

NURSES' KNOWLEDGE AND COMPETENCE IN WOUND MANAGEMENT

Background: The literature indicates that nurses' knowledge in wound assessment is insufficient to inform practice and if knowledge is present it is not reflected in clinical practice. The competence required to perform wound care assessment and management is context-dependent, incorporating the nurse's ability, the task to be performed and the setting in which it is completed. A correlation between knowledge and competence is said to exist, however no studies were sourced that examined knowledge and competence in wound assessment and management. **Aim:** To explore nurses' knowledge and competence in wound assessment and management in the acute hospital setting. **Method:** A descriptive quantitative design was used. Data were collected from 150 nurses via a researcher-designed questionnaire. **Results:** Findings indicated that knowledge of the parameters of wound assessment were very good. Statistically significant correlations were found between knowledge and wound assessment competence in respondents who had updated their wound care knowledge in the previous two years. Findings also suggest that the more wounds treated per week significantly impacted on competence but not on knowledge. **Conclusions:** Nurses' general knowledge in relation to wound assessment was very good contrasting with findings in previous research. However, a large number of nurses rated their competence in relation to wound assessment on the lower end of the scale. When nurses had updated their knowledge on wound care in the previous two years application to practice was significantly enhanced. **Conflict of interest:** None.

Wound care affects all patients from neonates to the elderly encompassing all specialities. The best practice statement, *Optimising Wound Care*, states that 'any patient with a wound has a right to expect a good minimum standard of care regardless of the aetiology of their wound, where the care is delivered or by whom' (Wounds

UK, 2008). Therefore, clinicians who care for patients with wounds are responsible for ensuring that their practice is of the highest standard.

KNOWLEDGE OF WOUND ASSESSMENT

The literature states that nurses require a range of knowledge sources to underpin

KEY WORDS

- ▶▶ Acute nurses
- ▶▶ Competence
- ▶▶ Knowledge
- ▶▶ Education

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KEY POINTS

- ▶ Nurses require a range of sources to underpin clinical practice, including empirical, aesthetic, personal and tacit knowledge
- ▶ Appropriateness of practice is influenced by how the nurse interprets, integrates and applies knowledge in practice. The measure of this is competence
- ▶ Wound assessment is essential to systematically formulate a plan of care within a broader framework of holistic assessment, which incorporates total patient assessment as well as assessment of the wound
- ▶ The findings suggest that the knowledge of wound assessment and management is considerably higher than has been previously reported and supports more recent research
- ▶ Nurse's rated their competence as moderate in relation to wound assessment despite evidence of a good knowledge base of the parameters of wound assessment
- ▶ Education in wound care is associated with increased perception of self-assessed competence and wound assessment knowledge

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clinical practice. Sources include empirical, aesthetic, personal and tacit knowledge (Moule and Goodman, 2009). Empirical knowledge is a pre-requisite in the provision of evidence-based practice. It is gained through enquiry from research and may be deductive, implying that there is a theory or knowledge base already in existence, or inductive where an attempt is made to develop theory. However, knowledge gained from experience and reflective practice enhances personal knowledge and practice (Benner, 1984; Evans and Donnelly, 2006).

Wound care is a relatively new and developing area of expertise compared to other nursing specialties and in essence offers an extra challenge to nurses to extend their knowledge base and develop the expertise in evidence-based wound care.

Flanagan (1994) identifies the physiology of wound healing (phases of healing), the intrinsic and extrinsic factors that affect healing, and accurate assessment of the wound as the parameters necessary to establish baseline information. Young (1997) suggests that assessment is essential to systematically formulate a plan of care within a broader framework of holistic assessment, which incorporates total patient assessment as well as assessment of the wound. To support this, nurses need to have a basic understanding of the physiology of wound healing and the factors that influence it (Harrison, 2006; Benbow, 2009).

The literature suggests that nurses' knowledge in wound assessment is insufficient to inform practice (Hadcock, 2000; Hollinworth et al, 2008; Barrett et al, 2009). Conversely, other literature suggests that the knowledge base is good, although the knowledge is not reflected in clinical practice (Maylor and Torrance, 1999; Ayello et al, 2005). There is evidence that nurse's knowledge base has improved over the past decade (Ashton and Price, 2006), however, ritualistic practice continues (Hadcock, 2000; Hollinworth, et al, 2008). The reasons for the disparity are not clear. Lack of standardisation in wound education and the diversity/complexity of wound aetiologies and treatments have been offered as possible explanations (Hadcock, 2000; Hollinworth, et al, 2008). Attitude and motivation on behalf of the

individual/organisation or the confidence or competence required to implement best-practice have also been cited as possible barriers to the implementation of evidence-based practice (Ashton and Price, 2006; Benbow, 2008).

COMPETENCE

Appropriateness of practice is influenced by how the nurse interprets, integrates and applies knowledge in practice. The measure of this is competence. Competence is multifaceted and its complexity is well described (Cattini and Knowles, 1999; An Bord Altranais, 2009). There is evidence that competencies can be interpreted in different ways, may vary between nurses in different care settings (Meretoja et al, 2004) and that standards of care vary accordingly.

There is recognition that observation of performance alone is not sufficient to measure competence as it does not allow for the contextualisation of the decision-making, judgement and evidence base, which forms the basis for the performance (Epstein and Hundert, 2002; McLean et al, 2005; Evans and Donnelly, 2006).

Nurses in some care settings have found wound assessment and management challenging (Hadcock, 2000) and there is evidence that factors such as length of time spent in particular care settings and length of nursing service impact positively on the development of competence in delivery of wound care (Zulkowski, et al, 2006). This supports Benner's (1984) framework on competencies, where nurses grow in competence as they move from novice to expert (Ayello, et al, 2005).

Ostensibly this assumption has been contested by other researchers (Boxer and Maynard, 1999; Maylor and Torrance, 1999) who argue that this assumption has not been demonstrated in the literature. Despite the plethora of published literature on wound management there is a lack of data on the exploration of nurse's knowledge of the parameters (physiology, tissue classification) of wound assessment, which underpin the management of wounds healing by secondary intention. There is also paucity of self-assessed competence in wound assessment. The application of knowledge to practice also requires further exploration.

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This paper presents findings on nurses' knowledge and competence in the assessment and management of wounds healing by secondary intention in an acute Irish healthcare setting.

METHODS

A quantitative, descriptive design was chosen to objectively measure, describe and document nurse's knowledge of the parameters used in wound assessment and management, and to explore if knowledge and competence influence wound assessment and management. In addition, the design chosen allowed for the exploration of the relationship between variables, such as the impact of wound management education on knowledge, competence and application to practice in wound assessment and management.

A questionnaire was developed based on the literature review and previous research by Ashton and Price (2006). The questionnaire contained four sections and included both open and closed questions and a vignette incorporating a photograph (*Figure 1*) and case study. Questions in the various sections included:

- ▶▶ In the last two years, have you had the opportunity to update your knowledge on wound management?

- ▶▶ How many wounds would you treat per week?
- ▶▶ How many of the patients in your caseload have a wound healing by secondary intention?
- ▶▶ Do you assess pain in wound management?

Section 1 detailed the sample characteristics and demographic data. Section 2 examined wound management background and education specific to wound management.

Section 3 sought information on the participants' wound assessment knowledge. The parameters used in wound assessment — wound measurement, pain evaluation, physiology of wound healing (phases), treatment objectives based on wound-bed classification, factors inhibiting healing, infection and product knowledge — were explored. The final question aimed to determine nurses' perception of their competence in wound assessment. This required the participants to rate their perceived level of competence in relation to wound assessment on a Likert-type scale (Range 1–10, with 1 being the lowest level of competence).

Section 4 comprised a vignette with the accompanying photograph and questions to determine if knowledge was applied to practice. A case study was presented to provide the participants with background information on the patient and wound.

Validity and reliability

The instrument was examined for clarity and relevance to the research question by a clinical nurse specialist (CNS) in wound care and a registered nurse (RN). It was then piloted using a sample of five nurses with varying levels of experience in wound care including RNs from medical, surgical and outpatient units. Pilot results revealed a degree of ambiguity in relation to the question on pain assessment. Accordingly the question was restructured and clarified so that the nurses were able to provide a more nuanced answer.

Sample

Convenience sampling was used and participants were recruited based on the following criteria:

- ▶▶ Full-time and part-time RNs with at



Figure 1: The case study photograph included in the questionnaire.

‘Despite the plethora of published literature on wound management there is a lack of data on nurse’s knowledge’

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Table 1
Respondents’ demographic information

	Frequency (n)	Percentage (%)
Education		
RGN	132	91
Certificate	13	9
Diploma	53	36.6
Degree	77	53.1
Masters	7	4.8
Other	18	12.4
Hours Worked		
Full-time	111	76.6
Part-time >20	25	17.2
Part-time <20	9	6.2
Years in Clinical Practice		
1-5 Years	31	21.4
6-10 Years	47	32.4
>10 Years	67	46.2
Years in Current Clinical Setting		
<1 Year	12	8.3
1-3 Years	52	35.9
4-6 Years	29	20
>6 Years	52	35.9
Age Group		
20-25	15	10.3
26-30	48	33.1
31-35	28	19.3
>35	54	37.2
Type of Clinical Setting		
Medical	60	41.4
Surgical	40	27.6
Unit	45	31

Table 2
Wound management knowledge and practice

	Frequency (n)	Percentage (%)
Post-graduate qualification in wound management		
Yes	10	6.9
No	135	93.1
Updated knowledge in last two years		
Yes	56	38.6
No	89	61.4
Who is expert?		
Clinical nurse specialist	125	86.2
Other nursing colleagues	69	47.6
Hospital consultant	32	22.1
I have a special interest in wounds	24	16.6
Registrar/senior house officer	12	8.3
No recognised expert	11	7.6
Company representative	6	4.1
Other	1	0.7
Wounds treated per week		
<5	86	59.3
6–10	41	28.3
11 or more	18	12.4
Patients with secondary intention wounds		
<5	112	77.2
6–10	26	17.9
11–20	5	3.4
21 or more	2	1.4
Wound measurement		
Yes	107	73.8
No	34	23.4

‘Nurses in some care settings have found wound assessment and management challenging’

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Table 3
Best source of information (ranked)

	Mean	Median	Standard dev
Specialist nurse	1.52	1.0	.89
Surgeon/physician	3.08	3.0	1.38
Own knowledge	3.74	4.0	1.49
Guidelines	3.80	4.0	1.68
Registrar/senior house officer (SHO)	4.21	4.0	1.38
Local procedure book	4.85	5.0	1.30
Other	6.29	7.0	1.76

least one year's clinical experience from all wards/units and outpatient departments in an acute general hospital.

An acute general hospital was chosen as the setting as it met the objectives of the study. The site provided a sufficient pool to recruit the sample (Polit and Beck, 2006). Subjects were invited to take part through a participant information leaflet. Formal ethical approval was sought and granted from the Clinical Research Ethics Committee.

Data analysis

Data were stored, analysed and presented using the Statistical Package for Social Sciences (SPSS). Descriptive and inferential statistics were used to describe, explain and summarise the data.

RESULTS

Sample characteristics and demographic data

Of the 150 questionnaires distributed, 145 were completed and returned, which yielded a response rate of 97%. Forty-three percent of participants were aged between 20–30 years. The majority of participants (76.6%) worked full time and 78.6% had more than six years' clinical experience. Fifty-three percent (n=77) had a degree in nursing and 17% (n=20) held a Masters degree or a higher level university qualification (Table 1).

Wound management and associated education

Thirty-nine percent (n=56) of participants had updated their knowledge in wound care in the previous two years, of which 22% (n=32) reported attendance at conferences and 23.6% (n=34) informal

study sessions lasting less than two hours (Table 2). Just 7% (n = 10) of participants had achieved a post-graduate qualification in wound care. Fifty-nine percent (n=86) were treating less than five wounds per week, while 12% (n=18) treated more than 11 wounds on a weekly basis and 28% (n=41) treated between 6–10 wounds.

The majority of wounds (77%; n=112) treated healed by primary intention. Eighty-six percent of participants reported that the CNS was the expert in wound care while other nursing colleagues ranked second at 47% (n=69) (Table 3). Hospital consultants were recorded as being experts by 22% (n=32) of participants. Only 8.3% (n=12) recorded the non-consultant hospital doctors as experts, while 4.1% (n=6) recorded the company representatives as experts.

With reference to published guidelines on wound care, 10% (n=15) referred to the *National Best Practice and Evidence-based Guidelines* (Health Service Executive, 2009). Eleven percent (n= 16) reported using the wound care resource folder on their ward and 5% (n=7) referred to the National Institute of Clinical Excellence (NICE) or *Wound Management Guidelines* (Kelly, 2007).

Wound assessment and knowledge

Ninety percent of participants reported that they measure wounds in a variety of ways (Table 4). Whether or not they provided pain assessment was measured using a Likert-type scale, with three graded options ('Never', 'Sometimes', 'Routinely'). The majority of respondents reported that they assessed pain routinely (81%, n=117). A further 15% (n=22) recorded that they sometimes assessed pain while performing wound assessment. A pain assessment tool was used by 82% (n=118) of participants. Of those who did not use a pain assessment tool (18%, n=26), the most used method of pain assessment was asking the patient (n = 21) and observing body language. Only 4% (n=6) reported that they did not assess pain.

Participants who identified that necrotic tissue was not in the proliferative phase of healing (wound physiology) accounted for 94% (n=136). Participants were asked if granulation tissue occurred in the proliferative phase of wound healing and 95% (n=137) answered this question correctly.

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The final question on wound physiology sought to identify if slough, granulation and epithelial tissue occurred in the acute inflammatory phase of healing. There was a marked reduction in the number of correct answers to this question (46%, n=67). Forty percent (n=58) answered this question incorrectly and a further 14% (n=20) answered 'don't know'.

Participants were then requested to identify objectives of treatment for specific wound types. The most common objective chosen for the necrotic wound was debridement (51%, n=70), followed by rehydration and debridement (36%, n=50). Protection was recorded by 5% (n=7) and rehydration by 2% (n=4).

The main objective of treating a granulating wound is to provide a moist wound environment and 44.1% (n=64) answered this question correctly. Conversely 26% (n=37) reported that decreasing the bacterial burden was the main treatment objective. The majority of respondents (84%, n=122) identified correctly the factors that contribute to delayed wound healing.

Participants' knowledge on the correct progression of bacterial growth in a wound was also answered correctly by 82% (n=119) of respondents. A similarly high rate of correct answers was recorded (88%, n=126) for the question asking about the main treatment objective in a wound colonised with Methicillin-resistant *Staphylococcus aureus* (MRSA). Respondents were asked to identify passive and interactive dressings. In keeping with the previous questions the majority of respondents identified both correctly.

Application of knowledge to practice

A vignette was used to identify if knowledge was applied to practice. This included a case history and photograph of a wound on which questions were based. The first question asked that participants identify the phase(s) of wound healing shown in the photograph. The correct phases were identified by 38% (n=54) of the participants and one phase was identified by a further 42% (n=61 — 32 participants correctly identified 'destructive'; 29, correctly identified 'proliferative'). Forty-nine percent (n=68) identified both tissue types.

Table 4
Wound assessment practice

	Frequency (n)	Percentage (%)
<i>How do you measure the wound?</i>		
Ruler	26	20.8
Tape	43	34.4
Tracer	44	35.2
Incorrect answer	12	9.6
<i>Why do you measure the wound?</i>		
Establish baseline	28	22.4
Monitor progress	94	75.2
Incorrect answer	3	2.4

Participants were requested to state whether or not they believed if the wound was infected. All but one participant answered this question, of which 63% (n=91) stated that it was infected and 37% (n=53) answered correctly that the wound was not infected.

Participants were asked to suggest treatment objectives based on the wound appearance and history. A range of answers were proffered that were appropriate for this wound, which included donating moisture to aid debridement of slough and providing a moist wound environment to promote wound healing. Other objectives included protection and absorption. However, 25% (n=36) of participants suggested reducing the bacterial burden in the wound despite a lack of evidence to suggest that this wound was burdened with bacteria.

Participants were requested to recommend dressings/therapies to support wound healing. Negative pressure wound therapy (NPWT) would be considered a first-line choice in the management of such an extensive wound and 14% (n=20) of participants chose NPWT to treat this wound. Dressings incorporating Hydrofiber® Technology (ConvaTec) and hydrogels were the next most frequently chosen, both of which were appropriate in this case.

However, 48% (n=70) of participants' answers were not appropriate first-line choices, including non-adhesives (n=35), saline-soaks (n=15), paraffin gauze (n=7) and antimicrobials (n=16). Only 1% (n=2) of participants suggested larval therapy as

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'Pain has been described by patients with chronic wounds as the most distressing factor in wound care'

an appropriate intervention and a further 1% suggested antibiotic therapy.

Competence in wound assessment

Findings revealed that nurses rated their competence as moderate in relation to wound assessment, despite evidence of a good knowledge base. However, a high percentage (40%) rated their competence on the lower end of the scale (<4; range 1–10).

Certification in wound management, i.e. enhanced knowledge, was significantly associated with self-assessed competence in wound care ($p<.001$) and wound assessment knowledge ($p = .010$). This finding illustrated that participants ranked their self-assessment of competence higher when they had updated their wound care knowledge in the previous two years.

In addition, application of knowledge to practice was enhanced ($p<.001$) when nurses had updated their knowledge in wound care in the previous two years. Furthermore, findings indicated that there was a positive and significant association between the numbers of wounds treated per week and self-assessed competence ($p=.001$). Interestingly, the actual knowledge scores did not display a similar significant positive trend.

DISCUSSION

Wound assessment knowledge

The findings suggest that the knowledge base of this sample was considerably higher than has been previously reported (Hadcock, 2000) and supports more recent research, demonstrating that nurses know a considerable amount about wound care, especially older more experienced nurses (Ayello et al 2005), and that this has improved over the past decade (Ashton and Price, 2006).

The ability to accurately measure wounds is a necessary parameter that provides baseline information from which progression to wound healing can be monitored (Flanagan, 2003). Wound measurement also facilitates effective decision-making and can aid predictive outcomes for the patient. The majority of nurses (75.9%, $n=107$) surveyed were performing wound measurement with an appropriate underpinning rationale.

Pain has been described by patients with chronic wounds as the most distressing factor in wound care (Price, 2005).

However, results from an international study exploring clinicians' understanding of pain at dressing change indicate that pain assessment was considered a low priority and more emphasis was placed on observing body language (Moffatt et al, 2002). Furthermore, Young et al (2006) postulate that the absence of a valid pain assessment tool contributes to the mismanagement of pain by clinicians. This finding was confirmed by Bell and McCarthy (2010).

The introduction of a pain assessment tool in the site where this study was conducted has had a significant impact on the assessment of pain in wound care. The current research indicates that pain assessment in wounds is considered a high priority, with over 80% of nurses routinely assessing pain during wound assessment using a validated pain assessment tool.

Findings on wound physiology suggested that respondents had good baseline knowledge in relation to identifying tissue type within the correct phase of healing. This supports findings by Maylor and Torrance (1999) that nurses' knowledge base on physiology is generally good. Questions that related specifically to one tissue type per healing phase ranked highly. However, when more than one tissue type was suggested for a phase of healing, only 40% ($n=58$) of respondents answered this question correctly. Workshop education with the use of case studies and wound assessment tools could help to address this deficit.

Results indicate that respondents have a good general knowledge of the objectives of treating wounds based on tissue classification. This is noted particularly in necrotic wounds and those colonised with MRSA. Conversely, providing a moist wound environment for a fully granulated wound was only chosen by 44.1% ($n=64$) with a further 18.6% ($n=27$) suggesting rehydration (a reasonable second choice).

There are numerous publications promoting moist wound healing as the 'gold standard' in providing the optimum environment for wound healing (Winter, 1962; Sibbald et al, 2007), yet despite this

the concept of moisture at the wound interface remains poorly understood (Benbow, 2008).

One finding of concern is that 25.5% (n=37) of participants chose decreasing the bacterial burden as the main objective in treating a granulating wound. This was a surprising finding as one would expect that clean granulating wounds are relatively straightforward to manage. The reason for this finding remains unclear.

Competence in wound assessment

As mentioned above, the findings reveal that nurses rated their competence in relation to wound assessment as moderate. A high percentage rated their competence on the lower end of the scale.

While it is recognised that self-assessment of competence is a subjective measurement and observation may provide a more objective measurement, Evans and Donnelly (2006) suggest that observation of performance places an over-reliance on the completion of the task without an understanding of the critical-thinking and decision-making that is involved.

When age was compared to knowledge and competence a slight downward trend was observed in relation to older nurses' knowledge. This was not statistically significant. Respondents who treated more than five wounds per week ranked themselves higher on self-assessed competence and there was a significant positive correlation between competence and number of wounds treated.

However, this has been highlighted in previous research (Meretoja and Leino-Kilpi, 2003), where findings indicated that greater exposure to a task equated with increased competence in its completion. Interestingly, the actual knowledge scores in this study did not display a similar significant positive trend in those with greater exposure to wound care. As with self-assessed competence, one might have expected that wound care knowledge would have increased when assessing and managing more wounds.

Although Meretoja et al (2004) attest that self-assessed competence is too subjective a measure of competence, the authors of this report believe that self-assessment

offers the opportunity for clinicians to reflect and identify specific objectives for enhancing their professional practice that might not be apparent through observation. Significant correlations were found between competence and knowledge and this is a significant finding as they have not been previously explored in a single study.

Strengths and limitations of the study

For the purpose of this study the researcher designed the questionnaire based on the literature reviewed. It is acknowledged that using a new questionnaire has implications for the results. To reduce the limitations and increase the validity of the tool a pilot study was conducted. Further use of the instrument to increase its validity and reliability is recommended.

A second limitation exists in collecting a convenience sample, as those who volunteered to participate were self-selected. Therefore, it could be argued that the motivation and interest in the subject or the personal attributes of the participants could bias the findings (Parahoo, 2006).

The target population for this sample was also relatively heterogeneous and may not represent all RNs, such as those practising in nursing homes or community settings, reducing the generalisability of the findings. However trends recognised within this research may be representative of the acute setting and are worthy of further exploration.

CONCLUSION

Findings in this study indicate that the knowledge of the parameters of wound assessment among acute nurses is very good. However, this knowledge is not always applied to practice.

The majority of participants rated themselves as moderately competent in wound assessment. However, participants who had updated their knowledge in wound care perceived themselves as more competent in wound assessment with an improved application of knowledge in practice. A key recommendation of this study, therefore, is for an increase in wound care education among nurses working in acute hospitals. **WUK**

‘One finding of concern is that 25.5% of nurses chose decreasing bacterial burden as the main objective in treating a granulating wound’