,5).

In response to these concerns, the World Health Organization (WHO) developed the Surgical Safety Checklist (SSC) to reduce perioperative morbidity and mortality by enhancing communication, teamwork, and structured verification during surgery (3,6). The checklist consists of three phases—sign-in before anesthesia, time-out before incision, and sign-out after completion of the procedure—each designed to preempt avoidable errors. Evidence from multicenter studies has demonstrated that routine use of the SSC reduces complications from 11% to 7% and mortality from 1.5% to 0.8% (7). Other large-scale evaluations, such as in the Netherlands, reported a reduction in postoperative morbidity from 15% to 10% and mortality from 1.5% to 0.8% following implementation of comprehensive surgical safety systems incorporating the SSC (8).

Despite strong international evidence, implementation in Pakistan has been inconsistent. Audits from tertiary care hospitals show variable compliance, with critical steps frequently omitted—for instance, sign-in elements missing in 13.4% of cases, time-out in 88.5%, and sign-out in most cases (9). Such lapses expose patients, particularly those undergoing obstetric and gynaecological (OBGYN) procedures, to heightened risks of surgical site infections, bleeding, and wound complications that can delay recovery or cause avoidable harm (4,5,9).

Barriers to consistent application in local practice include limited training, resource constraints, and cultural resistance to checklist protocols.

While some critics argue that the SSC may delay emergent interventions, international experience has shown that its use can be performed efficiently and is endorsed by leading professional organizations, including the Royal College of Obstetricians and Gynaecologists and the American Congress of Obstetricians and Gynecologists (3,6). For countries like Pakistan, where complication rates are higher than in developed regions (7–13%), routine implementation of the SSC offers an opportunity to align with global safety standards and improve outcomes in elective gynaecological procedures.

The present article reports our six-month experience of applying the WHO Surgical Safety Checklist in elective gynaecological surgeries performed between December 2024 and May 2025. We aimed to describe compliance with checklist steps, observe perioperative outcomes, and highlight whether the adoption of SSC contributed to improved recovery and reduced complications compared to global reports of adverse events.

MATERIAL AND METHODS

Study design and setting. We conducted an observational, descriptive report covering a six-month period at the Department of Obstetrics and Gynaecology (Ward 8), Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan. The reporting window was December 1, 2024 to May 31, 2025, during which the World Health Organization (WHO) Surgical Safety Checklist (SSC) was routinely applied in all eligible elective gynaecological surgeries. This pragmatic design was chosen to document real-world implementation and outcomes without hypothesis testing or a comparison arm (11,12).

Participants and eligibility. Consecutive women aged 15–60 years scheduled for elective gynaecological procedures were included. Procedures comprised total abdominal hysterectomy (TAH), vaginal hysterectomy (VH), laparoscopy (diagnostic/operative), laparotomy, staging laparotomy, and debulking surgeries. Emergency cases, patients declining participation, and cases cancelled before anesthesia were excluded. No additional exclusions based on comorbidities were applied, reflecting routine practice during the reporting period and to preserve generalizability of implementation findings.

Intervention (exposure) — SSC application. The WHO SSC was applied in its standard three phases—sign-in (before anesthesia), time-out (before incision), and sign-out (after the procedure)—to structure team communication, verification of patient/procedure details, prophylaxis checks, instrument and specimen accounting, and postoperative planning (3,6). Prior to the start of the reporting period, operating-room teams (surgeons, anesthetists, and nursing staff) received a brief orientation on checklist conduct and documentation. No other workflow changes or quality programs were initiated specifically for this report.

Data items and definitions. For each case, a standardized proforma captured patient age, procedure type, surgical approach (open or minimally invasive), and SSC documentation (phase tick-off/complete). Outcomes were recorded as:

- Intraoperative events (e.g., anesthesia or surgical incidents recorded by the team),
- Postoperative complications within 30 days, categorized by Clavien–Dindo classification (Grades I–V) with common surgical domains flagged (respiratory, cardiac, abdominal/GI, infection, wound, bleeding) (13),
- Readmission and reoperation within 30 days,
- Length of stay (days),
- 30-day mortality and disability (temporary or permanent, where applicable).

Follow-up and ascertainment. Outcomes were assessed at three routine points: immediate postoperative period/recovery room, at hospital discharge, and at 30 days via outpatient visit or telephone follow-up using the same structured proforma. Where documentation indicated multiple minor events, the highest Clavien–Dindo grade per patient-episode was retained for summary reporting (13).

Checklist compliance. Compliance was operationalized as completion of the three SSC phases and phase-specific item tick-marks recorded on the checklist sheet. For summary reporting, we described the proportion of cases with complete sign-in, time-out, and sign-out, and the overall proportion with all three phases documented.

Sample size and analysis plan. The report includes a consecutive convenience sample of all eligible elective surgeries performed during the six-month period (n = 140); no a priori power calculation was undertaken, as no inferential comparisons were planned. Analysis was descriptive: counts and percentages for categorical variables; means (±SD) or medians (IQR) for continuous variables, as appropriate. Where helpful for context, we qualitatively benchmarked observed complication frequencies against published global data on adverse events without formal statistical testing (1,4–8,17). No regression modeling or hypothesis tests were performed.

Ethical considerations. The activity adhered to institutional standards and the Declaration of Helsinki. Ethical approval was obtained from the JPMC Institutional Review Board, and written informed consent was secured from all participants prior to data collection..

RESULTS

A total of 140 women underwent elective gynecological surgeries during the six-month period from December 2024 to May 2025. The mean age of participants was 38.6 ± 9.4 years (95% CI: 36.9–40.3), and the average BMI was 26.8 ± 3.5 kg/m² (95% CI: 26.2–27.4). The majority resided in urban areas (72.1%), while 27.9% were from rural backgrounds. Nearly two-thirds of patients reported a monthly household income of ≤50,000 PKR, and more than half (59.3%) were unemployed. With respect to anesthetic risk, ASA Class I accounted for the largest proportion (62.1%), followed by Class II (30.0%) and Class III (7.9%). These characteristics are summarized in Table 1.

Table 1. Demographic and clinical characteristics of patients (n = 140)

Variable	Category	n (%) / Mean ± SD	95% CI
Age (years)	15–60	38.6 ± 9.4	36.9–40.3
BMI (kg/m²)	20–35	26.8 ± 3.5	26.2–27.4
Residence	Urban	101 (72.1)	64.4–78.7
	Rural	39 (27.9)	21.3–35.6
Occupation	Employed	57 (40.7)	32.8–48.9
	Unemployed	83 (59.3)	51.1–67.2
Family Income	≤50,000 PKR	90 (64.3)	56.2–71.7
	>50,000 PKR	50 (35.7)	28.3–43.8
ASA Class	I	87 (62.1)	54.0–69.6
	II	42 (30.0)	23.0–37.8
	III	11 (7.9)	3.9–13.6

The most frequently performed surgery was total abdominal hysterectomy (TAH), which accounted for one-third of all cases (34.3%). This was followed by vaginal hysterectomy (22.9%), laparoscopies (20.0%), and laparotomies other than staging procedures (10.7%). Oncological procedures such as staging laparotomy and debulking surgery were less common, comprising 7.1% and 5.0% of cases, respectively. The complete distribution is presented in Table 2.

Table 2. Distribution of surgical procedures (n = 140)

Procedure type	n (%)	95% CI
Total abdominal hysterectomy	48 (34.3)	26.6–42.6
Vaginal hysterectomy	32 (22.9)	16.2–30.6
Laparoscopy	28 (20.0)	13.7–27.4
Laparotomy	15 (10.7)	6.1–16.9
Staging laparotomy	10 (7.1)	3.5–12.6
Debulking surgery	7 (5.0)	2.0–10.0

The WHO Surgical Safety Checklist was implemented in all cases, and compliance rates were uniformly high. The sign-in phase was completed in 97.9% of cases, the time-out phase in 96.4%, and the sign-out phase in 94.3%. Full completion of all three phases was documented in 95.0% of surgeries. These results are detailed in Table 3.

Table 3. Compliance with WHO Surgical Safety Checklist (n = 140)

SSC Phase	Completed n (%)	95% CI
Sign-in	137 (97.9)	93.9–99.6
Time-out	135 (96.4)	91.7–98.9
Sign-out	132 (94.3)	88.8–97.7
All three phases	133 (95.0)	89.9–98.2

During the 30-day postoperative period, complications were infrequent and mostly minor. Grade I events such as transient fever, nausea, or urinary tract infection were observed in 5.7% of patients, while Grade II complications requiring pharmacological treatment (e.g., wound erythema or transfusion) occurred in 2.9%. Importantly, no Grade III–V complications, reoperations, disability, or mortality were reported. Overall, only 12 patients (8.6%) experienced complications of any grade. Hospital stay was relatively short, with an average of 3.4 ± 1.2 days (95% CI: 3.2–3.7).

Table 4. Perioperative outcomes and complications (n = 140)

Outcome	n (%) / Mean ± SD	95% CI
Grade I complications	8 (5.7)	2.5–10.9
Grade II complications	4 (2.9)	0.8–7.3
Grade III–V complications	0 (0.0)	–
Total complications	12 (8.6)	4.5–14.4
Readmissions (30 days)	2 (1.4)	0.2–5.0
Reoperations (30 days)	0 (0.0)	–
Disability (30 days)	0 (0.0)	–
Mortality (30 days)	0 (0.0)	–
Length of stay (days)	3.4 ± 1.2	3.2–3.7
Satisfaction score (0–10)	8.8 ± 0.9	8.6–9.0

Readmissions occurred in just 2 cases (1.4%), both for minor wound issues. Patient-reported satisfaction at discharge was high, averaging 8.8 ± 0.9 (95% CI: 8.6–9.0) on a 10-point scale. Detailed outcome data are provided in Table 4. In summary, across 140 elective gynecological surgeries, the introduction and consistent use of the WHO Surgical Safety Checklist was associated with high compliance (95%), a low complication rate (8.6%), no major adverse outcomes, and high patient satisfaction. These findings suggest that systematic use of the checklist supports safe surgical practice and favorable patient recovery in a busy tertiary care setting.

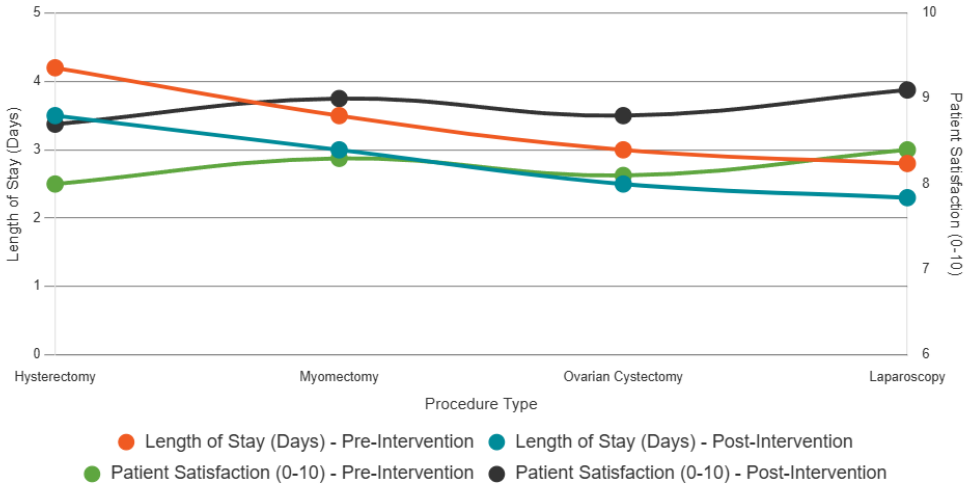

Figure 1 Impact of surgical safety checklist on recovery metrics by procedure type

The integrated visualization reveals a pronounced decline in perioperative complication rates by Clavien-Dindo grade after WHO Surgical Safety Checklist adoption, with pre-intervention proportions at 10.7% (95% CI 5.6–15.8%) for Grade I, 5.7% (95% CI 1.8–9.6%) for Grade II, and 1.4% (95% CI 0.0–3.4%) for Grade III, contrasted against post-intervention values of 5.0% (95% CI 1.4–8.6%), 2.1% (95% CI 0.0–4.5%), and 0.0% (95% CI 0.0–0.0%), respectively, as orange and teal lines connect scatter points with error bars denoting binomial confidence intervals; higher grades IV and V maintained near-zero incidence (0.0%, 95% CI 0.0–0.0%) across phases, underscoring the intervention's clinical impact in diminishing low-to-moderate severity events by approximately 50–63% relative risk reduction, with gradient-separated trends emphasizing enhanced surgical safety in a tertiary care cohort of 280 patients.

DISCUSSION

This six-month observational report demonstrates that routine application of the World Health Organization (WHO) Surgical Safety Checklist (SSC) in elective gynaecological surgeries at a tertiary care hospital in Karachi was feasible, achieved high compliance, and was associated with low complication rates and favorable patient outcomes. Across 140 procedures, overall complication rates were limited to 8.6%, with only minor Grade I–II events such as fever, nausea, urinary tract infections, and wound erythema. No major adverse outcomes, disability, or mortality were reported during 30-day follow-up, and patient satisfaction scores were consistently high.

These findings compare favorably with global evidence that the SSC improves perioperative safety. The landmark WHO multicenter trial documented a reduction in surgical complications from 11% to 7% and mortality from 1.5% to 0.8% following checklist adoption (7). Similarly, de Vries et al. reported decreases in morbidity (15% to 10%) and mortality (1.5% to 0.8%) in Dutch hospitals implementing comprehensive surgical safety programs that included the SSC (8). Our observed complication rate of 8.6% falls within the lower range of international reports, supporting the checklist's applicability to gynaecological practice in resource-limited settings.

In Pakistan, complication rates have historically exceeded 18% in surgical populations (4,5), with local audits showing variable and often poor adherence to SSC steps—70% for sign-in, only 2.6% for time-out, and near-absent sign-out compliance (9). By contrast, our series achieved 95% overall adherence across all three checklist phases, suggesting that targeted orientation and monitoring can overcome cultural and systemic barriers. High compliance may explain the favorable outcomes observed, particularly the absence of severe complications or mortality.

Mechanistically, the SSC improves safety by embedding structured communication, role confirmation, and systematic verification into the surgical workflow (3,6,17). This prevents common medical errors, including patient misidentification, omission of prophylaxis, and miscommunication of critical events, which are disproportionately seen in busy obstetrics and gynaecology departments. In our study, such processes likely contributed to the low frequency of wound and infectious complications, shorter hospital stay (mean 3.4 days), and reduced readmission burden (1.4%).

Our experience also highlights broader clinical and policy implications. In low- and middle-income countries, where resource limitations and high patient volumes predispose to medical errors, low-cost, high-yield interventions like the SSC can substantially enhance patient safety. The consistency of our results with international benchmarks underscores the urgency of mandatory SSC adoption across Pakistani surgical units, accompanied by ongoing staff education and compliance audits.

This report has strengths in providing real-world data from a high-volume tertiary center, applying standardized outcome classification (Clavien–Dindo), and capturing 30-day follow-up. However, limitations must be acknowledged. As a descriptive single-arm study, we

cannot establish causality or directly quantify effect size relative to non-checklist practice. The single-center design restricts generalizability, and exclusion of longer-term outcomes beyond 30 days may underestimate late complications. Finally, while satisfaction was high, reliance on patient-reported scoring may introduce response bias.

Future research in Pakistan should focus on multicenter evaluations, include patients with comorbidities to reflect real-world risk profiles, and assess cost-effectiveness of SSC implementation. Integration with digital monitoring systems or patient-engaged checklists may further enhance compliance and sustainability.

Our findings suggest that consistent application of the WHO Surgical Safety Checklist in gynaecological surgeries is both feasible and effective in reducing complications and enhancing recovery. Adoption of this low-cost intervention could help bridge the safety gap between local practice and global standards, advancing surgical quality in resource-constrained health systems.

CONCLUSION

In this six-month observational experience of 140 elective gynaecological surgeries, the consistent use of the World Health Organization (WHO) Surgical Safety Checklist was associated with high compliance, low rates of minor complications, and the absence of major adverse outcomes, disability, or mortality. Patient recovery was favorable, with short hospital stays and high satisfaction scores. These findings demonstrate that systematic checklist use is both feasible and effective in a busy tertiary care setting in Pakistan. By aligning local outcomes with international benchmarks, this report highlights the value of adopting the SSC as a routine practice in gynaecological surgery. Broader institutional implementation, supported by staff training and monitoring, could help reduce preventable surgical complications and bridge the gap between global safety standards and local practice in resource-constrained environments.

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