Overcoming barriers in the prevention of surgical site infections

Summary

Surgical site infections (SSIs) occur when a patient is receiving surgical treatment for a medical problem. As these infections can have severe physical, emotional, and financial consequences, their prevention has become an important point of focus in patient safety. Robust prevention guidelines do exist that, when properly implemented, can help reduce their incidence. To strengthen and build the capacity of health care organizations, the World Health Organization (WHO) has, therefore, defined core components for infection prevention and control that specify how national authorities, as well as institutions/hospitals, can prevent infections in the long term. More specifically, to prevent SSIs it is imperative to have an infection control program in place that incorporates relevant, evidence-based recommendations, targeted surveillance, process monitoring and feedback, education and training, and an enablingenvironment, as well as proven practice and behavior change measures. Although the WHO recommends that all of these components be implemented, it also specifically points to the adaptation/adoption of evidence-based guidelines, monitoring and feedback, the use of multi-modal improvement initiatives, and active surveillance in particular for making a difference in reducing SSI rates. Essential is a focus on educatingand training healthcare professionals who work in the operating rooms (ORs). Even though the global surgical societies are well aware of the harmful impact SSIs have on patient outcomes, there is a paucity of scientific information about the factors that inhibit the adoption of the said guidelines. Furthermore, knowledge about training healthcare personnel in preventing SSIs in the ORs in low- and middle-income countries(LMICs) is scant. In this dissertation we, therefore, addressed the following two main questions:

- *What factors hinder the implementation of surgical site infection guidelines in the operating rooms of low-middle income countries?*
- *How can we design a high-quality and feasible training plan to prevent surgical site infection prevention in low-middle income countries?*

After introducing the reader to SSIs in general and LMICs in particular, as well as to existing guidelines and the role of education and training, Chapter 1 presents the research questions and gives an overview of the studies reported in this dissertation.

The aim of Chapter 2 was to gain insight into the factors that inhibit the implementation of SSI prevention guidelines in LMICs. For this study, we surveyed healthcare professionals and interviewed healthcare leaders from two university hospitals in Pakistan. We found that the barriers identified were either related to the individual

healthcare professionals or associated with the institution where these healthcare professionals worked. Individual factors that were perceived to inhibit the implementation of the guidelines included a lack of awareness, knowledge, and skills, a reluctance to change current practices, and a lack of motivation to follow the most recent SSI prevention guidelines. Factors at the institutional level that were perceived to inhibit the implementation were the absence of a surveillance system, a lack of support for human resource development, a lack of institutional responsibility for infection prevention, and the absence of a culture of practicing evidence-based guidelines.

In Chapter 3, we developed and evaluated a task-based interprofessional training program to prevent SSIs in the ORs. Designed in line with contemporary instructional design principles of whole-task and interprofessional learning, the training was delivered in four sessions spanning two months. Participants met in a five-person interprofessional group every two weeks for a two-hour session. To evaluate their perceptions of the training program, we used a questionnaire and held semi-structured focus-group interviews with participants, and also conducted individual interviews with two facilitators. We found that participants and facilitators had positive perceptions of and experiences with the training. In their view, learning tasks are realistic and derived from trainees' daily practice. The different healthcare professionals felt that the joint learning experience had helped them develop the communication skills they needed when collaborating to prevent SSIs. Indeed, certain training parts were specifically dedicated to practicing these skills. The training did not, however, explore which barriers trainees met when trying to apply what they have learned in practice.

In Chapter 4, we used a mixed-methods study to assess the perceived and measured effectiveness of an improved version of the interprofessional, task-based training. Based on the evaluation outcomes reported in the previous chapter, we implemented the training on a larger scale, whilst including an additional session at the end of the training. In this additional session, participants discussed their experiences of applying what they had learned in practice and reflected on ways to overcome the barriers encountered. The aim of the study was to assess participants' perceptions, as well as their knowledge gains and perceived behavioral changes following the training. To measure their perceived 'satisfaction', we administered a questionnaire at the end of the training. We used pre-and post-intervention assessments to gauge their knowledge and a questionnaire and interviews eight weeks post-training to measure their self- perceived behavior change'. Participants were positive about the training and were eager to participate. Pre- and post-test scores showed a significant increase in knowledge. Moreover, Participants reported that they had applied in practice what they had learned

about SSI prevention. The use of authentic tasks representative of daily clinical practice, as well as the interprofessional approach and reflection sessions, were considered to promote the transfer of learning. However, they also pointed out practical obstacles limiting the application of evidence-based knowledge, such as a shortage of supplies and conventional practices.

In Chapter 5, we developed a master training plan to raise awareness of SSIs and produce lasting behavioral changes in SSIs. Taking up the suggestions from Chapter 4, the master training plan proposed basic, institution-based training in combination with repeated training interventions to effect lasting behavioral change. We conducted a qualitative, individual interview study to investigate how various stakeholders - policymakers, medical educators, and healthcare leaders - perceived the newly developed master training plan. We found that stakeholders deemed the plan necessary to term spread knowledge of SSIs and produce behavior change. In their view, repeated training was essential to make sure that such changes would last. They also felt that the instructional design principles of interprofessional, task-based, and reflective learning included in the master plan improved understanding and transfer of skills to the workplace. Finally, because implementation costs were low, they considered the master training plan as particularly practicable and suited to their specific resource-constrained LMIC context.

In Chapter 6, we looked back and reflected on the research questions presented in the Introduction.

1. *What factors hinder the implementation of surgical site infection guidelines in the operating rooms of low-middle income countries?*

Healthcare professionals and their leaders classified the factors that they perceived as inhibiting the implementation of SSI control measures into two groups, namely individual factors and factors that were associated with the institution. A lack of education and training, absence of a culture of following guidelines, and absence of a surveillance system were found to be important barriers to SSI control implementation.

2. *How can we design and implement a high-quality and feasible master training plan for surgical site infection prevention in low-middle income countries?*

We concluded that training in which authentic, whole learning tasks are used in an interprofessional and reflective learning approach was perceived to enhance learning about SSI prevention by participants. The training also resulted in a significant knowledge

gain. We also learned, however, that a short stand-alone training is unlikely to affect sustainable behavioral change in practice. To promote further reflection and discussion, we recommended the inclusion of an additional training session in which trainees can discuss their experiences and ways to overcome the barriers encountered when applying in practice what they had learned. We also developed an outline of a master training plan to raise awareness of SSIs and induce lasting behavioral changes. This training plan proposed basic, institution-based training in combination with repeated training interventions to make sure that such changes would last. Stakeholders, who were policymakers, medical educators, and healthcare leaders, felt this master training plan matched their resource-constrained context well. They judged implementation costs to be low, for example when compared to advanced technological simulators. They were also positive about the task-based, reflective, and interprofessional learning components of the training and thought these would increase participants' understanding, transfer of knowledge, and workplace skills. To implement the master plan at a national level, train-the-trainer programs were deemed necessary. Finally, in Chapter 6, we presented practical implications, strengths, and weaknesses of the research and offered possible directions for future research.