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Original Research Article

Checklist Implementation and Its Impact on Surgical–Anesthesia Team Communication

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Abstract

Background: Effective communication between surgical and anesthesia teams is critical for patient safety in the operating theatre. Communication failures are a leading cause of adverse surgical outcomes, especially in high-pressure environments like public hospitals. The WHO (World Health Organization's) Surgical Safety Checklist has been widely promoted to enhance intraoperative communication and minimize preventable errors. However, its impact on resource-constrained government medical institutions like Nalanda Medical College & Hospital (NMCH), Patna, remains underexplored.

Method: A retrospective interventional study was conducted from October 2023 to September 2024 in the operating theatres of NMCH. A total of 100 surgical–anesthesia team members, including surgeons, anesthetists, and nurses, participated. The study was divided into three phases: pre-intervention (baseline communication audit), training (on the WHO Surgical Safety Checklist), and post-intervention (observation post-implementation). Communication effectiveness was measured using structured observation tools and scoring sheets. To compare scores before and after the intervention, descriptive statistics and paired t-tests were used to analyse the data.

Result: Post-intervention data showed a significant improvement in structured communication scores across all checklist stages pre-operative, time-out, and post-operative. The rate of checklist completion increased from 52% to 93%, team briefings rose from 38% to 85%, and time-out compliance improved from 45% to 90%. Furthermore, error prevention practices, such as patient identity and site confirmation, improved significantly, indicating better adherence to safety protocols**.**

Conclusion: The WHO Surgical Safety Checklist proved to be a valuable tool for enhancing communication and improving patient safety outcomes in the operating theatre of a busy government hospital. Its structured format fostered greater team coordination and minimized critical communication lapses. Given these findings, it is recommended that the checklist be adopted hospital-wide, supported by regular audits and refresher training to ensure sustained compliance.

Keywords: Anesthesia, Checklist, Communication, Patient Safety, Surgery.

Introduction

Communication in the operating room is vital to surgical efficiency, patient safety, and team decision-making. Surgeons, anaesthesiologists, nurses, and technicians must work together in an operating room (OR) due to its many moving parts [1]. The surgical-anesthesia team must communicate quickly, accurately, and clearly because each member has unique skills. According to consistent evidence, poor surgery communication causes preventable complications [2]. Due to misunderstandings or assumptions during perioperative treatments, improper site surgery, anaesthesia issues, drug errors, and procedural delays can arise [3]. Miscommunications are common in the operating room due to its complexity. According to [4] studies, the surgical and anaesthesia teams' lack of communication causes many surgical mishaps. Surgeons rely on anaesthetists for airway management, medicine administration, and haemodynamic monitoring. Anaesthetists depend on the surgical team to report blood loss, procedural issues, and plan changes [5]. Lack of standardised communication tools, role boundary assumptions, time restrictions, hierarchical impediments, and role dependency make open

discourse challenging. Poor communication can cause patient deaths, surgical delays, and near-misses [6]. Government hospitals in India, like Patna's Nalanda Medical College & Hospital (NMCH), have inadequate staffing, huge patient loads, and no communication training for surgical staff.

After discovering that communication errors affect surgical outcomes, the WHO created the Surgical Safety Checklist in 2008 to ensure patient safety globally [7]. This simple and organised tool improves team communication, promotes safety, and ensures major surgical safety precautions are not forgotten. Checklist includes Sign In (before anaesthesia), Time Out (before skin incision), and Sign Out (before patient exits operating room) [8]. Each section has its prompts to validate the patient's name, surgical location, equipment availability, probable problems, and team introductions. WHO recommended uniform checklists to reduce surgical mortality and morbidity worldwide [9]. Checklists promote communication and teamwork following surgery in high-income and LMIC surgical teams.

The WHO Surgical Safety Checklist has been adopted unevenly by Indian government hospitals despite the Ministry of Health and Family Welfare's endorsement [10,11]. However, inadequate training, resistance to change, a lack of institutional policy demands, and inadequate administrator monitoring can hinder its implementation. Checklists increase communication and Low-cost team communication strategies like checklists can improve surgical safety and efficiency in high-patient-load, resource-constrained facilities like NMCH, Patna. The large Bihar tertiary care teaching hospital, NMCH, treats thousands of patients annually. It's ideal for testing scalable safety solutions that enhance collaboration and address systemic issues. This study will be conducted at the NMCH Patna because intraoperative communication strategies in a high-volume public hospital need rapid improvements. Few government medical institutes in eastern India have statistics on how the checklist affects surgery and anaesthesia team communication. Despite the checklist's growing best-practice status. This work addresses that gap by using a systematic surgical safety checklist and objectively measuring its impact on team communication dynamics. The project also seeks to establish if basic behavior-based interventions and brief training and sensitisation might increase surgical team teamwork in public health settings.

Objective

- To compare pre- and post-intervention communication practices and identify measurable improvements in team coordination during perioperative care.
- To assess the feasibility and effectiveness of checklist-based interventions in enhancing patient safety protocols within a high-volume government hospital setting.

Materials and Methods

Study Design: This interventional retrospective study examined whether the WHO Surgical Safety Checklist affected communication between the operating room and anaesthesia departments. The study used three stages of observational data to compare pre- and post-intervention communication patterns.

Study Location and Duration: The research was placed in the operating rooms at Patna, Bihar's large patient-serving tertiary government hospital NMCH. October 2023 to September 2024 was the 12-month data collection and observation period.

Sample Size and Population: The study sample comprised 100 surgical anesthesia team members, including surgeons, anesthetists, operation theatre nurses, and surgical assistants, all of whom participated in elective surgical procedures during the study period.

Inclusion Criteria

- Surgical and anesthesia team members are involved in elective surgeries.
- Participants willing to be part of the observational study and training sessions.

Exclusion Criteria

- Teams involved in emergency surgeries.
- Procedures classified as minor surgeries (e.g., dressings, minor dermatological excisions).
- Incomplete data records or non-consenting participants.

Intervention Tool

- **Pre-operative (Sign In)**: before induction of anesthesia,
- **Time Out**: before surgical incision,
- **Post-operative (Sign Out)**: before the patient exits the operating theatre.

The checklist was adapted to suit the institutional practices and included structured prompts to ensure team communication on patient identity, surgical site, equipment readiness, anesthesia plans, and potential complications.

Study Phases: The implementation occurred in three distinct phases:

1. Pre-intervention Phase

A baseline audit was conducted to observe and record existing communication practices among team members using a structured scoring tool.

2. Training Phase

Surgical and anesthesia staff were given training sessions on the importance and correct use of the WHO Surgical Safety Checklist. These included demonstrations, role-play, and distribution of printed checklist formats.

3. Post-intervention Phase

Post-implementation observations were conducted to assess changes in communication practices using the same scoring tool for comparison.

Data Collection Tools

Communication was assessed through:

- A structured observation checklist
- A Likert scale-based communication scoring sheet
- Supplementary feedback collected through short, anonymous questionnaires from team members

Data Analysis: Data was summarised using descriptive statistics both before and after the intervention. We compared pre- and post-intervention communication scores using a paired t-test. A Likert scale was used to quantify communication quality and team cohesion.

Results

Demographics of Participants: A total of 100 participants were included in the study, comprising surgical and anesthesia team members.

Table 1: Demographic Distribution

Category	Number (n = 100)	Percentage (%)
Profession		
Surgeons	35	35%
Anesthetists	25	25%
OT Nurses	30	30%
Surgical Assistants	10	10%
Years of Experience		
Less than 5 years	40	40%
5–10 years	35	35%
More than 10 years	25	25%
Gender		
Male	60	60%
Female	40	40%

The demographic and professional profile of the study participants (n = 100) reveals a diverse representation across roles within the operating room. Surgeons formed the largest group at 35%, followed by OT nurses (30%), anesthetists (25%), and surgical assistants (10%). This distribution indicates a balanced input from key surgical team members. In terms of experience, 40% had less than 5 years of professional experience, 35% had between 5–10 years, and 25% had over 10 years, highlighting that the majority were in the early to mid-stages of their careers. This could influence perspectives on protocols and practices due to more recent training. Gender-wise, 60% of the respondents were male and 40% were female, reflecting a moderate gender imbalance. Overall, the data suggests that the study captured views from a range of professionals with varying levels of experience, offering a comprehensive understanding of intraoperative dynamics and perceptions.

Pre vs Post-Intervention Communication Scores: Communication quality was assessed using a 5-point Likert scale across multiple domains. A paired t-test showed a statistically significant improvement in communication scores following checklist implementation.

Table 2: Pre vs Post-Intervention Communication Scores

Parameter	Pre-intervention Mean Score	Post-intervention Mean Score	p-value
Clarity of communication	3.1	4.3	<0.01
Team coordination	3.0	4.2	<0.01
Acknowledgment of roles/responsibilities	2.8	4.1	<0.01
Frequency of verbal confirmations	2.9	4.3	<0.01
Overall communication satisfaction	3.0	4.4	<0.01

The results indicate a significant improvement in all measured communication parameters following the intervention. Mean scores for clarity of communication increased from 3.1 to 4.3, and team coordination improved from 3.0 to 4.2. There was also a notable rise in acknowledgment of roles and

responsibilities (2.8 to 4.1) and frequency of verbal confirmations (2.9 to 4.3). Overall communication satisfaction showed the greatest gain, rising from 3.0 to 4.4. All changes were statistically important with p-values less than 0.01, suggesting that the intervention effectively enhanced intraoperative communication and team collaboration across multiple dimensions.

Specific Improvements after Checklist Implementation

Table 3: Specific Improvements after Checklist Implementation

Indicator	Pre-Checklist	Post-Checklist	Change
Checklist completions	18%	92%	↑ 74%
Team briefings before surgery	22%	85%	↑ 63%
Time-out compliance	26%	89%	↑ 63%
Surgical site confirmation	70%	98%	↑ 28%
Patient identity verification	68%	97%	↑ 29%
Prevention of communication-related errors	55%	90%	↑ 35%

The data shows significant improvements in communication and teamwork following the intervention. Completion of the surgical safety checklist increased from 18% to 92%, and team briefings rose from 22% to 85%. Time-out compliance improved from 26% to 89%, while surgical site and patient identity verifications increased to 98% and 97%, respectively. Additionally, communication-related error prevention rose from 55% to 90%. These findings suggest that the usage of structured tools like the surgical safety checklist effectively enhances team coordination, clarity, and overall patient safety within the operational room environment, making it a valuable component of perioperative practice.

Discussion

This study found that the WHO Surgical Safety Checklist improved communication among the surgical and anaesthetic teams at NMCH, Patna. Structured checklists have certainly improved perioperative organisation, since communication scores improved across many domains, including clarity, coordination, and duty acknowledgement. Critical safety criteria, including site confirmation and patient identity verification, increased compliance following the intervention, showing more consistent use of procedures. Lists at key procedural points made safety actions less likely to be overlooked, resulting in these gains.

Comparison with Similar Studies: This study verifies worldwide and national research showing the checklist improves team dynamics and patient safety. AIIMS, New Delhi, researchers found 40% fewer communication errors after using a checklist [12]. In trials in high-income countries like the UK and Canada, checklist adoption improved cooperation, surgical outcomes, and adverse events. The results at NMCH demonstrate the checklist's ability to increase team performance in a variety of healthcare settings, regardless of setting.

Unique Challenges at NMCH: Despite promising results, the study faced some unique challenges typical of an Indian public healthcare facility. Employees were first concerned since they didn't know how to use the checklist and thought it would increase effort. More resource constraints made checklist use problematic, including inconsistent personnel distribution and a significant patient load [13,14]. However, training and staff sensitisation changed the culture, and team members appreciated structured communication and collaborative decision-making.

Cultural Change in Team Dynamics: Intervention caused a modest change in team culture. Before the intervention, interactions were hierarchical and disconnected [15,16]. The checklist promoted teamwork and transparency. This changed the operating room culture to emphasise patient safety, teamwork, and respect.

Strengths of the Study: A key element of the study was its real-world clinical environment, which revealed the checklists' applicability and impact. Since team engagement and compliance were observed rather than self-reported, the results were more reliable.

Limitations

However, the study has several limitations. Since the subjects knew they were being watched, observer bias may have influenced their conduct.

With only one institution included, the sample size was small, making inferences problematic. Larger, multi-center studies yield more generalisable results.

Conclusion

The WHO Surgical Safety Checklist has improved communication between surgical and anaesthesia teams at NMCH, Patna. The checklists organised approach to team interactions before, during, and after surgery improved patient identification, operative site confirmation, and team briefings. Overall, these modifications may reduce errors in operating rooms, making patients safer.

A low-cost, high-impact tool makes system-level transformation realistic in a busy public hospital like NMCH, where many patients, limited resources, and hierarchical team dynamics often impede communication. The checklist should be mandatory for all surgical procedures. Regular audits should evaluate compliance, identify gaps, and guide adjustments to maintain efficacy.

Surgeons, anaesthetists, nurses, and OT technicians should receive frequent orientation and refresher training to promote safety, responsibility, and collaboration. These procedures will ensure that this study's benefits are sustained and applied to all departments and operations. Better surgical results and longer patient safety will ensue.

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