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Implementation of the Surgical Safety Checklist: Perceptions of Surgical Providers at the University of Ghana Medical Centre

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Abstract

This study explored the implementation and perceptions of the Surgical Safety Checklist (SSC) among surgical providers at the University of Ghana Medical Centre (UGMC). Using a qualitative cross-sectional design, the research assessed compliance levels, identified barriers and facilitators to effective implementation, and evaluated the SSC's perceived impact on patient safety and surgical outcomes. Semi-structured interviews were conducted with 12 healthcare professionals, including surgeons, anesthesiologists, and nurses. Findings revealed generally high compliance with the SSC, though inconsistencies were noted, particularly in cases involving local anesthesia. Key barriers included resistance from some healthcare professionals, time pressures, and resource constraints. Facilitators included team cooperation, comprehensive training, and checklist availability. The SSC was perceived to significantly enhance patient safety by reducing errors, improving communication, and ensuring critical safety steps were followed. These findings underscore the need for ongoing efforts to promote consistent SSC use, including comprehensive training, adequate staffing, and improved checklist accessibility to enhance surgical safety practices in similar healthcare settings.

Keywords: Surgical Safety Checklist, Patient Safety, Surgical Outcomes, Healthcare Providers, Implementation.

Introduction

The Surgical Safety Checklist (SSC) has emerged as a critical patient safety tool within operating rooms globally. Championed by the World Health Organization (WHO), the SSC serves as a vital communication mechanism among multidisciplinary surgical teams, including nurses, surgeons, anesthesiologists, and other relevant personnel . The checklist is designed to ensure that all team members are synchronized in their understanding of key aspects of each surgical case, thereby minimizing the risk of preventable errors [1-4].

The SSC is structured around three essential phases: The Briefing or Sign-In, Time Out, and Debriefing or Sign-Out. The Briefing occurs before the induction of anesthesia, focusing on patient identity, surgical site verification, and equipment assessment. The Time Out is conducted before skin incision, serving as a final review of patient identity, surgical procedure, and site, ensuring all team members are fully prepared and any concerns are addressed. The Debriefing takes place before the patient leaves the operating room, summarizing the procedure, confirming instrument counts, and discussing post-operative care aspects [5-7].

Research has demonstrated that SSC adoption is associated with significant reductions in both morbidity and mortality rates following surgery. Studies have shown reductions in mortality rates from 1.5% to 0.8% and in surgical complications from 11% to 7% following SSC implementation . Despite its proven efficacy, the perception and utilization of the SSC can vary significantly among healthcare providers, influenced by factors such as organizational culture, team dynamics, and individual attitudes towards safety protocols [8-11].

In Ghana, despite the potential benefits of the SSC, noticeable

gaps exist in how it is perceived and utilized within surgical settings . This study aimed to bridge these gaps by conducting a thorough assessment of SSC implementation and perceptions among surgical providers at the University of Ghana Medical Centre (UGMC). The research sought to:

- Assess the level of compliance with the SSC among surgical providers at UGMC main theatre;
- Identify the barriers and facilitators to the effective implementation of the SSC from the perspective of surgical providers at UGMC; and
- Evaluate the impact of the SSC on patient safety and surgical outcomes as perceived by surgical providers at UGMC. Ultimately, the goal was to enhance the safety culture within surgical settings at UGMC, thereby contributing to the reduction of surgical complications and the improvement of patient care quality [12].

Methodology

Study Design and Setting

This qualitative cross-sectional study was conducted at the main theatre of the University of Ghana Medical Centre (UGMC) in Accra. The unit comprises nine specialized theatres operating 24 hours a day, handling three to eleven cases daily since late 2020, which provided a high-volume environment for examining SSC practices.

Participants and Sampling

Purposive sampling was employed to recruit 12 healthcare professionals, consisting of four surgeons, four nurses, and four anesthesiologists. Inclusion criteria required participants to be current employees directly involved in surgeries with consistent SSC experience since the theatre's commencement; non-surgical staff, temporary personnel, or those with limited SSC exposure were excluded.

Data Collection and Analysis

Semi-structured interviews were conducted in English, audio-recorded, and transcribed verbatim. The interview guide focused on three core areas: compliance levels, implementation barriers/facilitators, and perceived impacts on patient safety. Data were analyzed using thematic content analysis to identify recurring themes.

Ethical Considerations

Ethical clearance was granted by the institutional Review Board (Ref: UGMC-IRB/MSRC/045/2023). Informed consent was obtained from all participants, ensuring they understood their right to withdraw, while confidentiality was maintained through the use of pseudonyms and secure data storage.

Results

Organization of Themes and Sub-Themes

Three main themes with corresponding sub-themes were identified from the data, derived from the objectives of the study. The themes included: (1) level of compliance with the Surgical Safety Checklist; (2) barriers and facilitators to the effective implementation of the SSC; and (3) impact of the SSC on patient safety and surgical outcomes. From the analysis of the data, eight sub-themes emerged and were subsequently grouped under the various themes. Details of the themes and sub-themes are presented in Table 1.

Table 1: Themes and Sub-Themes

Themes	Sub-Themes
Level of compliance with the Surgical Safety Checklist	• Practical application • Frequency of use • Key factors for successful compliance
Barriers and facilitators to the effective implementation of the SSC	• Barriers and challenges to SSC implementation • Facilitating factors • Resource gaps and suggested improvements
Impact of the SSC on patient safety and surgical outcomes	• Influence on patient safety • Changes in surgical outcomes

Theme 1: Level of Compliance with the Surgical Safety Checklist

Practical Application

Participants described a systematic application of the SSC divided into three distinct phases: sign-in, time-out, and sign-out. The sign-in process begins when the patient is received in the theatre, involving confirmation of patient identity and introduction to the surgical team. During this phase, anesthetists verify the readiness and functionality of their equipment, including the pulse oximeter and blood pressure cuff. The surgical team is asked if they have any concerns before proceeding. This phase also includes a preoperative briefing where the surgical team discusses the procedure, estimated blood loss, necessary sutures, and any special instruments required. The briefing ensures that all team members are informed about the patient and the procedure, facilitating a coordinated approach to the surgery.

One Perioperative Nurse Explained the Process

"The surgical safety checklist we use here is divided into 3 parts: sign-in, time-out, and sign-out. During sign-in, we confirm the patient's identity, introduce them to the team, and verify the readiness of anesthetic equipment. Time-out is conducted just before skin incision, where we confirm the patient's identity and the procedure, and check for any concerns. Sign-out occurs at the end of the surgery to verify instruments and discuss postoperative care." (NS 1)

A Staff Nurse Elaborated Further

"Before a procedure, we have the briefing at the pre-op area where the surgeon briefs us on the patient and procedure. In the theatre, we do a time-out to introduce team members and confirm details like antibiotics and sterility. We tally everything with our card and close the chapter with debriefing after the procedure." (NS 4)

The time-out is conducted just before skin incision. During this phase, team members introduce themselves and re-confirm the patient's identity, the procedure, the estimated duration, and any critical concerns. The anesthetist confirms if prophylactic antibi-

otics have been administered and anticipates any potential complications. The nurses confirm the sterility of the instruments. This critical safety pause ensures that everyone is aligned before the surgical incision is made.

As Articulated by One Surgeon
"The checklist is done at various stages. So, there is a time-out where that is done just before the surgery commences. But then other checklists are done to ensure that the correct patient is identified. The consent is signed, and then, the right procedure and the right instruments are already provided for before the surgery is commenced. And then the anesthetic clearance has been done." (Surg 1).

The sign-out occurs at the end of surgery before the patient leaves the operating room. It involves verifying that all surgical instruments and materials, such as specimens and swabs, are accounted for and correctly labeled. The anesthetist confirms satisfaction with the procedure, and any postoperative care requirements are discussed. This final step ensures that all aspects of the surgery have been properly managed and that any issues are addressed before the patient is transferred to recovery.

Frequency of Use
Regarding frequency of use, findings revealed generally high compliance, with participants reporting the SSC was used for approximately 90% of surgeries. The checklist is typically used for every patient, whether they are undergoing local or general anesthesia. However, occasional lapses were noted, particularly in cases involving local anesthesia where the checklist may not be completely followed.

One Nurse Shared her Experience
"We do it almost every time for every surgery. Mostly with surgeries that require local anesthesia, sometimes it is followed, and sometimes it is not followed completely. But at the beginning of surgery, it is being said. I would say about 90% of the time it's being used." (NS 2) Compliance largely depended on the willingness of surgical team members. While many adhered to the checklist diligently, completing it even after surgery to discuss findings and postoperative care, others occasionally refused despite persuasion, leading to inconsistent compliance. This variability was highlighted by a senior staff nurse:
"Okay. So, it is completed with those surgeons who agreed to do it, but some decide not to do it. No matter how you persuade them or convince them, they will not do it. But those who agreed to do, we complete it." (NS 3)

Another Perspective was Offered by a Surgeon Who Noted
"It has never been completed since I came here. We do not do a sign-out every time we do surgery. Sometimes we do not even do it." (Surg 2) This statement reveals significant inconsistency in sign-out completion, even when other phases of the checklist may be followed.

Key Factors for Successful Compliance
Participants identified several factors that contribute to successful compliance with the SSC. A recurring theme was the importance of cooperation and active participation from all team members. When everyone on the surgical team understands their role and commits to following the checklist, compliance is significantly enhanced.

As Stated by One Nurse
"I will say cooperation from all the team members." (NS 1)
Training and determination were also highlighted as essential elements. Respondents emphasized that comprehensive training is necessary because not all team members might be familiar with the checklist procedures. A senior staff nurse explained: "I think when there is determination and also additional training, as not everyone knows how to properly follow the checklist. Sometimes, colleagues are unsure about which questions to ask, when to ask them, and how to proceed. Therefore, we should ensure that everyone is trained to use the checklist correctly." (NS 3) Having an identified team leader who can coordinate efforts and ensure that the checklist is followed emerged as another significant facilitator.

A Surgeon Emphasized
"When everybody participates fully in it when there is an identified team leader and, when there is pre-briefing or briefing before surgery." (Surg 1) Some respondents emphasized that simplifying and compressing the checklist can further aid compliance. Revising the checklist to remove redundancies and focus on essential information makes it more manageable and easier to follow within the time constraints of a surgical procedure.

Theme 2: Barriers and Facilitators to the Effective Implementation of the SSC
Barriers and Challenges to SSC Implementation
Several significant barriers to effective SSC implementation and compliance were identified. Notable resistance from some surgeons and anesthetists to adhere to checklist procedures emerged as a major obstacle. This reluctance often stemmed from perceptions that the checklist was redundant, particularly when the patient was familiar with the team. Such attitudes resulted in critical steps being skipped, including verification of patient identity or confirmation of surgical details, thereby increasing error risk.

One Nurse Described this Challenge
"Some surgeons feel the checklist is not necessary, especially if they know the patient. They say, 'We have already discussed this with the patient,' so they don't want to repeat it. This makes it difficult to complete the checklist properly." (NS 3).

A Healthcare and Anesthesia Technician Provided Another Perspective
"Sometimes the surgeon is in a hurry and might even be agitated with the checklist, thinking that you are wasting time and asking irrelevant questions. They might say they have already discussed this with the patient before, so they don't need to repeat it." (Tech 1) Distractions in the theatre, such as unrelated conversations, further hindered concentration on the checklist process. When team members are engaged in side conversations or when there are multiple activities happening simultaneously, it becomes difficult to maintain focus on the systematic completion of the checklist.

Time pressures emerged as another significant barrier. Participants reported that pressure to complete surgeries quickly sometimes led to rushing through the checklist or skipping it entirely. Emergency cases particularly highlighted this challenge, as the

need for urgent intervention could make the checklist seem like an obstacle.

A Surgeon Explained
"I think sometimes if there is an emergency and you want to get into it or there is a patient who needs urgent surgery and you want to operate as fast as possible the checklist becomes an obstacle but most of the time it doesn't take too long to complete." (Surg 3) Interpersonal dynamics and communication issues within surgical teams also affected SSC implementation. When team members were unfamiliar with each other or when hierarchical dynamics prevented junior staff from speaking up, the checklist process was compromised. The reluctance of junior staff to question or prompt senior colleagues to complete the checklist creates an environment where compliance suffers.

Another barrier identified was the perception by some healthcare professionals that the checklist asks irrelevant questions or duplicates information already known to the team. This perception undermines the value of the systematic verification process that the checklist provides.

A Surgeon Expressed This Concern
"I think we need to do proper research to find out why people are not using it and what questions they find irrelevant. Some of the questions people find irrelevant, so I will suggest that somebody who knows what they are doing should do proper research to understand what they are asking." (Surg 3).

Facilitating Factors
Despite the barriers, several facilitating factors contributed to smooth SSC implementation. Cooperation and willingness of team members emerged as primary facilitators. When everyone, including surgeons, anesthesiologists, scrub nurses, and circulating nurses, understood their roles and the checklist's importance, the process became significantly smoother.

A Nurse Highlighted This
"It is all about cooperation and willingness. Some surgeons are willing to cooperate, and it makes the process very smooth because they understand and are willing to carry it out." (NS 1)Another nurse emphasized the importance of understanding: "It is cooperation and understanding. When the surgeon, anesthesiologist, and nurses understand the importance of the checklist, the use of it becomes very easy and successful. When they are cooperative, you can ask questions about the procedure and the patient, making it easy to use." (NS 3)Cooperative surgeons were willing to answer questions and ensure all details were verified before starting procedures. Team members with good working relationships and effective communication enhanced their ability to work together seamlessly, improving overall performance and ensuring thorough checklist completion.

Experience and preparedness of team members were also critical facilitating factors. When team members were well-prepared and had fulfilled their responsibilities before the checklist session, all pertinent questions could be answered promptly and accurately. Pre-briefing sessions were particularly effective, allowing teams to discuss cases, align understanding, and address potential issues before entering the theatre.

A Surgeon Shared his Positive Experience
"More than 90% of the time, it is smooth. It is all because everybody is in a happy spirit. The primary parts of the checklist have already been catered for individually by the various players of the team. Everybody playing their parts makes the checklist smooth." (Surg 1) The role of the circulating nurse was emphasized as vital. A dedicated circulating nurse who takes the lead in initiating and managing the checklist process from beginning to end significantly contributes to smooth implementation. Their active participation and leadership are vital in coordinating the team and ensuring that all necessary steps are followed. For instance, having a good circulating nurse ensures that protocols are strictly adhered to, making the process more efficient. Efficient management of the surgical schedule also plays a crucial role. Starting cases on time and managing the surgical schedule efficiently help reduce pressure and prevent backlogs, allowing the team to focus on following the checklist without feeling rushed.

Resource Gaps and Suggested Improvements
Participants identified several resource gaps hindering effective SSC implementation at UGMC and suggested areas for improvement. A significant gap was inadequate training. Many team members did not fully understand the SSC's relevance and necessity, leading to inconsistent use and non-compliance.

A Nurse Articulated This Concern
"We lack training on the relevance and need for SSC. Some people don't understand why we have to carry out the surgical safety checklist (SSC). So, if possible, some kind of workshop can be organized for all team members on SSC." (NS 1)Participants suggested organizing workshops and training sessions to educate all team members about the checklist's importance and proper use. Regular training could ensure everyone is well-versed in SSC procedures and its critical role in patient safety.

Limited availability of SSC cards or printouts in theatres often resulted in team members being unable to find the checklist and consequently forgetting important steps. A staff nurse explained: "I think it is the paperwork. So, there should be more of the checklist cards available once at any point in time. It should not be scarce that you are looking for it and you cannot find it. Because sometimes, if you do not have the checklist, you tend to forget most of the things." (NS 4)

Respondents recommended increasing the number of printed copies available in every theatre and pre-operative area. Additionally, the checklist should be displayed with specific components highlighted for different roles, such as anesthesia and nursing. Implementing a checklist board in the theatre was suggested as a centralized location where the checklist is always visible and easily referenced by all team members, reducing the likelihood of errors and enhancing overall compliance. Staffing issues were another significant gap identified. There was often a shortage of staff affecting how the checklist should be completed [13-15].

An Anesthetist Shared
"The number of people, there is always shortage of staff to do one thing or the other so it affects the flow of how the checklist should be done." (Anesth 2) Participants suggested increasing staff numbers and assigning specific individuals to manage the

SSC process. Assigning two or three people, depending on the procedure, to handle the checklist for the day would ensure it is seen as a responsibility and completed diligently. These dedicated staff members could also write reports on the checklist's implementation, ensuring accountability and continuous improvement.

Theme 3: Impact of the SSC on Patient Safety and Surgical Outcomes

Influence on Patient Safety

The SSC significantly influenced patient safety in surgeries at UGMC by enhancing accuracy and reducing error risk. Participants emphasized that the checklist ensures all team members are fully aware of the patient's condition, including any allergies or underlying medical conditions. This comprehensive awareness is crucial for preventing complications and ensuring patient safety throughout the surgical process.

A Nurse Explained

"SSC one way or the other are more or less questions directed to team members to make sure that everything is put in place for the patient's safety. Questions directed at us are to make sure things we are supposed to do have all been done." (NS 1) One primary role of the SSC in ensuring patient safety is verifying critical details such as patient identity and surgical site, helping avoid serious errors such as wrong-site surgery. The checklist facilitates communication among the surgical team, ensuring all necessary instruments and supplies are available before surgery begins, preventing delays and complications during procedures.

The SSC is particularly effective in managing anticipated challenges during surgery. For example, it prompts teams to consider potential blood or fluid loss and prepare accordingly. This foresight allows teams to have necessary resources on hand, reducing the need for last-minute adjustments and ensuring surgery proceeds smoothly. The checklist's emphasis on recounting all used gauzes, swabs, and sharps helps prevent the dangerous occurrence of leaving items inside patients' bodies. This meticulous approach has been instrumental in ensuring no foreign objects are left behind, safeguarding patients' health post-surgery.

As Articulated by a Staff Nurse

"Because we have it in the surgical safety checklist to recount all used swabs, gauzes, or sharps, it makes the whole team not risk leaving any gauze in the abdomen. Until those counts are completed, we are not closing any openings." (NS 4) .The SSC also reinforces infection control measures, such as administering prophylactic antibiotics before incision and ensuring use of appropriate cleaning agents. These steps are crucial in minimizing post-operative infection risk and improving overall surgical outcomes.

A Surgeon Described this Impact

"I think it has improved the outcome of patients as a whole, in terms of infection control, giving prophylactic antibiotics before your incision, and even the agent we use in cleaning. Some surgeons are specific about what they use, so if it is provided and done appropriately, then I think it improves the whole outcome of the surgery." (Surg 2)

Changes in Surgical Outcomes

Regarding changes in surgical outcomes, participants reported noticeable improvements following SSC implementation at UGMC. One significant change was infection rate reduction, as the checklist ensures thorough cleaning and sterilization of instruments before and after each surgery. The SSC has also contributed to smoother surgical procedures. By ensuring all necessary equipment and medications are prepared in advance, the checklist minimizes interruptions and delays during surgery.

A Nurse Shared

"The changes I've realized is that with the use of the SSC, surgeries are very smooth because everything goes on point. We don't need to be running around, and the surgery goes on smoothly without us wasting too much time." (NS 1).Furthermore, the checklist facilitates better communication and coordination among surgical teams. By outlining each member's roles and responsibilities, the SSC helps delineate tasks clearly, ensuring everyone knows what is expected of them. This clarity reduces confusion and improves overall efficiency of the surgical process [16-18].

As Noted by a Staff Nurse

"There is orderliness in the theatre now, and it has helped us. Before, we might hear that something has been left in the abdomen, but now that doesn't happen." (NS 4). The checklist provides a platform for post-surgical discussions, where surgeons can share outcomes and observations about patients' conditions. This feedback loop not only helps surgical teams understand immediate surgery effects but also allows them to plan better for future procedures. It provides a sense of closure and confidence to teams, knowing they have addressed all critical aspects of patient care. Some respondents highlighted the SSC's impact on reducing surgery time and enhancing quality of care. The SSC prompts surgical teams to anticipate needs and address them proactively, thereby streamlining surgical workflow and improving overall outcomes.

A Surgeon Explained

"Since the checklist started, surgery time has probably shortened. The things are anticipated and then worked on, which has positively impacted the time and quality of the service, and delineating roles properly for everyone to play their part in the team." (Surg 1)

Discussion

Level of Compliance with the Surgical Safety Checklist

The systematic application of the SSC at UGMC, comprising sign-in, time-out, and sign-out, aligns with WHO guidelines and existing literature emphasizing structured safety measures. While compliance was generally high (approximately 90%), the observed inconsistencies, particularly during local anesthesia cases, mirror the variability reported by. These lapses likely stem from skepticism regarding the checklist's benefits or perceptions of redundancy, a barrier previously identified by. Furthermore, the pivotal role of organizational culture observed in this study supports findings by, who argue that leadership support and a safety-prioritizing culture are prerequisites for consistent implementation. The variability in adherence at UGMC underscores the need for stronger institutional commitment to overcome individual resistance [19-23].

Barriers and Facilitators to Implementation

The barriers identified at UGMC are consistent with global data. Resistance from senior staff, often driven by perceptions of redundancy, aligns with findings by and Lim et al., who noted that negative attitudes toward "bureaucracy" significantly hinder adoption. Additionally, hierarchical dynamics that discourage junior staff from speaking up were evident, corroborating review on power dynamics in healthcare. Time pressure was another critical hurdle; consistent with and , staff often viewed the checklist as a burden during urgent cases rather than a safety tool [24-29].

Conversely, leadership support emerged as a primary facilitator. Active endorsement by senior staff legitimizes the process, a trend supported by and. Comprehensive, interactive training also proved essential; as noted by, understanding the evidence behind the checklist, not just the mechanics, improves buy-in. Finally, resource constraints such as staffing shortages and checklist unavailability mirrored challenges reported and, validating the need for dedicated checklist coordinators and improved visual aids [30-35].

Impact on Patient Safety and Surgical Outcomes

Participants' perceptions that the SSC reduces error risk and enhances situational awareness align with the established association between SSC adoption and reduced morbidity and mortality. The checklist's utility in preventing "never events", specifically through instrument counts and site verification, supports and findings on the prevention of retained foreign objects and wrong-site surgeries. Beyond technical safety, the reported improvements in team communication and findings that structured verification fosters a more collaborative environment. Furthermore, the perceived reduction in surgical site infections is consistent with and confirming the checklist's effectiveness even in resource-constrained settings. Ultimately, the SSC serves as a continuous improvement tool, providing a platform for feedback that enhances future surgical planning [36-43].

Conclusion

This study confirms the SSC's critical role in enhancing patient safety and surgical outcomes at the University of Ghana Medical Centre. While compliance was generally high and systematic, inconsistencies persisted, particularly regarding local anesthesia cases, and resistance from surgeons perceiving the checklist as time-consuming. Significant barriers included time pressures, resource gaps, and interpersonal dynamics, whereas team cooperation, training, and checklist visibility served as key facilitators. Notably, the SSC improved accuracy, communication, and error reduction. To optimize implementation, UGMC should strengthen leadership support, provide interactive training, improve checklist accessibility, address staffing needs, and foster a culture of open communication. Adapting the SSC to the local context will further support improved safety culture and care quality

Conflicts of Interest

The authors declare no conflicts of interest.

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