



Awareness and utilization of the who surgical safety checklist among surgical staff in a Nigerian tertiary hospital

Ikenna Stanley Ilo^{1,3}, Doris Ifeyinwa Ilo¹, Isaac Sunday Chukwu², Victor Obidike Adindu¹, Chukwuebuka Somto Aneke¹, Godwin Onyemachi Alaede¹

¹Department of Anaesthesia Federal Medical Centre Umuahia, Nigeria

²Department of Surgery Federal Medical Centre Umuahia, Nigeria

³Gregory University Uturu, Abia State, Nigeria

Abstract

Context: The WHO Surgical Safety Checklist (SSC) is a standardized tool to improve patient safety and reduce surgical errors. Despite global adoption, consistent use remains limited in many healthcare systems.

Objective: To assess awareness, knowledge, and utilization of the SSC among surgical staff in a Nigerian tertiary hospital, and to describe perceived barriers to its use.

Methods: A descriptive cross-sectional electronic survey used total enumeration of all 93 members of a departmental theatre-users WhatsApp group at Federal Medical Centre Umuahia; 78 responded (83.9%). A structured questionnaire assessed awareness, training, knowledge of checklist phases, and self-reported use. Frequencies and percentages were calculated; associations with professional cadre were assessed using Fisher–Freeman–Halton exact tests with Monte Carlo estimation.

Results: Awareness was reported by 77 (98.7%), while 33(42.3%) had received formal training and 60 (76.9%) stated that they knew the three checklist phases. Routine use was reported by 42(53.8%), but only 13 (16.7%) reported always using the checklist. Sign-in was most often identified as the consistently applied phase (61; 78.2%), while sign-out was most often identified as skipped (49; 62.8%). Professional cadre was associated with reported knowledge of the phases (exact $p < 0.001$), but not with routine use (exact $p = 0.167$); the study was not powered for these comparisons.

Conclusion: Awareness was almost universal, but formal training and consistent checklist use remained limited. The sign-out phase was particularly vulnerable to omission. Multidisciplinary training and periodic assessment of actual checklist completion may improve implementation; these self-reported findings do not establish observed adherence.

Keywords: Checklist; Patient Safety; Surgical Procedures, Operative; Guideline Adherence; Health Personnel.

Introduction

Patient safety has become a central focus in modern healthcare, particularly in surgical practice where adverse events can have severe consequences. The World Health Organization (WHO) introduced the Surgical Safety Checklist (SSC) in 2008 as part of its “Safe Surgery Saves Lives” initiative, aiming to

Corresponding Author:

Doris Ifeyinwa Ilo

Department of Anaesthesia Federal Medical Centre Umuahia, Nigeria.

ilodoris5@gmail.com

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reduce preventable surgical complications and mortality.¹ The checklist is designed to standardize critical safety steps across three phases of surgery: sign-in, time-out, and sign-out, thereby fostering communication, teamwork, and adherence to safety protocols.²

Implementation of the SSC has varied across institutions and regions. Studies have shown that while awareness of the checklist is often substantial, consistent and routine utilization remains suboptimal.³ Barriers such as perceived workflow delays, lack of formal training, and resistance to change have been identified as factors limiting compliance.⁴

In resource-limited settings, where surgical safety challenges are often compounded by infrastructural and workforce constraints, the SSC offers a practical and cost-effective intervention. However, understanding the extent of awareness, knowledge, and utilization among surgical staff is crucial for tailoring strategies that enhance compliance and maximize patient safety benefits.⁵ Nigerian studies have similarly reported high awareness of the checklist but inconsistent application in routine surgical practice, with lack of training among the reported barriers.^{6,7}

This study therefore evaluated the awareness, knowledge, and utilization of the WHO SSC, and described perceived workflow barriers, among surgical staff at a Nigerian tertiary hospital. The findings are expected to inform targeted interventions that strengthen surgical safety practices and improve overall patient outcomes.

Materials and methods

Study Design

A descriptive cross-sectional survey was conducted among surgical theatre personnel at Federal Medical Centre Umuahia, Abia State, Nigeria. Data were collected electronically over two weeks.

Study Population

The accessible population comprised 93 members of the departmental theatre-users WhatsApp group, including surgeons, anaesthetists, nurses, technicians, and other staff involved in perioperative care. Of these, 78 submitted responses (response rate, 83.9%). The group was a convenience-based sampling frame and may not have represented all theatre personnel.

Inclusion criteria: theatre personnel involved in perioperative care who were members of the WhatsApp group and who gave consent.

Exclusion criteria: members who did not consent, and personnel outside the group. No incomplete

returned records were identified among the 78 responses.

Sampling Technique and Sample Size

Total enumeration of the accessible WhatsApp-group membership (N = 93) was used; all 93 members were invited and 78 responded. Convenience sampling was used. Consequently, the study was not powered for between-cadre comparisons, and these comparisons are exploratory.

Data Collection Tool

The structured questionnaire was developed by the investigators using the WHO Surgical Safety Checklist as a guide and pre-tested among 10 theatre personnel, giving a Cronbach's alpha of 0.83. The instrument covered demographics, awareness, sources of awareness, formal training, self-reported knowledge, reported frequency and routine use, checklist phases, and perceived workflow barriers.

Awareness, formal training, self-reported knowledge of the three phases, routine use, ease of use, and perceived workflow delay were recorded as yes/no responses. Frequency of use, checklist verbalisation, and agreement that the checklist prevents errors were recorded in ordered response categories. The primary utilisation outcome in the association analysis was the explicit yes/no item: "Is the checklist used routinely in your theatre?"

For the professional-cadre association analyses, self-reported knowledge of the three phases (yes/no) and routine checklist use (yes/no) were retained as binary variables. No composite grading of knowledge or utilisation was used. These outcomes represent respondent reports, not direct observation of checklist compliance or tested knowledge.

Data Collection Procedure

The questionnaire was circulated through the departmental WhatsApp group and completed responses were returned electronically. Participation was voluntary, and electronic consent was obtained before the questionnaire was completed. Because responses were returned by email, the survey was not anonymous at collection; email addresses were excluded from the analyses and responses are reported only in aggregate.

Data Analysis

Data were analysed using SPSS version 20. Descriptive statistics were reported as counts and percentages. Associations between the five professional cadres and the binary knowledge or routine-use outcomes were assessed with two-sided Fisher–Freeman–Halton exact tests (the generalisation of Fisher’s exact test for 5×2 tables); Monte Carlo estimation used 100,000 replicates with a fixed random seed. The significance threshold was $p < 0.05$. Sparse professional categories precluded reliable asymptotic chi-square inference. The p-values are Monte Carlo estimates and may vary slightly on re-analysis.

Ethical Considerations

Ethical approval was obtained from the Health Research Ethics Committee, Federal Medical Centre Umuahia (FMC/QEH/G.596/Vol.10/1005). Participation was voluntary, with electronic consent. Respondent email addresses were not included in the analytical tables. The study was conducted in accordance with the Declaration of Helsinki.

Reporting Standard

The manuscript follows STROBE guidance for cross-sectional observational studies.

Results

A total of 78 theatre personnel responded (83.9% of 93 invited). Surgeons comprised 34 (43.6%), anaesthetists 24 (30.8%), nurses 17 (21.8%), technicians two (2.6%), and other staff one (1.3%).

Table 1: Demographic characteristics of study participants (n = 78)

Category	Variable	Frequency(n)	Percentage(%)
Age (years)	20–39	27	34.6
	40–59	50	64.1
	60+	1	1.3
	Mean age $\pm$ SD	42.8 $\pm$ 9.8	
Sex	Male	56	71.8
	Female	22	28.2
Profession	Surgeon	34	43.6
	Anaesthetist	24	30.8
	Nurse	17	21.8
	Technician	2	2.6
	Others	1	1.3
Years of experience	<1	1	1.3
	1–2	11	14.1
	3–5	13	16.7
	6–10	7	9.0
	>10	46	59.0
Total		78	100

The mean age was 42.8 ± 9.8 years; 56 (71.8%) respondents were male, and 46 (59.0%) had more than 10 years of experience (Table 1).

Awareness of the WHO Surgical Safety Checklist was reported by 77 (98.7%) respondents. Training was the most commonly selected source of awareness (49; 62.8%), although only 33 (42.3%) reported formal training. Sixty respondents (76.9%) answered yes when asked whether they knew the three phases of the checklist (Table 2).

Table 2: Awareness and training on the WHO Surgical Safety Checklist (n = 78)

Category	Variable	Frequency(n)	Percentage(%)
Awareness	Yes	77	98.7
	No	1	1.3
Source of awareness	Training	49	62.8
	Literature	11	14.1
	Colleague	11	14.1
	Social	2	2.6
	Others	5	6.4
Formal training	Yes	33	42.3
	No	45	57.7
Knowledge of three phases (self-reported)	Yes	60	76.9
	No	18	23.1

Routine checklist use was reported by 42 respondents (53.8%). Thirteen (16.7%) reported always using the checklist, 29 (37.2%) often, 27 (34.6%) sometimes, five (6.4%) rarely, and four (5.1%) never. The checklist was read aloud always by 20 (25.6%), frequently by 17 (21.8%), and sometimes by 30 (38.5%) respondents. Sign-in was most frequently selected as the most consistently

Table 3: Utilization patterns of the WHO Surgical Safety Checklist (n = 78)

Category	Variable	Frequency(n)	Percentage(%)
Frequency of use	Always	13	16.7
	Often	29	37.2
	Sometimes	27	34.6
	Rarely	5	6.4
	Never	4	5.1
Routine use	Yes	42	53.8
	No	36	46.2
Checklist read aloud	Always	20	25.6
	Frequently	17	21.8
	Sometimes	30	38.5
	Rarely	7	9.0
Phase most consistently completed	Never	4	5.1
	Sign-in	61	78.2
	Time-out	12	15.4
	Sign-out	5	6.4
Phase most frequently skipped	Sign-out	49	62.8
	Time-out	22	28.2
	Sign-in	7	9.0
	Strongly agree	44	56.4
Checklist prevents errors	Agree	29	37.2
	Neutral	4	5.1
	Disagree	1	1.3
	Yes	74	94.9
Ease of use	No	4	5.1
	Yes	7	9.0
Workflow delay	No	71	91.0

applied phase (61; 78.2%), whereas sign-out was most frequently selected as skipped (49; 62.8%). Seventy-three (93.6%) agreed or strongly agreed that the checklist prevents errors, 74 (94.9%) regarded it as easy to use, and seven (9.0%) perceived workflow delay (Table 3).

Table 4: Association between professional cadre and self-reported knowledge of the three phases (n = 78)

Profession	Self- Reported Knowledge		Total	Exact p-value
	Yes, n (%)	No, n (%)		
Surgeon	17 (50.0)	17 (50.0)	34	
Anaesthetist	23 (95.8)	1 (4.2)	24	
Nurse	17 (100.0)	0 (0.0)	17	
Technician	2 (100.0)	0 (0.0)	2	
Others	1 (100.0)	0 (0.0)	1	
Total	60 (76.9)	18 (23.1)	78	<0.001

Knowledge of the three checklist phases differed by professional cadre (Fisher–Freeman–Halton exact test, Monte Carlo $p < 0.001$; Table 4): 95.8% of anaesthetists and 100% of nurses reported knowing the phases, compared with 50.0% of surgeons. Routine checklist use did not differ significantly by cadre (exact $p = 0.167$; Table 5), although the proportion reporting routine use ranged from 44.1% among surgeons to 70.6% among nurses. These comparisons were exploratory, given the small numbers of technicians and other staff.

Table 5: Association between professional cadre and routine use of the checklist (n = 78)

Profession	Routine Use of Checklist		Total	Exact p-value
	Yes, n (%)	No, n (%)		
Surgeon	15 (44.1)	19 (55.9)	34	
Anaesthetist	13 (54.2)	11 (45.8)	24	
Nurse	12 (70.6)	5 (29.4)	17	
Technician	2 (100.0)	0 (0.0)	2	
Others	0 (0.0)	1 (100.0)	1	
Total	42 (53.8)	36 (46.2)	78	0.167

Discussion

Awareness of the WHO Surgical Safety Checklist was almost universal (98.7%), yet fewer than half of respondents reported formal training (42.3%). This distinction suggests that exposure to the checklist does not necessarily imply structured preparation for its use. Similar discrepancies between awareness and implementation have been described in Nigeria and other resource-constrained

settings.^{5–7} In Nigerian surveys, awareness was 83.3% among theatre users in Ekiti, where lack of training was the leading barrier, and 93.1% among anaesthetists nationwide.^{6,7}

Most respondents (76.9%) stated that they knew the three checklist phases. However, self-reported knowledge is not equivalent to demonstrated competence, as respondents were not tested on the content of each phase. Professional cadre was associated with the yes/no knowledge response (exact $p < 0.001$), with particularly low reported knowledge among surgeons in this sample. The sparse numbers in some cadres and the cross-sectional design limit interpretation. Structured multidisciplinary education and periodic competency checks may address this gap.^{8,9}

Only 53.8% reported routine checklist use, and 16.7% selected “always” when asked about frequency. These measures ask different questions and should not be treated as interchangeable. Reported routine use was lower than the 62.7% reported among Nigerian anaesthetists,⁷ although the populations and sampling differ. Direct observational audits would be required to estimate actual checklist adherence.^{8,10}

Sign-in was most frequently identified as the phase consistently applied (78.2%), whereas sign-out was most frequently identified as skipped (62.8%). These are respondents’ selections of one phase, not observed phase-specific completion rates. The reported weakness at sign-out may reflect end-of-procedure workflow pressures and merits targeted observation, debriefing, and accountability measures.¹⁰

Most respondents agreed that the checklist could prevent surgical errors (93.6%), and 94.9% considered it easy to use; only 9.0% reported perceived workflow delays. These favourable perceptions coexist with inconsistent self-reported use. The study did not measure surgical outcomes or independently verify checklist completion, so improvements in morbidity or mortality cannot be inferred from these survey responses.^{9,11–13}

Routine use varied descriptively across cadres, from 44.1% among surgeons and 54.2% among anaesthetists to 70.6% among nurses (Table 5), but the overall exact test was not statistically significant ($p = 0.167$). This result should be interpreted with care. A difference of about 26 percentage points

between surgeons and nurses could be of practical importance, yet the study was not powered for between-cadre comparisons and the estimates for individual cadres, particularly technicians and other staff, are imprecise. A non-significant p-value therefore does not show that routine use is equal across cadres, nor does it establish that the observed differences are clinically meaningful; larger multicentre studies are needed to resolve this. These findings suggest that institution-wide measures, including multidisciplinary training, a stronger safety culture, accountability, and periodic audit, should be combined with targeted education for cadres reporting lower knowledge of the checklist phases, notably surgeons.^{5,8,10}

Limitations

This was a single-centre survey based on a departmental WhatsApp group rather than a complete verified staff register, introducing coverage and non-response bias. All outcomes were self-reported, with potential recall and social-desirability bias. No sample size calculation was performed, and the small number of technicians and other staff limited precision in professional comparisons. The questionnaire was investigator-developed, and the pilot data used to derive Cronbach's alpha could not be independently verified. Because email addresses were collected with the returned responses, anonymity should not be claimed. The cross-sectional design precludes causal inference.

Conclusion

Awareness of the WHO Surgical Safety Checklist was high, but formal training and consistent self-reported utilisation were less common. Respondents frequently identified sign-out as the phase most often skipped. Multidisciplinary training, clearer accountability, and observational audit of all three checklist phases may strengthen implementation; the effectiveness of these strategies requires prospective evaluation.

Author contributions

DII led conceptualization, study design, literature search, data extraction, and manuscript drafting. ISI contributed to conceptualization, study design, literature search, and manuscript drafting, critically

reviewed the manuscript for intellectual content, and provided supervision. ISC provided methodological oversight and critical appraisal. VOA, CSA, and GOA contributed to data interpretation and editing. All authors approved the final manuscript.

Ethical approval

Ethical approval for this study was obtained from the Health Research Ethics Committee of the Federal Medical Centre, Umuahia (Protocol No. FMC/QEH/G.596/Vol.10/1005). Consent was obtained electronically from participants.

Helsinki declaration

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki for research involving human subjects.

Availability of research and data

The authors are available and ready to supply the data on request through the corresponding author.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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