A quantitative description of the current practice of managing burn wounds

Andrews EA, BCur, MSc(Nursing), Doctoral Student; Langley G, PhD, Senior Lecturer
Department of Nursing, Faculty of Health Sciences, University of Witwatersrand, Johannesburg
Correspondence to: Ethel Andrews, e-mail: ethel.andrews@gmail.com
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Abstract

Objectives: This article forms part of the findings of a thesis on the management of burn wounds by nurses. The aim of the study was to describe the current practice by nurses of managing burn wounds.

Design: A mixed-method, quantitative and qualitative, nonexperimental, explanatory, sequential, descriptive design was used.

Subjects and setting: The population was nurses providing care to adult patients with superficial- to partial-thickness burn wounds, admitted to a single burn unit in a tertiary academic hospital in Gauteng.

Method: The quantitative data were collected initially through an integrative review, followed by the parallel collection of quantitative data through structured observations, and qualitative data through semi-structured interviews. This article presents the findings from the structured observations. Multiple dressing changes were observed, using a checklist as a data-collection tool. Data were collected from August to October 2012, and from April to June 2013. Descriptive statistics were used to summarise, categorise and order the data. The positivity index (PI) percentage was used for analysis. A total of 303 dressing changes were observed.

Outcome measures: The outcome measure was a description of current practice according to the themes of the nursing process using a quantitative checklist.

Results: The findings revealed that communication between nurses and patients was ineffective, with PIs of 18% for the nurses introducing themselves to patients, and 14% for giving an explanation of the procedure to be carried out to patients. Failing to heat the cleaning solution before applying it, and not washing their hands were also identified as areas needing improvement. On assessment and diagnosis, the nurses scored below the 70% mark required for a quality assessment. The lowest scores were observed for the use of the TIME (tissue management, control of infection and inflammation, moisture imbalance, and advancement of the epithelial edge of the wound) framework. This suggests that the framework had not been adopted as a frame of reference for the management of burn wounds in the observed setting. Satisfactory scores were obtained for certain elements of the dressing execution, namely the aseptic field being maintained, a logical sequence being followed throughout the procedure, and consideration being given to complaints by the patients about their pain. However, the way in which the environment was not adequately prepared prior to dressing execution, the way in which packages were not opened aseptically, the failure of the nurses to check the expiry dates of the cleaning materials, and the cleaning technique used were identified as gaps in competence. The need for a more structured approach to reporting was identified from lack of use of the TIME framework during documentation. A PI of 62% was obtained for the referral pathways, which is below the benchmarked score of 70% for quality.

Conclusion: The results obtained from the structured observations in this study indicate that there is a need for guidelines on the management of burn wounds by nurses.

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practice have been observed in the management of burn wounds. While these guidelines are in the public domain, the majority of nurses working in burn units are unable to access them as they are only available to registered and paid-up members of the SABS. The 2007 burn stabilisation protocol is freely available on the Internet, but the focus is on emergency management of the burn patient, and not on general wound care. However, the protocol still advocates the use of silver sulphadiazine (SSD), which is now considered to be outdated. The SANC, in a personal communication, confirmed that a standard is not in place for the management of burns, and that wound care, including burn wound management, is subject to institutionally mandated procedures, with each institution applying a different method of care. Some methods are outdated, such as the use of SSD, while others are not evidence based, for example, the practice of covering wounds with saline gauze.

Anecdotal interaction with doctors and nurses has revealed that a major challenge in the management of burns is the absence of, or limited training in, burn wound management, as well as the absence of measurable standards of care in South Africa. Lack of training of medical doctors has been confirmed, with 97% of participants indicating that more training on wound care is required. Studies on nurse training adequacy with respect to wound management, the identified needs of nurses working in the burn units or the current burn wound practice in South Africa, or on burn wound management from a non-surgical perspective internationally, could not be found.

This study aimed to identify the strengths, weaknesses and gaps in current practice with regard to the management of burn wounds by nurses, so as to create recommendations on how to improve clinical nursing practice, research and nursing education, as well as to provide motivation for the establishment of standardised evidence-informed guidelines.

Method

Structured observations were used to collect quantitative data on the current practice by nurses of managing burn wounds, using a checklist adapted from Nonino et al. A checklist standardises the process to ensure that all elements and necessary action have been addressed. Three answer options were permitted for each activity on the checklist, i.e. “Yes”, “No” and “Not applicable”. Patient reports were read, and summaries of the entries made on the checklist. The researcher collected all of the data to ensure consistency.

The population was nurses providing care to adult patients with superficial- to partial-thickness burn wounds. Table I describes the population according to their qualifications.

Data were collected from August to October 2012, and from April to June 2013. The first set of dates was chosen as it fell in the less busy season for burns (post winter). This meant that nurses were not pressured and did not need to rush to perform dressing changes; often case when the ward is full. The second set of dates was chosen to augment the number of observed dressings. The setting was a tertiary academic hospital in Gauteng where nurses receive wound care training from numerous companies. However, the researcher did not ascertain the formal qualifications of the nurses with regard to attendance at post-basic recognised training sessions on wound care, such as that offered by the University of the Free State, or Stellenbosch University.

Purposive sampling was performed. The sample consisted of an average of 10-15 dressings per week. A total of 303 dressing changes were observed. The positivity index (PI) percentage was used for analysis, according to which the type of answer given (affirmative, negative or not applicable) was identified for each activity on the checklist.

In PI: \( r_a = \) affirmative answers, and \( m = \) negative answers:

\[
\text{Positivity index (PI)} = \left( \frac{r_a}{r_a + m} \right) \times 100
\]

A PI equal to or higher than 70% was a parameter for dressing quality assessment.

Data were classified according to the categories of dressing preparation, assessment and diagnosis, dressing execution and outcome and evaluation, in accordance with the nursing process. The construct and content validity were evaluated. Construct validity was demonstrated through multi-method studies, and consultation took place with nurses and doctors working in the burn units in order to review the checklist. The content validity of the checklist was informed by the findings of the integrative review of the management of burn wounds conducted prior to the structured observations. The instrument was pretested during a pilot study. Reliability was demonstrated through repeated observations. A statistician was consulted, and Stata® 13.1 used to calculate the proportion, standard error and 95% confidence interval in this study. Reliability was further ensured through the pilot study.

Results

Dressing preparation

The preparation phase comprised various categories, including the nurses introducing themselves to the patients, heating the solution prior to applying it, and washing their hands before commencing the dressing. A literature search on dressing preparation revealed a paucity of information on how to prepare for the actual procedure.

The PI percentages obtained for the dressing preparation are listed in Table II.
The only two satisfactory scores which were obtained related to preparing the material for the dressing beforehand and maintaining the patient's integrity during the procedure. A score of less than 70% was obtained for the other elements pertaining to dressing preparation.

Assessment and diagnosis

Conducting a structured wound assessment is a crucial part of wound management. Performing a wound assessment is a prerequisite to good wound management. A thorough assessment facilitates the setting for an appropriate diagnosis. The nursing diagnosis drives interventions and patient outcomes, enabling the nurse to develop wound care objectives and thus plan and evaluate care.

The PI percentages obtained for the assessment and diagnosis stage of the procedure are detailed in Table III.

The nurses did not routinely assess and diagnose each patient. A score of higher than 70% PI of the recommended level was not obtained for any of the elements in this category. The two items which scored the lowest related to the TIME (tissue management, infection and inflammation, moisture imbalance and epithelial edge of the wound) model, with a PI of less than 10%.

Dressing execution (intervention)

Dressing execution refers to any treatment or action performed by a nurse based on his or her clinical judgement and knowledge, and which then helps the patient to achieve the goals and expected outcomes which have been set.8,9

The PI percentages obtained for the dressing execution stage of the procedure are detailed in Table IV.

The aseptic field being maintained, the logical sequence followed throughout the procedure and response to the patients' complaints of pain scored a PI greater than 70%. The PI percentage obtained was less than 70% for the environment being properly prepared (manipulation of the environment extends to the air current, equipment and surfaces, as well the temperature of procedure room) (54%), the nurses opening the packaging aseptically (62%), the expiry date of the material being checked (9%) and use of the prescribed solution (9%).

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**Table II: Positivity index percentages obtained for the dressing preparation**

<table>
<thead>
<tr>
<th>Dressing preparation</th>
<th>Positivity index (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did the nurse introduce him- or herself to the patient?</td>
<td>18</td>
</tr>
<tr>
<td>Did the nurse explain the proposed procedure to the patient?</td>
<td>14</td>
</tr>
<tr>
<td>Did the nurse prepare the material for the dressing beforehand?</td>
<td>72</td>
</tr>
<tr>
<td>Did the nurse heat the cleaning solution?</td>
<td>14</td>
</tr>
<tr>
<td>Did the nurse wash his or her hands before starting the dressing procedure?</td>
<td>62</td>
</tr>
<tr>
<td>Was the integrity of the patient maintained by the nurse during the dressing procedure?</td>
<td>73</td>
</tr>
</tbody>
</table>

**Table III: Positivity index percentages obtained for the assessment and diagnosis stage of the dressing procedure**

<table>
<thead>
<tr>
<th>Assessment and diagnosis</th>
<th>Positivity index (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was an assessment performed with respect to the wound? Was it a cardex (written report) or verbal description?</td>
<td>11</td>
</tr>
<tr>
<td>Did the nurse classify the wound? Was the type of burn and the burn depth described?</td>
<td>55</td>
</tr>
<tr>
<td>Was the location of the wound mentioned, described or considered?</td>
<td>27</td>
</tr>
<tr>
<td>Was the appearance of the wound bed described using TIME?</td>
<td>0</td>
</tr>
<tr>
<td>Were the TIME elements identified and managed?</td>
<td>9</td>
</tr>
<tr>
<td>Was the size of the wound described in terms of the TBSA?</td>
<td>67</td>
</tr>
<tr>
<td>Was the pain managed? Was analgesia administered or a non-drug method for pain control used?</td>
<td>66</td>
</tr>
</tbody>
</table>

**Table IV: Positivity index percentages obtained for the dressing execution stage of the procedure**

<table>
<thead>
<tr>
<th>Dressing execution</th>
<th>Positivity index (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did the nurse prepare the environment?</td>
<td>54</td>
</tr>
<tr>
<td>Did the nurse open the packaging aseptically?</td>
<td>62</td>
</tr>
<tr>
<td>Did the nurse check the expiry dates of the products used?</td>
<td>9</td>
</tr>
<tr>
<td>Was the “dirty” material kept separately from the clean field?</td>
<td>77</td>
</tr>
<tr>
<td>Did the nurse use the prescribed solution?</td>
<td>9</td>
</tr>
<tr>
<td>Did the nurse follow a logical sequence throughout the procedure?</td>
<td>78</td>
</tr>
<tr>
<td>Did the nurse maintain the aseptic technique throughout the procedure?</td>
<td>67</td>
</tr>
<tr>
<td>Did the nurse take complaints of pain by the patient into consideration?</td>
<td>73</td>
</tr>
</tbody>
</table>

**Table V: Positivity index percentages obtained for the outcome and evaluation stage of the procedure**

<table>
<thead>
<tr>
<th>Outcome and evaluation</th>
<th>Positivity index (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did the cardex (documentation) reflect the nursing process with regard to wound management?</td>
<td>0</td>
</tr>
<tr>
<td>Was the management based on the identification, recording and treatment of TIME-related problems?</td>
<td>0</td>
</tr>
<tr>
<td>Were referral pathways followed (i.e. referrals made to a physiotherapist, surgeon or counsellor, if needed)?</td>
<td>62</td>
</tr>
</tbody>
</table>

TIME: tissue management, infection and inflammation, moisture imbalance and epithelial edge of the wound
Outcome and evaluation

Outcome refers to the responses of patients in reaction to the care being provided. Nursing evaluation is the determination of whether or not the expected outcomes were met; in other words, the measurement of the effectiveness of the nursing care. The PI percentages obtained for the outcome and evaluation stage of the procedure are listed in Table V.

The nursing process was not reflected in any of the reporting, and neither was the TIME framework used to identify, record or manage wounds (0%). Even though referral pathways were followed more than half of the time, the PI obtained for this was still less than the recommended 70%.

Discussion

Dressing preparation

Communication between the nurses and the patients was deficient. Communication constitutes an important part of the quality of nursing care, and predominantly influences patient satisfaction, is a core element of nursing care and a fundamentally required skill. Without communication, patients cannot relate to healthcare professionals, make their needs and concerns known, or make sense of what is happening to them. They are also excluded from the formulation of their health plan, the decision-making process and the application of evidence-based practice. The positive results of effective communication are well documented, and are essential in achieving increased recovery rates, a sense of safety and protection, improved levels of patient satisfaction and greater adherence to treatment options. Aside from these, successful communication through a patient-centred approach also serves to reassure relatives that their loved ones are receiving the necessary and appropriate treatment.

It is accepted that good preparation shortens the dressing change process. None of the fluids were intentionally heated by the nurses in this study. The application of a cold cleansing solution can reduce the surface temperature of the wound. It was found in experimental studies on human wounds that if they were cleansed with an ambient-temperature solution (a mean of 29°C), this led to a 2°C drop in the wound temperature, resulting in a mean temperature of 32.6°C, i.e. below the targeted 33°C. Maintaining optimum wound temperature helps to increase blood flow to the wound bed, enhances the rate of gain of wound tensile strength, and increases oxygen tension, all of which aid wound repair and help to prevent uncontrolled bacterial proliferation, thereby reducing the risk of infection.

The relationship between poor hand hygiene and infection risks has been well documented. Most hospital-associated infections are thought to be transmitted by the hands of healthcare workers. Compliance with hand washing recommendations is estimated to be between 29% and 50%. A PI of 62% was obtained in this study in this regard.

Integrity is defined as a state of wholeness, as it gives individuals a sense of being in control of their life. In health care, the concept of integrity is often understood as occupying a personal and/or territorial space, and as the right to a private sphere in relation to the physical and/or psychological aspects of the person. The PI achieved in this regard was 73%, a good quality assessment.

Assessment and diagnosis

A comprehensive assessment forms the cornerstone of the meaningful planning of wound care, and the ability to determine whether or not the wound treatment has been effective. It has been shown in the literature that if the assessment is poor, the documentation of that assessment will also be poor, leading to poor patient outcomes. The PI in this regard in this study was a mere 11%, indicating a clear gap in current practice.

The TIME framework is a useful tool with which to deliver wound care education to nurses and can contribute significantly to improvements in wound care practice. In this study, the PI was 0% for the use of TIME to describe the appearance of the wound bed, and 9% for identifying and managing the elements of TIME. This indicates a weakness in the management of burn wounds, highlighting this as an area requiring further development in the future.

The size of the wound is used to establish the need for fluid resuscitation, the calculation of fluid requirements, nutritional support and the evaluation of prognosis (in other words, morbidity and mortality), and is also very important in monitoring the healing process. The PI obtained for describing the wound and its size during the observations was 67%. Although assessments were not routinely carried out, participants acknowledged the size of the wound, and indicated that the estimation was performed by the doctors in the ward.

Despite advances in burn care, inadequate burn pain management still exists. The effect of burn pain lingers long after the wounds have healed. Burn pain is amongst the most common causes of distress during the first year after discharge. Even though pain control was not greater than 70% PI, a score of 66% was one of the better managed aspects of the wound management process. Pain is subjective and is experienced differently by people. It is therefore imperative that nurses communicate with patients to get an understanding of their experience of pain. The PI percentage for the consideration of patients’ pain complaints was 72.60%. This is an indication of a quality assessment. Thus, consideration of pain was one of the areas that nurses performed best in the process of wound management.

Dressing execution

The PI obtained for dressing execution in the study was 54%. Instruments, equipment, furniture and supplies were cleaned and decontaminated before and after use. Active warming of the room was not performed. However, the doors and windows were closed to minimise airflow and to indirectly maintain the room temperature.
was revealed during the observations that the “dirty” material was kept separate from the clean or aseptic field, earning a PI of 77%. As the score was above the 70% parameter, this was a quality assessment. However, a PI of only 67% was allocated with regard to the aseptic technique being maintained throughout the procedure. The low PI percentage was owing to the fact that a clean procedure was used, as opposed to a surgically clean or sterile technique. Non-sterile gloves were used as the gloves of choice and the use of non-sterile dressings, accompanied by previously opened ointment and cream. Non-sterile water was used to clean the wounds.

The most commonly used solutions were normal saline and tap water. However, the choice of cleaning solution is still largely based on preference and the experience of the doctor. The type of solution used was not prescribed in 81% of the observations. A possible explanation for this was that the choice of cleaning solution was determined by a standing order (prescription), or that the choice was based on doctor preference. The PI obtained in this regard in the study was a mere 9%.

Any action to be undertaken needs to be predetermined and planned in order to limit the risk of contamination. Planning ensures that a logical sequence is followed throughout the procedure. In the clinical setting, wound dressing techniques are still largely taught using a procedural approach through a series of sequential steps in the absence of adequate rationale for such steps. It is well documented that in many instances, the practices incorporated in performing wound dressings are ritualistic, rather than evidence based. This tendency to adhere to ritualistic practice may stem from a fear of change owing to lack of knowledge, rather than unwillingness to change. A PI of 78% was allocated for following a logical sequence in this study, indicating a quality assessment.

Outcome and evaluation

Documentation is a requirement of nursing practice. The main benefit of documentation is to enhance the improvement of the structured communication between healthcare professionals to ensure the continuity of individually planned patient care. Documentation facilitates a review and evaluation of the efficacy of care. Despite the nursing process first being described in 1958 and the concepts being widely accepted, the PI obtained for documentation in this study was 0% as the nursing process was not reflected in the documentation at all.

The TIME framework was developed as a systematic approach to wound management. In this study, the TIME framework was not reflected in the documentation, so a PI percentage of 0% was allocated in this regard. Overall, despite its popularity in the literature, the TIME framework was not applied by the nurses when attempting to describe the wound bed (a PI of 0%), nor with regard to identifying and managing the elements of TIME, when making an assessment and diagnosis of the burn wound (a PI of 9%).

Burn patients are cared for by a multidisciplinary team. The Wound Healing Association of Southern Africa (WHASA) WHEEL is a concept which has been developed to demonstrate the impact of interspecialty cooperation for the ultimate benefit of patients with wounds. It has been demonstrated in numerous studies that utilisation of the WHASA WHEEL resulted in improved outcomes. A PI of 62% was obtained in this study with regard to the referral pathways.

Conclusion

Communication between nurses and patients was ineffective in this study, resulting in a PI of 18% being obtained for nurses introducing themselves to patients, and 14% for providing patients with an explanation of the procedure to be carried out. Failure by the nurses to heat the cleaning solution prior to its application and to wash their hands was also identified as areas needing improvement.

The nurses effectively prepared material for the dressing before the procedure and maintained their patients’ integrity. With respect to assessment and diagnosis, the nurses scored below the 70% mark required for a quality assessment. The lowest scores obtained was for not using the TIME framework. This indicates that the framework has not been adopted as a frame of reference for the management of burn wounds in the observed setting. Satisfactory scores were realised for certain elements of the dressing execution, namely the aseptic field being maintained, a logical sequence being followed throughout the procedure, and consideration being given to complaints made by patients about their pain. However, an identified gap in competence pertained to the nurses not preparing the environment properly, failing to open packages aseptically, not checking expiry dates, and using an inadequate cleaning technique. This means that the way in which the dressing changes were performed could increase the risk of infection, compromising patients’ healing and recovery process, thus resulting in a longer hospital stay. The nursing process was not documented and the TIME framework not used, suggesting the need for a more structured approach to reporting on dressing changes. The referral pathways, while performed, obtained a PI of only 62%, below the benchmarked score of 70% for quality.

These results indicate a need for guidelines on the management of burn wounds by nurses.

Conflict of interest

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