

Global View of Clinical Guidelines on Prevention of Surgical Site Infections for Health Care Professionals: A Scoping Review

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Abstract

Background

Even though there may be clinical guidelines for surgical site infections prevention, no review has been conducted on them. Therefore, a scoping review was undertaken to map and synthesize the available surgical site infections prevention guidelines.

Methodology

A scoping review methodology as defined by the Joanna Briggs institute was conducted. Eligible English and French published articles with guidelines were identified from data bases, search engines, and websites of professional organizations. The Search terms included: "health care professionals AND guidelines for surgical site infections prevention OR clinical practice guidelines". First level selection was based on title and abstract while full text for second level.

Results

Out of the 106 articles with guidelines, 7 were selected for the period 1999 to 2021. Four showed methods used to formulate guidelines. Five guidelines comprised recommendations for surgical site infections prevention for pre, intra and post-operative phases. WHO guideline appeared to be robust as it contained all the characteristics.

Conclusion

Of all the guidelines identified, the WHO guideline indicated population used to develop guidelines; method used and set recommendations, validation including all phases of surgical management. Hence, a recommendation to adapt WHO guideline to health care settings of low resources countries like Rwanda.

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Introduction

Surgical site infections (SSIs) refer to the infections happening within 30 days' post-operation without implant.[1] SSIs can also occur within 90 days when prosthetic material is left in the site of incision.[2] SSIs affect superficial or deep tissues of the operated site [3] SSIs remain a global health burden impacting negatively developing countries and the burden of SSIs is three times higher than in the developed countries.[1] In Low and Middle Income Countries (LMICs), an estimated 8% to 30% of surgical procedures performed may develop SSIs.[4] SSIs are the predominant type of hospital acquired infections (HAI) in LMICs and affect up to one third of patients who have undertaken any surgical procedure.[5] When SSIs are not treated adequately, they can negatively affect the patients' health and quality of life. [6] SSIs can lead to augmented morbidity, mortality where death rates account to 38%. [7] SSIs can incur high cost to patients and their families.[7,8] SSIs tend to cause local complications such as wound dehiscence and systemic complications ranging from bacteremia to sepsis,[9] for these reasons, health care facilities need to invest in the prevention of SSIs in order to reduce these burdens.

Several risk factors have been evidenced to aggravate the occurrence of SSIs. A recent systematic review found that increased BMI, severe wound class, diabetes mellitus, prolonged surgical operation, two days of hospitalization prior to surgical procedure, and delayed administration of prophylactic antibiotics for one hour or more can likely increase the risk of SSIs.[10] A multicenter cohort study conducted in England indicated that obesity, diabetes mellitus, grade of surgeon, ASA score (2,3+) were more likely to cause SSIs after C-Section.[11] Moreover, evidence suggests that elevated blood pressure, patients' past surgical history, smoking, bed wound dressing, inadequate hygienic condition, and diet plan may predispose the patient to a high risk of SSIs. [12]

In low income settings, advanced age, diabetes mellitus, obesity, alcoholism history, and long hospital stay post-surgery can contribute significantly to SSIs.[13] Studies conducted literature from Ethiopia and Rwanda indicated that advanced age, wound classification, experience and skills of a surgeon, blood transfusion, emergency surgery, duration of surgical operation, hemoglobin less than 7g/dl, systolic blood pressure <90mmhg, patient' surgical history, long hospital stay could likely contribute to SSIs.[14,15] Therefore, healthcare professionals should recognize aforementioned factors and apply the SSIs prevention guidelines adequately to minimize the occurrence of SSIs among patients with such risks.

Clinical practice guidelines (CPGs) are important tools necessary to guide wound care practices to prevent SSIs.[16] Fifty percent of SSIs can be prevented commonly through efficacious application of clinical guidelines for SSIs prevention.[17] The available literature from USA indicated that the prevention of SSIs is possible and up to 60% of SSIs can be prevented by using evidence-based guidelines for SSIs prevention.[18] Even though there is limited synthesize of evidences in the use of SSI prevention guidelines and related impacts to the reduction of SSIs, it is likely that non-adherence, inconsistent compliance of evidence based recommendations as well as barriers on the use of SSIs prevention guidelines may contribute to the reported increased rate of SSIs among surgical patients.[19]

There is a need to map available guidelines to determine whether they contain all essential measures to prevent and manage SSIs at all stages of surgical process. The current scoping review also sought to identify from the existing SSIs prevention guidelines one that can be adapted to be used in low-income countries. The following review questions were answered:

1. What are the available guidelines for the prevention of surgical site infections for healthcare professionals?

2. What are the characteristics of clinical guidelines on prevention of SSIs for health care professionals?

3. What are the gaps of the identified clinical guidelines on prevention of SSIs for healthcare professionals?

Methodology

A scoping review design was utilized to map available guidelines related to SSIs prevention. This review was undertaken and followed the methodology defined by the Joanna Briggs Institute for conducting such review.[20] This synthesis approach was relevant to our study since the purpose was to identify the available guidelines, characteristics of SSIs prevention guidelines and gaps.

Eligibility criteria

The review considered English articles with publicized national and international guidelines on managing and/or prevention of SSIs. Only guidelines developed for healthcare settings were considered. The process of searching was guided by the following criteria:

- I. Articles with guidelines that included healthcare professionals including nurses, midwives, doctors, pharmacists, and allied healthcare professionals as target audience.
- II. Articles on guidelines for surgical site infections prevention and management
- III. Guidelines published in English and French that indicated recommendations for prevention and management of SSIs in all three phases of surgical care namely pre/intra/post-operative
- IV. Focused on all guidelines for SSIs regardless of country of origin.
- V. Focused on guidelines used to prevent SSIs whilst offering pre/intra/post-operative care within hospital settings were considered for this review.
- VI. Guidelines that included one phase of surgical operation.

Excluded in the review were articles with:

- i. Guidelines in other languages which are not English or French
- ii. Unpublished guidelines that were being developed during the search period
- iii. Guidelines containing only one phase of health care (example: post-operative phase concentrating on wound care as well as pain management); and
- iv. Guidelines covering only one component of SSIs prevention (Example: antibiotic prophylaxis).

Search terms

The following search terms have been used: Healthcare professionals OR nurses or midwives OR doctors or pharmacists OR allied healthcare professionals AND guidelines for surgical site infection OR guidelines for post-surgical infections OR clinical practice guideline OR recommendations for SSIs AND global OR worldwide OR healthcare settings OR clinical settings.

Search strategy

Two authors were involved in search strategy (AN, GC). The search for potential articles with guidelines entailed three phases. Firstly, two appropriate data bases namely MEDLINE (PubMed or Ovid) and CINAHL were initially searched to identify all SSIs prevention guidelines. An analysis of the text words enclosed in the title and abstract of the obtained guidelines including the index terms used to describe the articles was done to refine the search terms. Secondly, a comprehensive search of other remaining data bases and search engines (Web of Sciences, Scopus, and Google Scholar) was undertaken. Professional websites of WHO, CDC and ministry of Health of different countries were also searched. The last search focused on reference manual checks of the identified guidelines to find out if there were additional guidelines.

Study selection process

Prior to selection, duplicates were removed. All authors (AN; MM, GC, AC) carried out the process of source selection in two stages. Two authors (AN; GC) carried out the process of source selection in two stages.

The first stage was based on title and abstract examination basing on inclusion criteria. Titles that looked potentially eligible were included to progress to full text examination. Full text stage to determine clinical guidelines to include in the current scoping review. The third and fourth authors (MM; AC) retrieved full text of all potentially related guidelines to identify which among them could include in the final synthesis to answer the review questions.

The selection of full texts articles (AN; GC) was done to ensure their relevance to research questions. All authors (AN MM, GC, AC) participated in the final synthesis of seven guidelines that complied with inclusion criteria. Where disagreements arose, a consensus vote was performed by all reviewers (AN, GC, AC, MM) to reach the final decision. A PRISMA-ScR diagram,[21] indicating the flow of source selection, screening of retrieved guidelines, and identification of guidelines to include in the final synthesis is presented here below (Figure1).

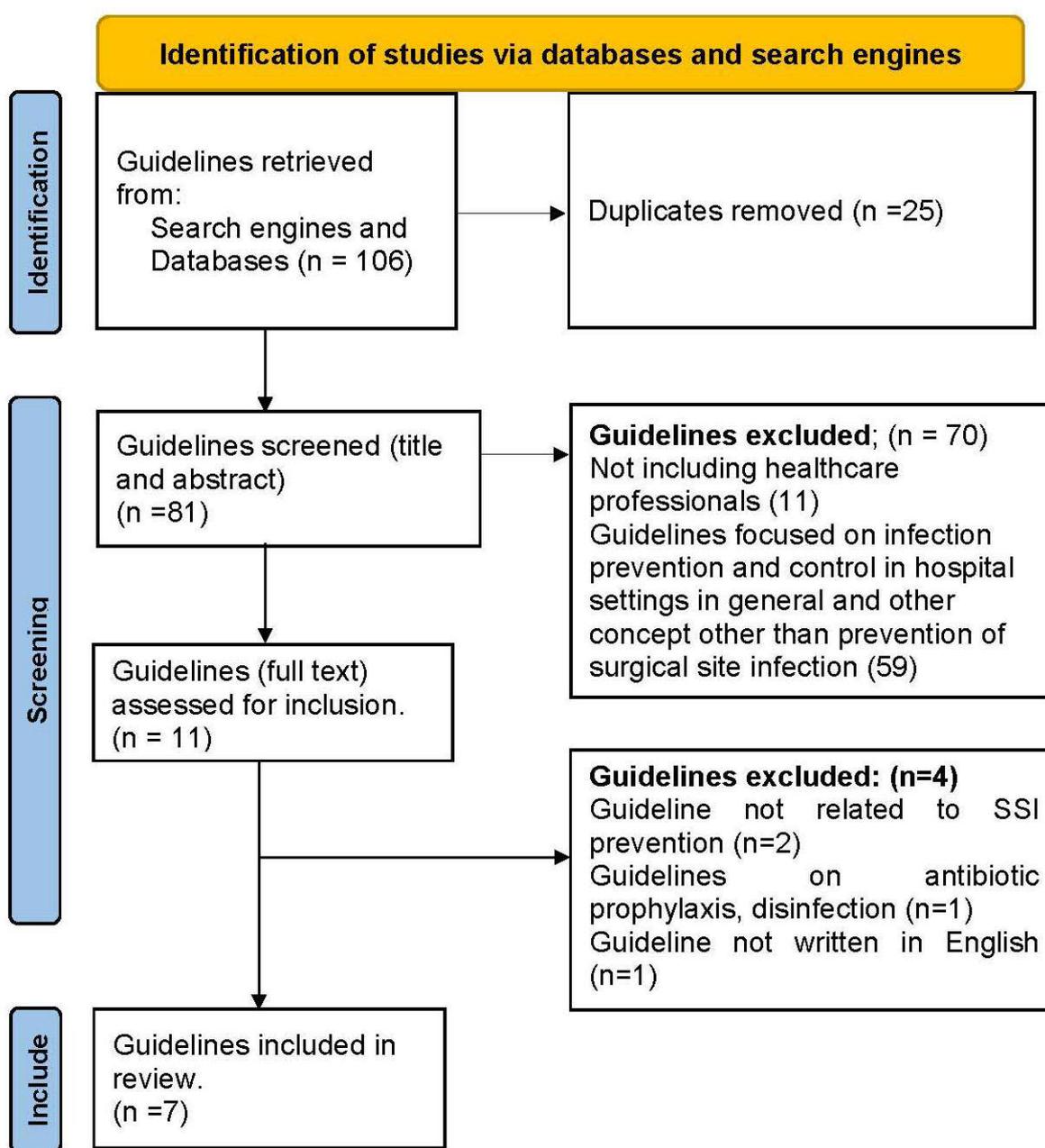


Figure 1. PRISMA flow chart indicating the selection process of guidelines

Data extraction process and presentation

A summary of the findings produced were aligned with the research questions that guided the process of this scoping review. A charting table (Table 1) was developed (AN, GC, AC, MM) to record the main information retrieved from the guidelines of SSIs prevention obtained include author, year of publication and republication, country, name of guideline, objective of guideline, population, method used to select evidences and formulate recommendations, method of validation, components of guidelines.[16] In the scoping review, the appraisal of quality of studies is not done. Scoping review aims to map the available evidence, not to produce critically appraised and synthesized result to particular question.[22,23]

Synthesis of retrieved data

The evidence of the scoping review was analyzed through frequency counts of documents and articles as well as type of studies relating to SSIs preventions practice guidelines and populations. A narrative summary accompanied the tabulated results to describe the distribution, population used to develop guideline, type of studies and surgical site infection prevention concepts being explored by identified guideline.

Results

Selected articles with guidelines

In this scoping review, 106 articles with clinical practice guidelines for the prevention of SSI were identified from search engine, google scholar and data bases (PubMed,). After removing 25 duplicates, 81 remained for the title and abstract screening. Seventy (70) documents were removed based on not including healthcare professionals (n=11) Guidelines focused on infection prevention and control in hospital settings in general and other concept other than prevention of surgical site infection (n=59).11guidelines remained which were considered during full text assessment. After reading the full texts of potentially eligible guidelines, four guidelines were excluded based on

the following: guideline not related to SSI prevention (n=2), guidelines on antibiotic prophylaxis, disinfection (n=1), guideline not written in English or French (n=1). This exclusion resulted in seven guidelines qualifying for the ending review as indicated in the PRISMA diagram (See Figure 1).

Available guidelines for the prevention of surgical site infections

Seven guidelines that were relevant to the review questions were included in this scoping review (Table 1). These were Global Guidelines for the prevention of surgical site infection developed by World Health Organization(WHO),[10] Centre for Disease Control and prevention guidelines for the prevention of surgical site infections(CDC), [24] Surgical site infection: prevention and treatment by National Institute for Health and Care Excellency (NICE),[25] Guideline for prevention of surgical site infection (American college of Surgeon),[26] Surgical site infection prevention: A Clinical practice guidelines developed by the University of Toronto's Best Practice in Surgery in collaboration with the Antimicrobial Stewardship Program,[27] The Asian Pacific Society of Infection Control (APSIC) guidelines for the prevention of surgical site infections,[28] Nurses, National association of orthopedic: NAON Clinical Practice Guideline Surgical Site Infections Prevention.[29] The identified guidelines ranged from 1999 to 2021 and the contributing countries were Canada, United States of America (USA), United Kingdom (UK), Switzerland, and Singapore. The Center for Disease Control, National Institute for Health and care Excellency and World Health Organization had upgraded the formerly developed guidelines. The guidelines presented in this review are the updated versions.

Characteristics and gaps of selected guidelines

Seven guidelines for SSIs prevention retrieved were developed by high income countries, four out of seven stated populations who developed guidelines,[10,24,28,30,31] four out of seven showed methods used to formulate guidelines' recommendations,[10,24,25,27,32] five out seven guidelines' recommendations were categorized into pre, intra and post-operative phases.[5,10,27–29,31] Seven out of seven guidelines for SSIs prevention recommend the use of preoperative bathing of patients to prevent post-operative SSIs.[5,10,25,27–29,31–33] Six out of seven guidelines recommend preoperative use of nasal decolonization for staphylococcus infection carrier using mupirocin 2% ointment to patients who need to undergo cardiothoracic and orthopedic surgery.[5,10,25,27–30] Seven out of seven guidelines recommend the use of preoperative prophylactic antibiotic prophylaxis before surgery.[5,10,17,25,27–30] Four out of seven guidelines recommend preoperative mechanical bowel preparation and use of oral antibiotics.[10,26,28,30] Six out of seven guidelines recommend hair removal preoperatively when indicated using clippers.[10,25,27–31] Five out seven SSIs prevention guidelines recommend preoperative preparation of surgical site before incision,[10,25,26,28,29] four guidelines out of seven recommend surgical hand scrubbing before surgery.[10,26,28,29] Three out of seven guidelines recommend to enhance patients' nutritional support for underweight patients before surgery or during surgery.[10,28,29]

Two out of seven guidelines recommend perioperative discontinuation of immunosuppressive agents.[10,31,34] Three out of seven guidelines recommend perioperative oxygenation.[10,26,34] Four out of seven guidelines recommend maintenance of body temperature intraoperatively.[10,26,29,34] Five out of seven guidelines recommend use of protocol for intensive preoperative blood glucose control before surgery or during surgery.[10,26,28,29,34]

Two out of seven guidelines recommend maintenance of adequate circulating control.[10,28] Six out of seven guidelines recommend use sterilized surgical gapes and gowns pre/intraoperatively.[10,25,26,28,29,31,34] Two out of seven guidelines recommend the use of surgical protector devices intraoperatively.[10,28] Three out of seven guidelines recommend intraoperative incisional wound irrigation.[10,28,30] One out of seven guideline recommend to use intraoperative prophylactic negative pressure wound therapy.[10] Two out of seven guidelines recommend intraoperative antimicrobial coated sutures.[10,28] Six out seven guidelines recommend use of advanced wound dressing postoperatively to prevent SSIs.[10,25,26,28,29,31,34] Three out seven did not state population used to develop guidelines,[26,27,29] Three out of seven did not indicate methods used to formulate recommendations,[26,28,29] two guidelines' recommendations were not categorized into pre, intra and postoperative phases.[27,34] One guideline developed by WHO complied with all characteristics.[10] (See Table 1)

Table 1. Identified Guidelines for the prevention of surgical site infection (N=7)

Table 1. Identified Guidelines for the prevention of surgical site infection (N=7)

Author, country	Year;	Name of the guideline	Objective	Population	Methods used	Methods of validation	Components of the guidelines
WHO 2018, Switzerland[10]		Global Guidelines for the Prevention of Surgical Site Infection	To Provide comprehensive evidence-based recommendations for interventions, applied during the pre/intra, & postoperative phases of care	4 groups: 1. Steering group 2. Guidelines development group 3. Systematic reviews group 4. External peer review group	Select evidence: PICO; Systematic reviews of topic areas. Formulate recommendations: Expert consensus. Analyze the evidence; Assessment & synthesis of evidence; Formulate recommendations & dissemination	External and internal peer review	Preoperative measures; Preoperative bathing; Nasal decolonization with mupirocin ointment with or without CHG body wash for the prevention of Staphylococcus aureus infection in nasal carrier; Optimal timing for preoperative SAP; Mechanical bowel preparation and the use of oral antibiotics; Hair removal; Surgical site preparation; Surgical hand preparation Preoperative/Intraoperative: Enhanced nutritional support; Perioperative discontinuation of immunosuppressive agents; Perioperative oxygenation; Maintaining normal body temperature (normothermia); Use of protocols for intensive perioperative blood glucose control; Maintenance of adequate circulating volume control/ normovolemia; Drapes and gowns; Wound protector devices; incisional wound irrigation; Prophylactic negative pressure wound therapy; antimicrobial -coated sutures Postoperative; SAP prolongation; Advanced dressings; Antimicrobial prophylaxis in the presence of a drain and optimal timing for wound drain removal
CDC,2017; USA[24]		Centre for disease control and prevention guidelines for the prevention of surgical site infections	To provide new and updated evidence-based recommendations for the prevention of SSI	12 health professionals from infectious diseases, surgery & nursing,	Select evidence: not stated for 1999; 2017-targeted systematic review using 4 databases. Analyze the evidence: Hierarchical system to grade levels of evidence Formulate the recommendations: Expert consensus	External and internal peer review	CDC guideline for prevention of SSI 2017; Parenteral Antimicrobial Prophylaxis; Non-parental Antimicrobial Prophylaxis; Glycemic Control; Normothermia; Oxygenation; Antiseptic Prophylaxis; Prosthetic Joint Arthroplasty Section; Blood; Transfusion Systemic Immunosuppressive Therapy; intra-articular Corticosteroid Injection; Anticoagulation; Orthopedic Surgical Space Suit; Postoperative Antimicrobial Prophylaxis; Duration with Drain Use; Biofilm
NICE,2019, UK[30]		Surgical site infection prevention and treatment of surgical site infection	Provide guidance on the patient's journey through out the pre/intra, & postoperative phases of care	2 surgeons, tissue viability nurse, theatre nurse, 2 microbiologists, surveillance coordinator, infection control specialist, 2 patient/ career representatives	Select evidences; 2008-systematic literature reviews using 7 databases; 2014-searches based on clinical questions Analyse evidences; Hierarchical system to grade levels of evidence formulate the recommendation: Expert consensus	External and internal peer review	Preoperative; Preoperative showering; Nasal decolonization; Hair removal; Patient theatre wear; Staff theatre wear; Staff leaving the operating area; Mechanical bowel preparation; Hand jewellery, artificial nails and nail polish; Antibiotic prophylaxis Intraoperative phase; Hand decontamination; Incise drapes; Sterile gowns; Antiseptic skin preparation (2019); Gloves; Diathermy; Maintaining patient homeostasis; Wound irrigation and intracavity lavage; Antiseptics and antibiotics before wound closure; Wound dressings. Postoperative phase; Changing dressings; Postoperative cleansing; Topical antimicrobial agents for wound healing by primary intention; Dressings for wound healing by secondary intention; Antibiotic treatment of surgical site infection and treatment failure; Debridement

Table continued on next page

Table 1. continued

Author, Year; country	Name of the guideline	Objective	Population	Methods used	Methods of validation	Components of the guidelines
American College of surgeon, 2017; USA[26]	Guideline for prevention of surgical site infection	To Provide comprehensive evidence-based recommendation for detecting HAI infections	Not stated	Not stated	External and internal peer review	Prehospital interventions; Preoperative bathing; Smoking cessation; Glucose control; MRSA screening; Bowel preparations; Hospital interventions; Glucose control; Hair removal; Skin preparation; Surgical hand scrub; Surgical attire; Antibiotic prophylaxis; Intraoperative normothermia; Instruments; Wound closure; Topical antibiotics; Supplemental oxygen; Wound care; Post-Discharge Interventions
University of Toronto and Antimicrobial Stewardship Program ; 2017; Canada[27]	Surgical Site Infection Prevention: A Clinical Practice Guidelines	To make recommendations which decrease the risk of surgical site infections in surgical patients.	Not stated in the guideline	The evidence was assessed in adherence to GRADE recommendation	This guideline has been prepared using best available evidence and expert opinion	Antibiotic use; Perioperative normothermia; Preoperative skin preparation; Preoperative hair removal; Staphylococcus aureus decolonization; Special consideration
APSIC, Singapore, 2019[28]	APSIC guidelines for the prevention of surgical site infections	To identify practical recommendations in achieving high standards in pre, peri and postoperative practices	APSIC convened experts and the members of this workgroup are the authors of this paper.	Not stated	External and internal reviewers	Pre-operative; preventive measures Preoperative bath; Mechanical bowel preparation (MBP) and oral antibiotics for elective colorectal surgery in adults; Hair removal; Methicillin-resistant Staphylococcus aureus (MRSA) screening and decolonization; Surgical hand/forearm preparation; Skin antiseptic; Surgical prophylaxis; Nutrition; Glycemic control; Intra-operative preventive measures; Normovolemia; Irrigation Antimicrobial impregnated sutures; Drapes; Wound protectors; Vancomycin powder; Laminar air flow; Post-operative wound management
National Association of Orthopedic Nurses (NAON), Chicago, 2021[29]	Clinical Practice Guideline Surgical Site Infection Prevention	The purpose for the Surgical Site Infection Prevention Clinical Practice Guideline is to educate staff in promoting a multifaceted approach to prevent all orthopedic surgery related infections	Not stated within the guideline	Not stated in the guideline	Not stated in the guideline	Preoperative care Decolonization with mupirocin ointment, pre-op patient skin cleansing, pre-op patient hair removal, blood transfusions, standard antibiotic prophylaxis (SAP), standard antibiotic prophylaxis (SAP) prolongation, additional preoperative considerations, patient education Intraoperative Care Sterile technique, surgical attire, surgical hand antisepsis, surgical site skin antisepsis, antibiotic prophylaxis, air quality, traffic patterns, prevention of hypothermia, sterilization of surgical instruments Postoperative Care Postoperative incisional care, postoperative skeletal pin care, postoperative care uses of negative pressure wound therapy, disinfection of non-critical items postoperative patient and family education

Discussion

This scoping review was conducted to map the available clinical guidelines for prevention of SSIs among operated patients, identify the characteristics and highlight the gaps. Some of the guidelines did not include all essential recommendations for surgical site infections prevention. For example, the guideline developed by CDC did not recommend nasal decolonization with mupirocin ointment with or without chlorhexidine gluconate body wash for the prevention of *Staphylococcus aureus* infections in nasal carriers. Studies have showed that perioperative decolonization of *staphylococcus aureus* nasal carriers with mupirocin together with chlorhexidine body washing reduces the incidence of *S. aureus* SSIs among patients undergoing cardiac and orthopedic surgery.[35,36]

The guideline for SSI prevention developed by CDC, NICE and American College of surgeon did not recommend nutritional support for the purpose of preventing SSIs in underweight patients who undergo major surgical operation. Guideline developed by NICE, American College of Surgeon, APSIC, NAON did not recommend discontinuing immunosuppressive agents prior to surgery for the purpose of preventing SSI. In addition, other studies revealed that nutrition support increases protein and calories and in turn would reduce SSI and related mortality. [37] The implementation of those guidelines presenting missing of essential elements in their content on the prevention of SSIs, impact negatively and increase the risk of SSIs in orthopedic, cardiac, underweight as well as discontinued immunosuppression agent's surgical patients. Further studies are needed to update those guidelines for prevention of surgical site infections and include all essential components for SSIs prevention.

The identified guidelines ranged from 1999 to 2021 and the contributing countries were Canada, USA, UK, Switzerland, and Singapore.

This finding was to complement with the findings of another study conducted in Saudi Arabia which revealed that in the past few decades several developed countries established and regularly updated guidelines to reduce SSIs.[38] The same study indicated high income countries managed to control SSIs due to extended interventions that included surveillance, health care bundles, antimicrobials prophylaxis, eradication of carriers status, infection control programs and education.[38] This is in accordance with the results of the research done by WHO on implementation of SSIs prevention guideline in LMICs which indicated that developed countries are more advanced in different domains as well as ecosystem including availability of well-trained health care professionals, infrastructures, supply chain and pharmacy management, leadership support, system and processes. [39]

The review identified limited literature related of Clinical Practice Guidelines (CPGs) for SSIs prevention in low –income settings. The lack of guidelines developed from the context of low-and middle-income countries may be explained by the fact that the field of SSI is overlooked. Limited financial resources may also prohibit LMICs to make development of guidelines of SSIs prevention a priority. However, the year in which the development of CPGs happened in developed countries, coincided with the time of increased global prevalence of SSIs. Hence the SSIs prevention guidelines were developed and implemented by clinicians to address burden caused by SSIs, issues with quality of life, health outcomes of patients and prolonged hospital stay.[40,41] The research carried out in USA highlighted fostering teamwork among health care professionals which includes nurses, operating physicians, anesthesia team and infection perfectionists to prevent the SSIs. [42] The research done in the United Kingdom showed that SSIs can be monitored and prevented by merging infection prevention and control (IPC) strategies with support from the surgical team and administrative staff.[39]

WHO guideline for SSIs prevention was identified to be robust compared to other guidelines. The guideline is suitable for adaptation as its development indicated clear characteristics with no gaps identified in method used to select evidence, set recommendations, validation of recommendations. All the components were clearly grouped into three phases of surgical procedure namely preoperative, intraoperative, and postoperative. Moreover, the WHO guidelines have been under a series of updates to match the current practice of SSI prevention at global level. Hence, they can be adapted for use in low-income countries like Rwanda.

Limitations

Although we explored SSIs prevention guidelines, during the search, guidelines not published electronically, may have been missed. This review focused on guidelines published in English or French only; which left those in other languages out.

Conclusion

Although the guidelines for SSIs prevention have been identified, not all are suitable or feasible to be applied in surgical practice in limited-resource settings. The recommendations for prevention of SSIs within CDC guidelines updated in 2017 were not categorized into three phases of surgical operation while the American College of surgeon guideline does not indicate methods used to select evidence, analyze evidence, and formulate the recommendations. Additionally, the Clinical Practice Guideline developed by the University of Toronto's is not clear on the population that developed the guidelines and for the APSIC's guideline, methods used to formulate guidelines recommendations are missing. Guideline developed by NAON did not indicate population that developed guideline, method used to select and validate recommendations were not clear. SSIs prevention guideline developed by NICE did not recommend perioperative oxygenation and discontinuation of immunosuppressive agents.

In this regard, the researchers propose for the adaptation of WHO guidelines for SSIs prevention to the context of low resources income countries like Rwanda.

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Authors' contribution

All stages of the review were done by all reviewers as follows: All authors (AN; MM, GC, AC) carried out the process of source selection in two stages. Two authors (AN; GC) carried out the process of source selection. The third and fourth authors (MM; AC) retrieved full text of all potentially related guidelines to identify which among them could include in the final synthesis to answer the review questions. The selection of full texts articles (AN; GC) was done to ensure their relevance to research questions. All authors (AN MM, GC, AC) participated in the final synthesis of seven guidelines that complied with inclusion criteria.

Conflict of interest disclosure

We declare that no conflict of interest concerning publication of this scoping review paper. We declare that the information provided in this disclosure is accurate and complete. When there is any change to the above given information and declaration, we will quickly notify the Editor and complete a new conflicts of interest disclosure that describes the changes occurred. The authors hereby declare to comply with the journal policy for conflict of interest.

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