Surgical wound assessment and documentation of nurses: an integrative review

- **Objective:** Surgical site infections (SSI) are serious complications that can lead to adverse patient outcomes such as prolonged hospital length of stay, increased health-care costs, and even death. There is an imperative worldwide to reduce the morbidity associated with SSIs. The importance of surgical wound assessment and documentation to reduce SSI complications is increasingly recognised. Evidence-based guidelines have been published internationally to highlight recommended practices. The aim of this integrated review is to evaluate current surgical wound assessment and documentation practices of nurses in order to inform future evidence-based research on acute wound care practices.
- **Method:** Databases including CINAHL, Cochrane, Medline and Proquest Nursing were searched using key terms of 'wound assessment' AND 'surgical, wound assessment' AND 'documentation, wound assessment' AND 'practice, wound assessment' AND 'postoperative, wound assessment' AND 'nurse, and wound assessment' AND 'surgical site infection'.
- **Results:** A total of 188 articles were identified from the database searches; searching the reference lists provided an additional 8 articles. After careful exclusion processes, a total of six papers were included in the review. Despite the recommendations around wound assessment, there is little discussion on how the clinical characteristics of surgical wounds should be assessed, the frequency of the wound assessments and to what extent wound assessments are documented in the literature.
- **Conclusion:** There is limited research evidence on acute wound assessment and documentation. Therefore, further research is needed to provide evidence for surgical nurses in relation to wound assessment and documentation practices.
- **Declaration of interest:** The authors declare that they have no conflict of interest.

surgical site infection; surgical wound assessment; surgical wound documentation; surgical wound care; nursing practice

S. Ding,¹ RN, Clinical Nurse;
F. Lin,² RN, PhD, Senior Lecturer;
B.M. Gillespie,³ PhD RN FACORN, Professor;
¹ Gold Coast University Hospital
² School of Nursing and Midwifery, Menzies Health Institute Queensland, Griffith University
³ National Health and Medical Research Council NHMRC for Research Excellence in Nursing (NCREN), Menzies Health Institute Queensland, Griffith University

Email: shuyingcd@gmail.com

Surgical site infections (SSIs) are serious complications that can lead to adverse patient outcomes such as prolonged hospital length of stay (HLOS), increased health-care costs, and even death.¹ In the US, the 2005 Healthcare Cost and Utilization Project (HCUP) identified that among 723,490 surgical admissions, approximately 1% (6,891) of cases were recognised as SSI.¹ According to recent reports from the Centers for Disease Control (CDC), SSIs are said to exceed 290,000 and incur more than \$10 billion health-care costs every year in the US.² In the UK, the National Institute for Health and Care Excellence (NICE)³ estimated that 5% of all surgical procedures resulted in SSI, accounting for up to 20% cases of health care associated infections (HCAI). However, this figure is likely to be higher as most patients diagnosed with a SSI develop signs and symptoms after leaving hospital.⁴ In elderly surgical patients in US, SSIs can have four times more mortality and an average of 15.7 HLOS at the total cost of USD \$43,970 per patient.⁵

There is an increasing imperative worldwide to reduce the morbidity of SSIs. In Australia, the Austral-

ian Commission on Safety and Quality in Health Care⁶ has established the National Safety and Quality Health Service Standards to improve health care services, to prevent and control HCAs and SSIs. Experts have recommended that prevention of SSI should focus on preoperative, intraoperative, postoperative assessment and management.² According to the Australian Wound Management Association (AWMA),⁷ wound documentation represents a legal and complete record of the patients' health history, wound assessment outcomes, diagnostic investigations, prevention and treatment plans. Yet, to date, little is known about the assessment and documentation of the wound care provided by nurses. As such, this integrative review will appraise the current wound assessment and documentation status to inform future evidence-based research.

The importance of surgical wound assessment and documentation to reduce SSI complications is increasingly recognised. Evidence-based clinical practice guidelines (CPGs) have been published worldwide to highlight recommended practices on wound assessment and documentation. NICE³ recommended that accurate wound assessment guides medical treatment

and identifies problems in the healing process. Conducting a comprehensive wound assessment is the best way to determine the status of the wound to ascertain whether the wound is progressing and achieving the desired goal. Clinical decision-making depends on comprehensive individual assessment, clinical signs and symptoms of wound or systemic infection, risk factors and wound healing environment.⁷ Wound assessment involving direct observation of surgical wounds is the most accurate technique for identifying SSIs.⁸ The World Union of Wound Healing Societies (WUWHS)⁹ has recommended that assessment for signs of wound infections should include an increase in wound dimensions, offensive odour, pyrexia, wound dehiscence or breakdown. As such, wound assessment includes using a combination of both direct prospective observation and indirect prospective detection for identification of inpatients' and outpatients' SSIs.¹⁰

Despite the recommendations around wound assessment, there is little discussion on how the clinical features of surgical wounds should be assessed in relation to the frequency of the wound assessments and to what extent wound assessments are documented in the literature. CPGs recommend that acute wounds be assessed on a daily basis or upon every dressing change.³ Wounds should be reassessed after receiving patients from the operating room or a different facility, or if the wound markedly deteriorates, and develops an odour or purulent exudates.¹¹ Vuolo¹² suggested that wound assessment needs to include patients' identification details, type of wounds (open, closed, drain site), date of surgery, wound location, size, amount of exudates, surrounding skin conditions, identification of factors that may delay wound healing, and taking pictures of the wound. Other wound care experts recommend that essential assessment practices should also include assessment of wound edges for signs of epithelialisation, amount of exudates and drainage, appearance of healing ridge, and signs of infection.¹¹ However, these recommendations only provide broad guidance on wound assessment, and there is a lack of clear direction and agreement on what tools to use to assess surgical wounds.

Documenting wound care is indispensable for evaluation of care, clinical audit and research. Good documentation enables SSI surveillance, which is considered to be an effective strategy for reducing SSI incidence, as well as a tool for surgical staff to prevent infection and reduce associated morbidity and mortality among postoperative patients.¹³ Comprehensive wound documentation allows structured comparisons of wound healing progress between dressing changes.⁷ Yet, a key factor that influences nurses' ability to perform comprehensive wound documentation is the priority given to providing 'hands-on care' over clinical documentation.¹⁴ Arguably, an essential part

of providing safe clinical care and ensuring continuous quality care includes documentation of the care given. Good documentation is essential for the continuity of surgical wound care, and is valuable to promote early recognition and intervention for SSIs.⁷

An integrative review is a technique that allows the inclusion of a variety of primary research studies, for example, quantitative and qualitative studies, to inform evidence-based practice initiatives.¹⁵ This method allows inclusion of different methodologies in the same review to discover the nature or phenomenon of interest.¹⁵ The integrative review method has been advocated as being critical for evidence-based nursing practice.¹⁶

Integrative review uses thorough and robust search strategies to identify different studies from a variety of databases. This method allows researchers to systematically apply particular criteria to rate evidence strength, assesses rigour and analyses scientific value.¹⁵ These criteria include:

- Adequate sample size and the representativeness of sample for the target population, response rates and loss to follow-up rates
- The data collection method and its reliability and validity, outcomes assessment measures and blinding techniques
- The appropriateness of the statistical test chosen and adequacy of result analysis method.

The aim of this integrative review is to evaluate current surgical wound assessment and documentation practices of nurses in order to inform future evidence-based research and acute wound care practices. This integrative review was guided by the following clinical question: 'What are the current surgical wound assessment and documentation practices used by nurses?'

Methods

We used an integrative review methodology described by Whitemore and Knafl.¹⁵

Search strategies

Databases including CINAHL, Cochrane, Medline and Proquest Nursing were searched using key words including 'wound assessment' AND 'surgical, wound assessment' AND 'documentation, wound assessment' AND 'practice, wound assessment' AND 'post-operative, wound assessment' AND 'nurse, and wound assessment' AND 'surgical site infection'.

Inclusion and exclusion criteria

The inclusion criteria were peer-reviewed, research-based articles which described wound assessment in acute surgical wounds that healed by primary intention, the grey literature (unpublished theses, articles in press, conference proceedings), and full text articles written in English. Search dates were January 1990 up until November 2013 due to the impact that

Fig 1. Search strategy flow diagram adapted from PRISMA 2009 flow diagram³²

major wound care revolutions such as the shift from dry healing to moist wound healing in the 1990s had on surgical and acute wound practices.^{17,18} A hand search through the included articles' reference lists was performed to ensure identification of any articles that met the inclusion criteria.

Studies were excluded if they exclusively examined wound care practices in complex and chronic wounds including diabetic feet, ulcers, and cellulitis, and if the research focused on patient-related factors, for example, clinical comorbidities.

Data extraction and synthesis

Data were extracted and synthesised according to: author, year, country, aim/design, sampling/measures, key findings on wound assessment/documentation, and limitations. Assessing rigour of articles is important for data extraction and provides the foundation of literature review. Quality assessment was completed by using a tool developed by Kmet et al.¹⁹ This scoring system involves an assessment process where two authors independently review each paper. There are 14 items on the tool with a total possible score of 28. For each item, the score

ranges from 0 to 2 (no=0, partial=1, yes=2) depending on the degree to which the particular criteria were met. Items not applicable to a particular study design were marked 'n/a' and were not included in summed final scores. The portion of agreement was measured using an intra-class correlation coefficient (ICC).²⁰ SPSS Statistics 20.0 was used to calculate ICC. A coefficient of ≥ 0.70 was considered acceptable for internal consistency.²⁰

Results

A total of 188 articles were identified from the database searches, and an additional 8 articles were found by searching reference lists, one duplicated article was removed and 189 articles excluded by screening titles and abstracts. At completion of the search, six articles were included (Fig 1).

The quality of the six papers²¹⁻²⁶ was assessed independently by two of the review authors (Table 1). A third review author adjudicated where there were discrepancies in scores. The quality assessments of the studies by two independent reviewers were in good agreement (ICC=0.97; CI 95% [0.853, 0.997]; $p=0.0001$). Out of a possible score of 22 on the modified 14 item tool, studies score ranged from 95.0%²¹ to 50.5%.²² The average mean % for the six included studies was 71% (standard deviation (SD)=0.17, [range 0.4], five of the six studies scored $\geq 70\%$).^{21,23-26}

Of the six articles, three scored higher in sufficient objective explanation, study design, sample selection, appropriate subject characteristics description, results report section and results sufficiently supported conclusions.^{21,25,26} The same three papers well described means of assessment, outcome and exposure measures^{21,25,26} while four of the articles did not clearly describe analytic methods and justification.²²⁻²⁵ Sample sizes varied in relation to type and size, and ranged from 49 patient charts²⁵ to 122 patients with a total number of 292 wounds.²⁶ There was also variability in relation to the types of nurses included in the samples, ranging from 20 district nurses²² to 255 wound care conference delegates.²⁴ An appropriate sample size was used in 4 papers (66.7%)^{21,23,24,26} and two articles (33.3%) had small group size.^{22,25}

The respondents in the reviewed studies varied from patients, conference delegates, surgical nurses and doctors, to district nurses. Most of the studies examined wound care practices and revealed that the clinical wound assessment and documentation differ across clinical contexts. Geographic location varies: three (50%) studies were undertaken in Australia,^{21,23,25} two studies (33.3%) were in the UK^{22,24} and one study (16.7%) was from the US.²⁶ Two studies were set in the community,^{22,23} three studies in surgical wards of regional hospitals^{21,25,26} while one was conducted during wound conference.²⁴ In relation to the types of wounds studied, two studies described the prevalence, type and source of wounds such as chronic and

acute wounds.^{23,26} Two studies were non-specific in relation to wound type because survey participants practised across different health-care contexts.^{23,24} However, Gartlan et al.²⁵ and Gillespie et al.²¹ assessed acute wounds and provided specific insights into current surgical wound practices.

Out of six included studies, three studies surveyed wound assessment,^{21,22,24} and three studies investigated documentation.^{23,25,26} Notably, none of these stud-

ies examined both assessment and documentation practices. In regards to wound assessment findings, Kennedy and Arundel²² revealed that a third (33.3%) of participants used observation and clinical experience in wound assessment. Very few district nurses (5%) used a standardised wound assessment tool when assessing wounds, and nurses agreed that there was a need for a common language to define wound progress or deterioration.²² Similarly, Cook's²⁴ UK

Table 1. Summary of included studies

Lead author year location	Aim and design	Sampling and measures	Key findings	Limitations
Gillespie et al. ²¹ 2013 Australia	<ul style="list-style-type: none"> Describe acute wound care practices of nurses in 1 hospital Descriptive cross sectional survey 	<ul style="list-style-type: none"> Convenience 120 acute care nurses Specially developed tool based on literature 	Assessment <ul style="list-style-type: none"> Response rate 48% 75.6% respondents informed that 'wound appearance' was the most significant aspect for choice of dressings 34.7% reported 'good' or 'excellent' knowledge about wound products, 75.4% of nurses used wound care specialist nurses as primary sources 50.4% of subjects unaware of national guidelines Documentation <ul style="list-style-type: none"> Not reported 	<ul style="list-style-type: none"> Self-reported data Single hospital site Possible non-response bias
Kennedy and Arundel ²² 1998 United Kingdom	<ul style="list-style-type: none"> Investigate wound assessment knowledge and knowledge-influenced practice among 'DNs Descriptive cross sectional 	<ul style="list-style-type: none"> Stratified random 20 district nurses Questionnaire used in the pilot study 	Assessment <ul style="list-style-type: none"> Response rate 100% 33.3% respondents applied observation and experience in wound assessment 5% DNs applied a standardised wound assessment tool with 80% DNs agreeing the assessment tool implementation Documentation <ul style="list-style-type: none"> Not reported 	<ul style="list-style-type: none"> Researcher is a colleague of respondents, potential conflict of interest No clear description of subject characteristic Small sample size
Carville and Smith ²³ 2004 Australia	<ul style="list-style-type: none"> Observe the prevalence, type and source of wounds in the community Evaluate wound assessment documentation practices after implementation of an education intervention for nurses Identify time and costs to wound healing Retrospective /cross sectional chart audit 	<ul style="list-style-type: none"> Convenience 155 patients with 222 wounds 2 data tools: pre-audit and post-implementation review 	Assessment <ul style="list-style-type: none"> Not reported Documentation <ul style="list-style-type: none"> Varied times for wound documentation, 15.1% of wound assessments were not recorded. 35.3% documented within 1 week before the survey, 35.7% <1 month and 13.8% >1 month prior to the survey 33.2% dressings were changed 3 times/week, 37.8% were changed twice a week or less often Wound location was the most documented pre-survey, clinical description was the most documented post-survey. Post-assessment documentation rate increased from 98.2% to 99.1% 	<ul style="list-style-type: none"> Wound assessment completed and audited by the surveying nurse All types of wounds included, difficult to compare documentation practices because of these differences Education intervention not described Before and after results difficult to compare due to the different samples of nurses included at each time point
Cook ²⁴ 2011 United Kingdom	<ul style="list-style-type: none"> Understand current practitioners' wound assessment practice and knowledge Cross sectional survey 	<ul style="list-style-type: none"> Convenience 255 wound care conference delegates Specially developed tool based on literature 	Assessment <ul style="list-style-type: none"> Response rate 72.9% Only 27% of delegates used an assessment tool to assess wounds. 73% of respondents did not regularly use a tool 81% of practitioners did wound assessment at dressing changes, only 2% upon admission Documentation <ul style="list-style-type: none"> Not reported 	<ul style="list-style-type: none"> Subjective information based on delegates' experience and knowledge No report of wound assessment tool validation

Table 1. Summary of included studies continued

Lead author year location	Aim and design	Sampling and measures	Key findings	Limitations
Gartlan et al. ²⁵ 2010 Australia	<ul style="list-style-type: none"> Examine whether acute wound care documentation by nursing and medical staff in a regional hospital meets the AWMA* standard Retrospective chart audit 	<ul style="list-style-type: none"> Random 49 patient charts Specially developed chart audit tool 	Assessment <ul style="list-style-type: none"> Not reported Documentation <ul style="list-style-type: none"> 12 dressings were recorded by nurses on admission; nurses did not document wound bed, local skin sensation, and dimensions. <10% of wound margins were recorded and surrounding skin status was noted in <20% on admission Upon dressing change, 122 dressings were recorded by nurses; management plan was the most recorded (80%), dimension and skin sensation were less documented (2%) 	<ul style="list-style-type: none"> Inter-rater reliability not performed, but chart audit tool sent for expert review and piloted
Smith and Lait ²⁶ 1996 US	<ul style="list-style-type: none"> Review wound management practice on 3 surgical wards Normalise wound care management according to research knowledge. Introduce research findings into wound management Retrospective chart audit 	<ul style="list-style-type: none"> Convenience Stage 1: 122 patients were observed with 292 wounds Stage 2: 119 notes Specifically designed wound assessment sheet 	Assessment <ul style="list-style-type: none"> Not reported Documentation <ul style="list-style-type: none"> Only 19.3% of retrospective records included assessment sheets (a tool for documentation) 65.5% located in the nursing plan/notes 89.7% of documentation was poor and 10.2% was satisfactory 	<ul style="list-style-type: none"> Study is in one large university Medical input into wound care decisions may have influenced the results Numbers were too small to perform inferential analysis Data were not collected on nurses, only the consequences of nursing

*AWMA: Australian Wound Management Association

†DN—District nurse

study surveyed wound care delegates attending the wound assessment zone at a Wound Expo in 2011, and found that nearly three-quarters (73%) of participants did not routinely use an assessment tool. Only 2% of wound delegates assessed wound on admission, and 81% of practitioners did wound assessment at every dressing change. Carville and Smith²³ did an audit on wound assessment documentation for Department of Veterans' Affairs (DVA) clients in the community in 2000. Following the audit, the surveying nurse comprehensively assessed their wounds and a post-assessment wound documentation audit was conducted. Carville and Smith²³ surveyed the frequency of dressing changes, and found that nearly one-third (33.2%) of dressings were attended three times/week, and 37.8% were changed twice weekly or less often. Gillespie et al.²¹ and Cook²⁴ examined the relationship between wound assessment and dressing choices. Gillespie et al.²¹ claimed that more than three-quarters of nurses (75.6%) stated that 'wound appearance' was the most important factor for choice of dressings. Cook²⁴ found that 58% of wound assessment results influenced dressing choice.

With regards to wound documentation, Carville and Smith²³ found that documentation was recorded incompletely and inconsistencies existed between the length of documentation time. Before their survey, about 15% of wound assessments were not docu-

mented. About 35.3% of wounds were recorded within seven days, 35.7% of wound documentation was attended in less than one month and under 15% (13.8%) of wounds exceeded one month to document.²³ Smith and Lait²⁶ found that 19.3% of retrospective records contained assessment sheets; about two-thirds (65.54%) of wound management documentations were included in nursing plans and notes; and 89.7% of documentation were poorly recorded in these notes. Two studies^{23,25} have provided comprehensive information on different aspects of wound documentation. In Carville and Smith's²³ study, wound location was the most documented pre-survey while clinical description was the most frequently recorded after survey. Gartlan et al.²⁵ found that only 12/49 (24.5%) wound assessment was documented by nurses on admission. Wound dimension, wound bed and skin sensation were not documented on admission. Less than 10% of wound margins and less than 20% of peri-wound status was noted on admission. In regards to documentation upon dressing changes, dimension and skin sensation were poorly documented (2% in each case).²⁵ These studies have demonstrated that less information regarding baseline wound status was obtained during wound assessment. However, Gartlan et al.²⁵ stated that the wound care plan was documented in 80% of dressing changes and nurses documented

References

- 1 De Lissvooy, G., Fraeman, K., Hutchins, V. et al. Surgical site infection: incidence and impact on hospital utilization and treatment costs. *Am J Infect Control* 2009; 37: 5, 387–397.
- 2 Gaston, R.G., Kuremsky, M.A. Postoperative infections: prevention and management. *Hand Clin* 2010; 26: 2, 265–280.
- 3 National Institute for Health and Care Excellence (2008). Surgical site infection: prevention and treatment of surgical site infection. Available at: <http://bit.ly/IUYsLMI> (accessed April 2016).
- 4 Tanner, J., Khan, D. Surgical site infection, preoperative body washing and hair removal. *J Perioper Pract* 2008; 18: 6, 232–243.
- 5 Kaye, K.S., Anderson, D.J., Sloane, R. et al. The effect of surgical site infection on older operative patients. *J Am Geriatr Soc* 2009; 57: 1, 46–54.
- 6 Australian Commission on Safety and Quality in Health Care. National Safety and Quality Health Service Standards (2011). Available at: <http://bit.ly/1TFZrbH> (accessed April 2016).
- 7 Australian Wound Management Association. Standards for Wound Management. Available at: <http://bit.ly/1QXN7xl> (accessed April 2016).
- 8 National Nosocomial Infections Surveillance. National Nosocomial Infections Surveillance (NNIS) System Report, data summary from January 1992 through June 2004. *American Journal of Infection Control* 2004; 32: 8, 470–485.
- 9 World Union of Wound Healing Societies. (2008) Principles of best practice: Wound infection in clinical practice. An International Consensus. Available at: <http://bit.ly/1ABVWPQ> (accessed April 2016).
- 10 Mangram, A.J., Horan, T.C., Pearson, M.L. et al. Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee. *Infect Control Hosp Epidemiol* 1999; 20: 4, 250–278.
- 11 Doughty, D.B. Wound assessment: tips and techniques. *Adv Skin Wound Care* 2004; 17: 7, 369–372.
- 12 Vuolo, J.C. Assessment and management of surgical more frequently about wound pain and dressing type when compared with doctors.²⁵

Aside from wound assessment and documentation, four studies also examined clinical nurses' wound care knowledge.^{21–24} One study investigated knowledge about dressing products,²¹ two studies investigated nurses' knowledge in regards to timing and frequency of dressing changes.^{23,24} Kennedy and Arundel²² claimed that 80% of nurses used wound product representatives to refresh their knowledge of products and 73% of nurses approached colleagues for assistance. Over 75% (75.4%) of nurses referred to wound care nurses (tissue viability) as primary sources.²¹ Gillespie et al.²¹ also found that around one-third (34.7%) of surgical nurses reported 'good' or 'excellent' knowledge about wound products.^{23,24} In Cook's²⁴ study, only 6% of Wound Expo delegates considered themselves as very competent with wound assessment; 16% reported being unsure and 9% felt they needed more training. Carville and Smith²³ reported that after implementation of an education programme for nurses, post-assessment documentation rate increased slightly from 98.2% to 99.1%. Only one study reported on nurses' CPG awareness.²¹ Gillespie et al.²¹ revealed that half (50.4%) of the surveyed nurses were 'unaware' of national CPG.

Discussion

The findings of this integrative review indicate that description of wound assessment and documentation practices for surgical wounds (i.e., wounds that heal by primary intention) is insufficient and lacking in high-quality research. Moreover, it appears that there is a lack of standardisation in wound assessment and documentation practices worldwide. All of these studies are either retrospective or cross sectional chart audit and survey, and none used an intervention. As such, the rigour with which interventional studies are appraised could not be applied, for example randomisation, allocation concealment, blinding, and intervention fidelity. All six papers included were descriptive quantitative studies, and no qualitative studies/observational studies were found. All were focused either on wound assessment or on wound documentation, none surveyed both. Moreover, some of the studies included all wound types (acute and chronic), making it difficult to compare assessment and documentation practices due to wounds' differences in clinical complexity and treatment requirements. Notably, there was no study conducted in the intensive care unit (ICU), which is an important health-care setting for patients developing SSIs.²⁷

This review found that there is a lack of literature on wound assessment and documentation, which indicates that wound assessment and documentation are poorly studied.²³ Wound assessment meth-

ods varied, with few nurses using wound assessment tools.^{22,24} Some nurses used their own observation and clinical judgement,²² while most of the study participants referred to wound care specialists and resource persons when assessing wounds.²¹ Wound assessment was insufficiently attended to on admission,^{24,25} which would make it difficult to monitor patients' wound healing process. It is also concerning that choice of dressing was not always based upon wound status.²⁴ The use of a standardised wound assessment sheet may help to assist in selecting the right wound care products.²⁶ Importantly, holistic wound assessment is essential for wound management, to prevent infection, promote healing and improve quality of life.²⁸ Comprehensive wound assessment results in cost reduction and reduces healing times.²³ Inconsistency in the use of standardised wound assessment tools^{22,24} suggests the need for further study into the limited uptake of wound assessment tools in clinical practice.

This review found that wound documentation was not done in a timely manner²³ and wound assessment findings were inconsistently recorded on assessment sheets or on patients' care plans/notes.²⁶ Wound characteristics were not documented well, as important aspects of wound healing status, such as wound bed, wound margins, exudates and wound size were missing.²⁵ Admission assessments were poorly documented. Wound documentation regarding assessment was less consistent on admission and upon dressing changes.²⁵ Therefore, justification for wound management decisions is unclear.

The slight increase in post-assessment documentation rates following a surgical wound educational programme²³ could be attributed to nurses' improved awareness on documentation. In fact, Smith and Lait²⁶ declared that when a wound assessment sheet was used, it was comprehensively documented and systematic wound care was facilitated. Clearly, good documentation of wound care enables continuous wound healing monitoring, so it is important to document signs and symptoms of SSI, such as pain, redness, tenderness and wound swelling.¹⁰

It is increasingly recognised that improved adherence to evidence-based guidelines can reduce the incidence of SSI. Worldwide wound practice guidelines were published to prevent SSIs.^{3,7–9} Of concern is the high proportion of nurses reported being 'unaware' of the national standards pertaining to wound management,²¹ which poses challenges to embed evidence-based wound care. However, none of the reviewed studies have measured nurses' adherence to guidelines in contemporary clinical practice. In fact, clinical evidence has shown that CPGs are often not applied by clinicians,²⁹ and guideline recommendations do not necessarily translate into nursing practice. A recent survey claimed that ICU nurses' knowledge of the SSI guidelines was only 29%.³⁰ It is

Acknowledgements

We wish to thank the National Health and Medical Research Council (NHMRC), Centre for Research Excellence in Nursing (NCREN) for funding received to support this research.

clear that the gap between wound care practice and clinical evidence remains unchanged.²⁵ In addition, Ashton and Price³¹ investigated wound care assessment practices and concluded that translating knowledge into practice was an ongoing challenge. The clinicians had the tendency to use outdated practices, they learned by example or felt comfortable with their past experience rather than wound care strategies that reflect evidence-based practice.³¹

Limitations

This review has its limitations in terms of the studies' design, sampling, measures, and the overall review. Some studies had small sample sizes. It is possible that studies may be missed despite using robust search methods. Notably, all studies included in this review have used quantitative methods that employed either survey or chart audit; none have used observations to describe what is occurring in practice. In addition, some of these papers have weaknesses regarding sampling, measurement and design. Specific limitations of these studies included use of a single site and the potential for investigator bias because the investigators themselves performed the wound assessment, instead of using blinded assessors. Furthermore, these studies were completed in different contexts including community settings and acute care hospitals which involved different types of wounds, making it difficult to compare the current surgical wound practice. This could affect generalisability of findings beyond the samples.

Recommendations

The results of this review suggest that future research using prospective observational and qualitative approaches is required to describe wound care prac-

tices. Researchers should focus on wound care assessment standardisation and establish a universal documentation chart to guide clinical practice. The prevention and management of SSI on surgical patients are determined by accurate wound assessment and documentation practice, and up-to-date knowledge of evidence-based wound care clinical practice guidelines. Clearly there is a need to conduct observational studies to investigate how well evidence-based guideline recommendations are adhered to in clinical practice. Finally, researchers may also consider examining wound care practices in settings such as ICU to gain better insights about surgical wound assessment, documentation and nurses' knowledge. This review indicates a need to encourage the consistent use of standardised assessment tools, as well as an educational programme on evidence-based practice and wound care guidelines to improve awareness of national guidelines.

Conclusion

Comprehensive wound assessment and documentation has the potential to reduce the incidence of SSI, reduce morbidity and mortality, and ease the economic burden on patients, hospitals and the health-care system. Our results suggest that comprehensive surgical wound assessment and documentation present substantial challenges for nurses and questions with regards to quality wound assessment and documentation tools remain unanswered. Future prospective observational studies are needed to describe wound assessment practices and a standardised documentation tool for wound care. Surgical nurses need to keep updated with evidence-based assessment and documentation of wound care. It is only in this way that improved practice may be realised and SSI rates reduced. ■

wounds in clinical practice. *Nurs Stand* 2006; 20: 52, 46–56.

13 Astagneau, P., Metzger, M.H., Bernet, C. et al. Reducing surgical site infection incidence through a network: results from the French ISO-RAISIN surveillance system. *J Hosp Infect* 2009; 72: 2, 127–134.

14 Marrelli, T.M., Harper, D.S. *Nursing documentation handbook*. (3rd edn) Mosby, 2000.

15 Whittemore, R., Knaf, K. The integrative review: updated methodology. *J Adv Nurs* 2005; 52: 5, 546–553.

16 Souza, M.T., Silva, M.D., Carvalho, R.D. Integrative review: what is it? How to do it? *Einstein* 2010; 8: 1, 102–106.

17 Nicks, B.A., Ayello, E.A., Woo, K. et al. Acute wound management: revisiting the approach to assessment, irrigation, and closure considerations. *Int J Emerg Med* 2010; 3: 4, 399–407.

18 Queen, D., Orsted, H., Sanada, H., Sussman, G.A. dressing history. *Int Wound J* 2004; 1: 1, 59–77.

19 Kmet, L.M., Lee, R.C., Cook, L.S. Standard quality assessment criteria for evaluating primary research papers from a variety of fields. Alberta Heritage Foundation for Medical Research, 2004.

20 Polit, D.F., Beck, C.T. *Nursing research: generating and assessing evidence for nursing practice*. (9th edn) Lippincott Williams and Wilkins, 2012.

21 Gillespie, B.M., Chaboyer, W., Allen, P. et al. Wound care practices: a survey of acute care nurses. *J Clin Nurs* 2013; 23: 17–18, 2618–2627.

22 Kennedy, C., Arundel, D. District nurses' knowledge and practice of wound assessment. *Br J Nurs* 1998; 7: 7, 380–387.

23 Carville, K., Smith, J.A. Report on the Effectiveness of

Comprehensive Wound Assessment and Documentation in the Community. *Primary Intention* 2004; 12: 1, 41–49.

24 Cook, L. Wound assessment: exploring competency and current practice. *Br J Community Nurs* 2011; 16: 12, S34–S40.

25 Gartlan, J., Smith, A., Clennett, S. et al. An audit of the adequacy of acute wound care documentation of surgical inpatients. *J Clin Nurs* 2010; 19: 15–16, 2207–2214.

26 Smith, L.N., Lait, M.E.A. A study of postoperative wound management in nursing. *Br J Nurs* 1996; 5: 19, 1162–1171.

27 Eggimann, P., Pittet, D. Infection control in the ICU. *Chest* 2001; 120: 6, 2059–2093.

28 Ousey, K., Cook, L. Understanding the importance of holistic wound assessment. *Practice Nursing* 2011; 22: 6, 308–314.

29 Marshall, A.P., West, S.H., Aitken, L.M. Preferred information sources for clinical decision making: critical care nurses' perceptions of information accessibility and usefulness. *Worldviews Evid Based Nurs* 2011; 8: 4, 224–235.

30 Labeau, S.O., Witdouch, S.S., Vandijck, D.M. et al. Nurses' knowledge of evidence-based guidelines for the prevention of surgical site infection. *Worldviews Evid Based Nurs* 2010; 7: 1, 16–24.

31 Ashton, J., Price, P. Survey comparing clinicians' wound healing knowledge and practice. *Br J Nurs* 2006; 15: 19, S18–S26.

32 Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G. The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PRISMA 2009 Flow Diagram. Available at: www.prisma-statement.org (accessed April 2016).