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Title:

Preventing surgical site infections: facilitators and barriers to nurses' adherence to clinical practice guidelines – a qualitative study

Abstract

Aims

The aim of this study was to identify the facilitators of and barriers to nurses' adherence to evidence-based wound care clinical practice guidelines (CPG) in preventing surgical site infections in an Australian tertiary hospital.

Background

Current research suggests that up to 50% of nurses are unaware of the evidence-based recommendations to prevent surgical site infections (SSI), and that adherence to evidence-based CPG is suboptimal. However, little is known regarding the facilitators and barriers to adherence to evidence-based CPGs.

Design

A qualitative study incorporating ethnographic data collection techniques.

Methods

Data collection included semi-structured individual interviews and focus groups (N=20), and examination of existing hospital policy and procedure documents. Thematic analysis using inductive

and deductive approaches was conducted. This manuscript adheres to the consolidated criteria for reporting qualitative research (COREQ) guidelines and the checklist is available for upload when this manuscript is accepted.

Findings

Data analysis revealed four themes: adhering to aseptic technique, knowledge and information seeking, documenting wound care, and educating and involving patients in wound care. Facilitators and barriers within each theme were identified. Facilitators included participants' active information seeking behaviour, a clear understanding of the importance of aseptic technique, and patient participation in wound care. Barriers included participants' knowledge and skills deficits regarding application of aseptic technique principles in practice, the availability of the hospital's wound care procedure document, suboptimal wound care documentation, and the timing of patient education.

Conclusions

There is a need to develop interventions to improve nurses' adherence to recommended CPGs including following aseptic technique principles, hand hygiene, documentation, and patient education. Hospital procedure documents that outline wound care need to reflect current recommended CPGs.

Relevance to clinical practice

Adhering to evidence-based CPGs has been found to be effective in reducing and preventing SSIs. Our study provides an in-depth understanding of the barriers and facilitators to nurses' adherence to recommended CPGs. The findings may inform future practice improvements in wound care.

What does this paper contribute to the wider global clinical community?

- Research evidence and evidence-based clinical practice guidelines exist; however, adherence is often suboptimal. A thorough understanding of the reasons for poor compliance is important when planning and developing practice improvement interventions.

- The importance of aseptic technique in wound care was well understood, however the application of the principles of aseptic technique in specific clinical scenarios requires improvement.
- While both facilitators of and barriers to evidence-based guideline adherence are influenced by the context in which they are applied, some commonalities exist across settings such as environmental constraints, staff members' knowledge deficits, and the lack of availability of current organisational policies and procedure standards, paucity and inconsistency in research translation of aseptic techniques.

Key words

Behaviour, documentation, ethnography, infection control, information needs, nurses, patient participation, wound care, surgical nursing, qualitative study

Introduction

Surgical site infections (SSIs) are the most preventable hospital acquired infection (HAI) associated with any surgical procedure (Badia et al., 2017). SSI is defined as any infection occurring within 30 days after surgery or within 12 months of surgical implantation of a prosthesis or foreign body (Mangram, Horan, Pearson, Silver, & Jarvis, 1999). SSI can occur in up to 30% of surgeries and accounts for up to 14% of hospital acquired infections (HAI) (Badia et al., 2017; de Lissovoy et al., 2009; National Institute for Health and Clinical Excellence, 2008) which represents a significant burden in terms of patient morbidity and mortality, and costs to healthcare systems worldwide. It has been reported that SSIs cost estimated \$3.5-10 billion annually in the United States (Anderson et al., 2014), AU\$2,800 per patient with a total of AU\$53 million per year in Australia (Coleman et al., 2010), and an additional €32,000 per patient in some European countries (Badia et al., 2017). More importantly, patients may be unable to return to work and earn an income, and experience reduced quality of life as a result of having a SSI (Badia et al., 2017).

Acute wounds, including simple and complex surgical wounds are the most common wounds seen in hospitals, and remain an area where there is considerable variation in practice (Birchall & Taylor, 2003; Gillespie, Chaboyer, Kang, et al., 2014). Previous research has identified a gap between recommended and enacted practices in the area of wound care practice (Ding, Lin, Marshall, & Gillespie, 2017). Evidence-based CPGs, standards, and position statements specific to the promotion of wound healing and prevention of wound infections have been published in the United States (Berríos-Torres, Umscheid, Bratzler, & et al., 2017; Mangram et al., 1999), the United Kingdom (National Institute for Health and Clinical Excellence, 2008), Australia (Wounds Australia, 2016) and many other countries. These standards and guidelines recommend the following to prevent SSIs: (1) using an aseptic non-touch technique to manage surgical dressings; (2) using normal saline as cleansing solution on surgical wounds in the first 48 hours post-surgery if dressings need to be changed; (3) educating patients to care for their wounds; (4) avoiding using topical antibiotic agents

on wounds healing by primary intention; and (5) documenting the wound healing process (Mangram et al., 1999; National Institute for Health and Clinical Excellence, 2008; Wounds Australia, 2016).

Clearly, there is an expectation that wound care practices are underpinned by best available evidence. A recent systematic review concluded that asepsis in wound care has limited scientific research (Haesler, Thomas, Morey, & Barker, 2016). In addition, busy health professionals are often unaware of any research evidence that exists, and the clinical challenges they identify represent important opportunities for future research and implementation (Gillespie, Chaboyer, Allen, Morely, & Nieuwenhoven 2014). In a recent observational study of surgical wound care practice, adherence to aseptic technique was poor, with up to 20 % of nurses observed either not wearing gloves when dressing surgical wounds, wearing the wrong type of gloves (clean versus sterile gloves depending on the wound), contaminating the wound care field during wound dressings, or not washing their hands after completing wound care procedures (Ding et al., 2017). In other studies it has been reported that over 50% of surgical nurses were either unaware of, or did not use evidence-based wound care CPGs and that decision making in wound care was largely founded on practice-based, rather than evidence-based, knowledge (Gillespie, Chaboyer, Allen, et al., 2014; Gillespie, Chaboyer, St John, Morley, & Nieuwenhoven, 2014). The reason nurses do not use evidence-based CPGs may be related to nurses' information seeking behaviour. Marshall et al., (2013) reported that nurses often used their peers as source of knowledge. A recent integrative review identified very few studies which investigated wound documentation practices, but where documentation was reported, it was often described as incomplete or inconsistent (Ding, Lin, & Gillespie, 2016; Gillespie, Chaboyer, Kang, et al., 2014). These findings highlight the need to explore why there is limited adherence to wound care CPGs in clinical practice. Developing a comprehensive understanding of the factors that promote or prevent uptake of wound care CPGs will inform the design and implementation of targeted and tailored interventions to support guideline adherence and prevent SSIs.

Aim

The aim of this study was to conduct an in-depth exploration of the facilitators of and barriers to nurses' adherence to evidence-based CPGs in SSI prevention in an Australian tertiary hospital, which will inform the development of larger scale wound care practice improvement initiatives.

Methods

Design

This exploratory qualitative study used ethnographic data collection techniques including semi-structured individual interviews, focus groups, and examination of existing hospital wound care policy and procedure documents. This manuscript adheres to the consolidated criteria for reporting qualitative research (COREQ) guidelines and the checklist is available for upload when this manuscript is accepted (Supplementary File 1).

Theoretical framework

The formulation of interview questions and the data analysis process in this study were guided by the refined Theoretical Domains Framework (TDF) (Cane, O'Connor, & Michie, 2012; Michie et al., 2005) which has been used widely in healthcare services research. In the TDF multiple sociology and behaviour change theories and frameworks have been synthesised, thus the TDF provides a comprehensive mapping of the determinants of behaviour change into 14 domains (such as knowledge, skills, beliefs and capabilities) and 84 constructs under the domains (for example, under knowledge, there are three constructs including knowledge of condition and scientific rationale, procedural knowledge, and knowledge of task environment) (Cane et al., 2012).

Sample and setting

The study was conducted in a 28-bed general surgical ward of a large Australian tertiary hospital. The ward admits about 3,400 patients annually who undergo a mix of surgical procedures including head and neck surgery, urology, gynaecology, plastic reconstruction, maxillary facial, and ear, nose and

throat surgeries. A convenience sample of nurses who were at work on the days we conducted focus groups were invited to participate in the study. Nurses were eligible for inclusion if they belonged to one of these position categories: enrolled nurses (who have 1-2 years of training and provide basic patient care under the supervision of a registered nurse), registered nurses, and nurses in senior management roles including clinical facilitators (act as educators) and nurse unit managers. All nursing staff working on this ward were on a rotating roster during the data collection thus the sample represents staff working on all shifts, including night shift and weekends. Nursing staff in hospital wound management roles, such as wound management specialists who were responsible for promoting quality care, were purposely recruited to participate in the study. Nursing staff who worked on this ward on casual bases were excluded.

Data collection

We conducted focus groups consisting of enrolled and registered nurses. The focus groups were conducted by the chief investigator and a research assistant as observer and note-taker. The chief investigator was experienced in conducting qualitative studies in the acute and critical care setting. The chief investigator and the observer did not have a direct working relationship with the participants.

Project flyers and participant information sheets were used to promote the research project on this ward two weeks before data collection. The focus groups were conducted on days when the ward was less busy and it was convenient for the researchers to approach staff. Given that participants would need to be released from their nursing duties for up to 60 minutes, it was necessary to select days when an optimal number of staff could be recruited. We conducted focus groups when there were at least four people available to participate. Individual interviews were conducted with senior wound management staff to avoid the potential for unequal relationships, which could influence group dynamics. Interviews were undertaken to suit participant availability. All focus groups and individual interviews were audio-recorded, and notes were taken. Participants were asked to complete a non-

identifiable demographic data sheet, which included information such as age, gender, work experience, and position category. Participants were asked about contextual factors they believed helped or hindered their use of evidence-based CPGs in SSI prevention. We aimed to explore facilitators and barriers related to TDF domains including knowledge, contextual and environmental factors, and behaviour regulation. For example, we explored nurses' knowledge of the recommendations of current CPGs and knowledge of how to apply these in practice. Examples of questions included: "To what extent are you familiar with the guidelines on caring for patients with acute/surgical wounds?" (TDF knowledge domain), and "What makes it easy/hard for you to apply them in your practice?" (TDF knowledge, environmental context and resources, and knowledge domains). The questions were previously piloted with five nurses working in the research department of the hospital. Due to staffing constraints, participants could only be away from their clinical work for a maximum of 60 minutes for the focus group meetings. To ensure we captured everything participants wanted to say, just prior to the end of each focus group meeting, we provided an opportunity for participants to contribute any additional information which had not yet been covered. In relation to the documents reviewed, hospital policies on surgical wound care were retrieved from the hospital's shared drive and intranet. Data were collected over four weeks during December 2014 to March 2015.

Data analysis

All focus group and interview recordings were transcribed verbatim. Transcripts were entered into NVIVO version 10 (QSR, Melbourne, Australia) for data analysis and management. Data analysis commenced during data collection as a feature of qualitative data analysis processes (Miles & Huberman, 1994). Data saturation at the point of analysis occurred when there was no new information or concepts forthcoming. Inductive content analysis was carried out by firstly reading and re-reading focus group and interview transcripts by the chief investigator. Codes were developed in this process to sort similar information (Elo & Kyngas, 2007; Graneheim & Lundman, 2004). These codes were then sorted to identify patterns and themes (Elo & Kyngas, 2007; Graneheim & Lundman,

2004). Each theme was subsequently mapped against TDF domains, then facilitators and barriers within each theme were categorised using deductive content analysis. Versions of the data analysis, including the codes, categories and themes, were discussed among the authors and agreement was based on consensus. Descriptive data analysis was conducted using SPSS Version 25 (Armonk, NY: IBM Corp) to summarise participants' demographic data.

In order to analyse the wound care policy and procedure documentation, the research team located 11 wound care procedure documents that were in use in the hospital. The contents of the procedure documents were examined by the first author and the research assistant to ascertain their currency and consistency with recommended published CPGs or standards from the CDC of the United States (Mangram et al., 1999), the NICE of the United Kingdom (National Institute for Health and Clinical Excellence, 2008), and the wound care standards from Wounds Australia (Australian Wound Management Association, 2010). These CPGs were chosen as they were considered the most current CPGs and standards in SSI prevention in the literature. The summary of differences between the wound care procedure document and current CPGs were reviewed by senior wound care staff working in the hospital, and by the research team.

Rigour

Credibility, fittingness, auditability, and confirmability are elements that ensure the rigour of a qualitative study (Lincoln & Guba, 1985). In this study, credibility was established by the methods through which the interview questions were developed, based on previous literature and informed by the TDF. Participants included all categories of nurses working on the surgical ward. In addition, we used data triangulation techniques, deriving data from the interviews, focus groups, and analysis of existing hospital procedure documents which helps to ensure the completeness of findings. The research topic is high on the national healthcare priority agenda (National Health and Medical Research Council, 2010), which supports the notion of fittingness beyond the study site. Auditability was achieved by keeping a clear audit trail that supported decision making at each stage of the

analysis. This was enacted through the linking of memos to other pieces of data to confirm findings such as categories and themes. Once credibility, fittingness, and auditability are established, confirmability is achieved (Lincoln & Guba, 1985; Sandelowski, 1986).

Ethics

This research was approved by the ethics committees of the local health service and the university (approval numbers: HREC/14/QGC/16, and 2014/394). All participants provided written consent.

Findings

We conducted four focus groups with a total of 18 nurses; each focus group lasted up to 60 minutes. Two individual interviews with senior wound care staff were conducted, each lasting up to 30 minutes. The mean age of participants was 29 years (range 18-53 years). Years' of nursing experience ranged from 1-14 years with a mean of 5 years. Among participants, there was representation of all nursing position categories (including enrolled nurses, registered nurses, and nurses in senior management roles), level of education (from diploma to master's degree), and employment status (full- and part-time).

Data analysis revealed four themes: *adhering to aseptic technique, knowledge and information seeking, documenting wound care, and educating and involving patients in wound care*. Facilitators and barriers to nurses' adherence to recommended practices within each theme are presented in Table 1. In presenting our findings, we put the TDF domains in brackets as bold text. In addition, we have used "FG" to denote focus groups, and INT to indicate individual interviews.

Insert Table 1 here

Adhering to aseptic technique

The first theme describes participants' knowledge of aseptic technique related to key recommendations in current evidence-based CPGs, and the facilitators of and barriers to CPG adherence. There were two facilitators in this theme: (1) participants demonstrated a clear understanding of the importance of aseptic technique and the consequences of SSI. "Aseptic technique can effectively prevent SSI", and SSI "causes discomfort to patients", "contributes to longer hospital stays", and "increases cost to the hospital" were common statements from participants; and (2) participants showed good knowledge about what and how to access the hospital's aseptic adherence education program (Table 1).

The main barrier was nurses' knowledge deficit relative to application of asepsis principles and aseptic technique in practice which may have contributed to suboptimal adherence. Most participants were unclear about how to enact aseptic technique in clinical practice. Some participants stated that "aseptic" meant "not sterile but clean" (FG4). Many participants were unsure in what situation they should choose to wear clean gloves versus sterile gloves when they care for patients' surgical wounds. As shown in the following quote:

Well, whether you are putting something in or taking something out of patients' wounds is a factor that you have to consider when choosing sterile versus clean gloves. Because if you are just taking something out, it's just a clean technique in which you use clean gloves, isn't it?
(FG3)

According to participants, there were occasions when nurses did not adhere to aseptic technique principles. For example, one participant said that,

"Sometimes when I'm doing a wound dressing I wear two layers of gloves to begin with. I take the first pair off after taking the old dressing off the patient's wounds, and then I have got clean, sterile gloves underneath" (FG4).

Several other participants indicated that they also engaged in this practice.

When asked about performing hand hygiene after caring for patients' wounds, participants thought distractions from other staff and patients and time constraints were contributing factors to suboptimal adherence. Participants reported "often trying to do too much in the morning because the doctors open the dressings in the morning round and it [the wounds] can't be left open for long" (FG4). The following quote also represents many participants' perceptions,

I think that not washing hands after a wound care episode might be [due to] a distraction. Because after you've done it, you have packaged everything up and have to take it into the clinical waste room which is far away from some patient rooms ... sometimes it might be a distraction that you're no longer right next to the sink. (FG2)

Knowledge and information seeking

The second theme reflects participants' experiences of locating and accessing the hospital wound care procedure documents, and the perceptions of their usefulness. Table 1 outlines two facilitators in this theme relating to nurses' information seeking: looking for information when needed, and trusting senior staff members' knowledge on wound care. "I would definitely look for information when I need" and "I would ask a senior staff" were common responses when participants were asked about where they would get help from during wound care.

Consistent to what we identified in document examination, participants identified a number of barriers relating to the hospital wound care documents. These included, that the documents were outdated, lacked useful information, and were difficult to find on the hospital's intranet system. Two wound care procedure documents contained contents related to acute surgical wound management: the surgical wound management procedure; and the wound cleansing procedure document. Examination of the hospital's wound care procedure documents confirmed that one of the documents appeared

incomplete as it did not include all aspects of surgical wound care from recommended CPGs. For example, nurses had to refer to separate documents about how to clean a wound and with respect to the procedure for wound team referral if any complications were identified. One procedure document named “surgical wound management” was clearly outdated and inconsistent with the best practice outlined in CPGs since it recommended staff keep the dressing in place up to day three after the surgical procedure. Participants indicated that they did not always refer to the documentation, as this quote demonstrates:

We don’t refer to the procedure documents ... because the policy doesn’t have too much on it ... there is no specific things we need. I find it easier to ask someone such as our clinical facilitator or the wound care team. (FG1)

Another barrier to adherence to CPGs was related to nurses relying on senior wound care staff members’ knowledge instead of being able to refer to accurate, up-to-date and comprehensive hospital procedure documents. Participants indicated that there was often difficulty locating accurate hospital wound care policies documents.

Documenting wound care

This theme reveals participants’ understanding of wound care documentation in relation to what and where to document wound care episodes. As Table 1 shows, one facilitator for wound care documentation was that the ward’s senior staff had identified the need for improvement in wound care documentation. One of the senior nursing staff we interviewed stated that “wound care documentation is a huge problem here” (INT 2).

The main barriers to documenting wound care were that participants were unclear about what and where to document wound care episodes, with some stating they should document simple surgical wound care episodes in the Electronic Medical Record (EMR) system, while others used the Wound

Care Pathway document (WCP), or both. As such, there was inconsistency in terms of the methods of documentation used, and the information that was documented. The following quote typified the sentiments of most participants:

The form [WCP] itself, when you look at it, there's a huge amount of boxes that need to be ticked. Some people just look at that and they won't bother. So that's a task need to be fixed ...to simply and redefine the Wound Care Pathway, and to make it easier to understand. There's [sic] a lot of big words in the Wound Care Pathway, and some of them I don't even know what they mean. (FG4)

Another barrier identified related to missing or incomplete information on the WCP. For instance, the WCP did not include important aspects of wound care such as pain assessment and patient education. According to some participants, the content they documented on EMR varied, and many participants only wrote "wound dry and intact" most of the time. Participants agreed that more complex wounds should be documented in the WCP; however, there was no agreement on what constituted a 'complex' wound. Participants stated that they were unaware of any guideline on wound care documentation. We could not locate any hospital guideline or policy in the ward or hospital giving guidance on when nurses should use the EMR or WCP, particularly in relation to the information that was required in the EMR.

Other barriers to wound care documentation were time constraints and workloads. As this quote reveals,

It's more a time thing. We can't sit down and do it properly. The thing is ... the workload of the nurses is just horrendous. There's so much to be done. (FG1)

Educating and involving patients in wound care

This theme reveals participants' perceptions on the extent to which they should educate and involve patients in wound care activities during their hospital stay. Participants agreed that patient education on wound care was important (facilitator, knowledge domain of TDF). Senior staff on the ward believed that patients should be educated and involved in their wound care as soon as they are admitted into the ward with a wound which is a facilitator. The following verbatim speaks to the importance of encouraging patient participation in wound care activities:

When patients get discharged, they will get bombarded with all this information about what they should do and what they shouldn't do. They should be involved with their wound care right through their whole stay. (INT1)

However, there were disagreements about when patient education should be conducted which is a barrier. Many participants stated that patient education should be done at discharge. One example statement was that, "unless the wound is very complicated, as it is the nurses' job to look after the patients' wounds while they are in hospital" (FG2).

Discussion

The findings highlighted a number of facilitators of nurses' adherence to recommended practices, such as participants' active information seeking behaviour, and a clear understanding of the importance of aseptic technique and patient participation in wound care. Barriers included knowledge deficits regarding aseptic technique, documentation, timing of patient education, and the currency of the hospital wound care procedure documents, all of which are important factors to address.

Our findings illustrate a lack of adherence to principles and practices of aseptic technique that may indicate a knowledge deficit in this area. This is consistent with the results from our previous published observational study conducted in the same setting that found that over 14% nurse breached

aseptic non-touch technique, and 22% nurses did not use sterile gloves correctly during wound care (citation masked for blinded review). The term “asepsis” means free of potentially pathogenic microorganisms (Loveday et al., 2014). Recommended in current evidence-based CPGs, aseptic technique refers to a set of practices that aims to prevent contamination of pathogenic microorganisms by hands, surfaces and equipment to susceptible sites such as a surgical wound (Australian Commission for Safety and Quality in Health Care, 2013; Loveday et al., 2014; National Health and Medical Research Council, 2010; Wounds Australia, 2017). There are three types of aseptic techniques that apply to different clinical environments: 1) sterile technique (example used in the operating room), 2) surgical aseptic technique (example used in central venous catheter insertions), and 3) the standard aseptic technique which is recommended in simple surgical wound management (National Health and Medical Research Council, 2010). Central to aseptic technique in the CPG recommendations is the “non-touch” concept, which stipulates that sterile gloves should only be used when touching a wound during dressing change is unavoidable. Although most staff were familiar with the aseptic technique term and understood the consequences of SSIs, some participants did not know what ‘non-touch’ meant or how to apply the principles in practice. For instance, participants were unclear about when sterile gloves should be worn and the “non-touch” concept was not mentioned by any participants. However, nurses reported not following what is recommended in evidenced CPGs on wound management with some indicating that they used a double layer of gloves and did not perform hand washing after taking off the first layer.

While knowledge is considered necessary for optimal health care, knowledge alone is not sufficient. Competence in applying that knowledge is also essential to ensure that the highest standards of clinical practice are implemented, especially with respect to wound care (Michie, van Stralen, & West, 2011). Enabling nurses working in wound care settings to continue to develop their competence in best practice aseptic techniques is critical. Given that knowledge and competency can be modified, they provide useful targets for future interventions and implementation strategies to facilitate the widespread implementation of aseptic technique in wound care.

As the results of this study demonstrate, nurses in this study did not always adhere to the universally recognised effective handwashing recommendations after wound care episodes. Hand hygiene adherence can be influenced by multiple factors including environmental factors (availability of handwashing facility or product, and reminders at key work locations), organisational factors (such as leadership in promoting hand hygiene), and education (availability of educational programs). The World Health Organisation suggests a multimodal approach to improve adherence in hand hygiene, including systems change, ongoing training and education, audit and feedback, reminders in the workplace, and institutional safety climate (World Health Organisation, 2009). Each component of the multimodal approach is considered equally important. Therefore, a thorough assessment of influential factors in any given setting is needed to improve adherence. Furthermore, in this study, participants noted that distractions from patients and staff on their path to disposing of wastes, and being too busy, were barriers to complying with best practice standards. Previous research has found that nurses' work is often complex with constant distractions and interruptions (Kalisch & Aebersold, 2010), both of which have long been recognised as risk factors for patient safety (Westbrook, Woods, Rob, Dunsmuir, & Day, 2010). To address these risks, strategies to reduce interruptions such as reminding patients and staff not to interrupt nurses if they see them in the middle of a task, and to equip nurses with skills for overcoming the distractions from patients and other staff should be explored.

Environmental factors such as regulation and policies are also key influential factors that affect staff members' behaviour (Michie et al., 2011). Healthcare organisations should effectively implement CPGs to ensure consistency in service delivery and minimise variations in practice (Australian Commission on Safety and Quality in Healthcare, 2010). Hospital policies should be developed based on best available evidence identified in recommended CPGs to provide staff a reliable reference point for standards of practice. Our findings suggest that the content of the hospital procedure documents on surgical wound management needed to be updated, and to be made more accessible (i.e., easier to find on the intranet).

In addition, staff choosing not to look for the hospital's policy or procedure documents on wound care but instead solely relying on the wound care team members as a source of knowledge, can be a barrier to optimal wound care. For instance, even a wound care specialist may not be up to date with current research evidence. It is recommended that CPGs should be used to prevent variations in practice (Australian Commission on Safety and Quality in Health Care, 2010). While the wound care team can play a crucial role in CPG implementation and promoting evidence based practice, staff should be familiar with hospital policies and recommended CPGs to ensure that the information they obtain is correct and their practice is consistent with current CPG recommendations. Further, this finding is consistent with research evidence suggesting that nurses often relied on trusted colleagues instead of looking for policies and guidelines (Marshall, West, & Aitken, 2011, 2013).

Multidisciplinary health professionals working in hospitals also reported that it is much quicker and easier to find the information they need when collaborating with others in information seeking, especially when the information they were looking for was needed urgently and was difficult to access (Newman, Dobbins, Yost, & Ciliska, 2017). It has been found that problem solving skills training was beneficial in helping critical care nurses to improve their information seeking skills (Newman, Doran, & Nagle, 2014). Thus, nurses' information seeking skills and behaviour need to be targeted when designing future interventions to ensure that their practice and clinical decision making is underpinned by best available evidence. While unit culture has not been identified as an issue in our study, unit culture has been identified as a constraint in using evidence based practice (Gillespie, Chaboyer, St John, et al., 2014).

The findings from this study stress the need to develop interventions that are designed to standardise documentation practices in this hospital, a finding consistent with evidence from current literature (Ding et al., 2016). Understandably, clear and complete wound care documentation helps healthcare professionals to communicate and track patients' wound healing process. Literature suggests that only 40-75% of wound care episodes were documented (Gillespie, Chaboyer, Kang, et al., 2014), with some of these being incomplete and some important information missing (Ding et al., 2017; Gillespie, Chaboyer, Kang, et al., 2014; Wong, 2009). In our study, participants expressed their confusion about

what form of documentation tool should be used (the EMR system in the form of program notes versus paper-based WCP), and the types of information to document. Many participants stated that the terminology used in the paper-based version wound documentation form was difficult to understand and lacked important information such as patient education and wound pain assessment. Therefore future interventions aimed at standardising wound documentation should be developed and implemented with end-users' (nurses) input, a highly recommended strategy in change management and behaviour change literature (Graham, Kothari, & McCutcheon, 2018; Kotter, 1996). Clinician engagement in the design and implementation process increases their ownership of the process, making it more likely that practice change will occur.

Partnering with patients in healthcare services has been recognised as an important strategy to improve patient outcomes and prevent adverse events (Australian Commission on Safety and Quality in Health Care, 2010, 2011). Educating patients about their own wound care is also recommended in current CPGs (Mangram et al., 1999; National Institute for Health and Clinical Excellence, 2008). In fact, improved health literacy is associated with better patient outcomes (Australian Commission on Safety and Quality in Health Care, 2014). In our study, the importance of patient education in wound care was recognised by nurse participants, however, participants thought patients did not need to know about their wound care until they are discharged. This may have patient safety implications if patients fail to identify signs and symptoms of SSI during their recovery. The senior wound care staff we interviewed believed nurses should educate patients on their wound care as soon as the patients are admitted to the ward and during all wound care, which is consistent to what is recommended in the Australian National Health and Medical Research Council's framework (NHMRC, 2004; Wounds Australia, 2016).

Limitations

Generalisation of the study findings is limited because this is a single site study with a relatively small sample. However, the learnings from conducting this study, which included gaining an in-depth

understanding of the issues influencing nurses' adherence to recommended wound care CPGs, can be shared across clinical settings, and may inform larger scale implementations in this hospital or similar healthcare settings. In addition, social desirability bias may have influenced some nurse participants to withhold their true opinions in public, resulting in them not sharing some of the barriers they felt influenced their practice. Thirdly, the focus groups were less than the recommended 6-10 people (Krueger & Casey, 2015). However, due to staffing requirements we were limited in the number of participants available for each interview session. Further, the participants did provide important insights into our topic area, thus having fewer participants likely had little effect on the quality of our data. Lastly, our focus groups were restricted to 60 minutes in length due to staffing limitations on the day of the focus groups. Participants may not have had sufficient time to share their thoughts in the issues discussed, however, we did give the participants the opportunity to ask or add anything we had not discussed at the end of each focus group meetings. They were also given the option to contact the chief investigator if they have anything further to contribute.

Conclusion

This research found that the importance of adhering to aseptic technique principles, participants' active information seeking, the trust among bedside nurses and the senior wound care team, and the importance of patient participation in wound care were well understood. However, there are a number of barriers that need to be addressed including participants' knowledge and skills deficit on aseptic technique, the currency, usefulness, and accessibility of the hospital's wound care procedure documents, suboptimal wound care documentation, and the timing of patient education on wound care. Evidence-based interventions and implementation strategies should be initiated to address these barriers.

Relevance to clinical practice

SSIs can have significant consequences for patient outcomes, yet in most instances, they are preventable. Adherence to recommended evidence-based wound care CPGs is effective in reducing

and preventing SSIs. Our study provides an in-depth, thorough understanding of the facilitators and barriers that confront nurses at the bedside when adhering to recommended CPGs. The findings may be used to inform future practice improvements in wound care. Staff adherence to aseptic technique, wound care documentation, and patient participation in wound care should be regularly audited in clinical practice and continuous improvements should be made.

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Table 1 Themes, barriers and facilitators within each theme in TDF domains (Bold text are TDF domains)

Themes	Description	Facilitators	Barriers
Adhering to aseptic technique	Describes participants' knowledge of aseptic technique, and the facilitators and barriers in following recommended practices in relation to aseptic technique use when managing surgical wounds	Knowledge: Participants were aware of the importance and consequences of SSIs Environmental context: Compulsory completion of hospital online modules on aseptic technique; and the hospital has a dedicated program on hand washing adherence	Knowledge: Understanding how to apply asepsis principles and aseptic technique in practice: confusion about when to use clean gloves and sterile gloves
Knowledge and information seeking	Describes participants' experiences of locating and accessing hospital wound care policy and procedure documents, and their perceptions of the hospital policies' usefulness. It also describes participants' information seeking behaviours	Behaviour regulation: Actively seeking information when needed Environmental context: Senior staff was trusted as source of knowledge	Behaviour regulation: Hospital wound care policy and procedure documents were difficult to find Behaviour regulation: Hospital wound care procedure documents contents outdated and aspects of wound care such as wound cleansing and dressing choice were located in different policies; nurses often had to refer to multiple policies for simple surgical wound care Environmental context: Participants preferred to ask senior wound care staff if they have questions about wound care instead of referring to the hospital policy or procedure documents
Documenting wound care	Describes participants' understanding of wound care documentation in relation to what information relative to wound care episodes is documented and where to document this information	Environmental context: Wound care senior staff were aware of the issues with wound care documentation	Knowledge: Unaware of guideline on documentation and feeling confused about where and what to document Behaviour regulation: There was no hospital guideline on wound care documentation Environmental context: Nurses stated that time constraints affected their wound care documentation
Educating and involving patients in wound care	Describes participants' perceptions of patient education on wound care	Knowledge: Understanding the importance of patient participation in wound care Knowledge and environmental context: Senior wound care staff believed that patients should be involved from the start in their wound care	Knowledge and behaviour regulation: Nurses were unsure about when patient education should be given. Bedside nurses thought patient education should be done at discharge