

Why the checklist works: the interplay of non-technical skills and the WHO surgical safety checklist in variable resource healthcare settings

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The World Health Organization's Surgical Safety Checklist (SSCL) is an essential tool, created to *promote safe administration of anesthesia, reduce surgical site infections, and foster improved teamwork and communication within operating rooms*.¹ Successful implementation of the SSCL across diverse settings has consistently been associated with significant reductions in postoperative complications and mortality rates.^{1, 2} The effectiveness of the SSCL lies in its potential for multifaceted impact, including enhanced communication, the cultivation of safety-oriented cultures, and the initiation of broader interventions to elevate surgical safety and quality. A critical aspect of its success hinges on non-technical skills, the social, cognitive, and personal management skills needed for safe and effective performance.³ The SSCL must be recognized as a facilitator for discussions and engagement among operating room team members, transcending its role as a mere checklist. Despite the compelling evidence supporting the use of the SSCL, challenges persist in its effective implementation within low-resource settings.⁴⁻⁶

Despite its proven efficacy, the Surgical Safety Checklist has not been adopted widely, particularly in low- and middle-income countries (LMICs).⁷ SSCL uptake has been slow, and significant challenges have impeded implementation.⁴ Studies highlight that the full benefits of the Checklist, in terms of morbidity and mortality reduction, are most evident when its components are completed comprehensively; incomplete performance of the Checklist diminishes these safety benefits.⁴ A study conducted in 15 African countries on the implementation process of the SSCL in 15 hospitals in 2012 demonstrated that none completed full SSCL implementation in all operating rooms in the year following a WHO AFRO workshop on the SSCL, citing barriers such as staff resistance and a perceived lack of priority.⁵ A 2016 prospective study conducted in five

referral hospitals in Uganda reported a compliance rate of 41.7%, with no association seen between compliance and surgical outcomes.⁶ Reasons noted for low compliance in this context included a *lack of leadership, teamwork, and enforcement of the use of the checklist and cultural barriers where hierarchy prevents some team members from initiating the WHO SSCL*.⁶ Steep hierarchies within operating room cultures pose a substantial hurdle to successful SSCL implementation, and a lack of surgical team empowerment directly correlates with low fidelity in checklist performance.⁸ The SSCL's full potential is realized only when paired with collaborative work processes within the operating room.

Training in non-technical skills (NTS) can facilitate collaboration among surgical team members. There are many examples of successful SSCL implementation in LMICs with enhancement of NTS. The Safe Surgery 2020 project introduced the SSCL alongside multi-professional training to 40 facilities in two regions of Tanzania.⁹ One multi-professional surgical team from each facility participated in leadership training, in addition to a safe surgery clinical skills training. The leadership training focused on *teamwork and communication, active listening, situation awareness, conflict resolution, root cause analysis, and problem-solving – essential skills for realizing team goals*.⁹ This approach led to a remarkable increase in SSCL utilization from 0% to 98% during the 12-month study. The success was attributed to interactive team training and the adaptability of the SSCL to local contexts.⁹ Similar successes have been observed in other LMIC settings where multi-professional team training, focusing on non-technical skills including teamwork and leadership, accompanied SSCL implementation.^{4, 10} The combination of multi-professional training and SSCL implementation proves effective in overcoming challenges related to uptake and sustainability.

Non-technical skills training, such as seen in the Non-Technical Skills for Surgeons (NOTSS) framework, works synergistically with the SSCL to enhance safety in the operating room by optimizing teamwork and reducing adverse events. The NOTSS framework categorizes skills into situation awareness, decision-making, communication and teamwork, and leadership, emphasizing their teachability, learnability, ability to be assessed, and improvable nature.³ Extending non-technical skill training beyond surgeons to include the entire multi-professional surgical team may facilitate SSCL uptake and sustainability. In Rwanda, the NOTSS framework has been modified into the Non-Technical Skills for Surgery - Variable Resource Context (NOTSS-VRC) curriculum - designed for resource-challenged settings. This framework addresses a multi-professional audience, rather than surgeons alone.¹¹ Previous work has demonstrated the feasibility of modifying the NOTSS taxonomy for variable-resource contexts, where a one-day course yielded improved understanding of non-technical skills.³ The SSCL components find support in these non-technical skills, transforming the checklist into a guide for discussion and open communication, thereby preventing its use from becoming a mere "box-checking exercise."¹² Training in non-technical skills, coupled with SSCL implementation, emerges as a potent strategy to facilitate uptake and sustain the impact of the SSCL in diverse contexts.

Providing non-technical skills training to multi-professional surgical teams emerges as a potentially critical factor in supporting the successful implementation of a locally-adapted SSCL. This approach not only facilitates functionality but also promotes sustained use of the SSCL. Through recognizing the interplay

between non-technical skills and SSCL effectiveness, the surgical community can promote enhanced patient safety and improved outcomes in diverse healthcare settings.

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