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Preferences of patients, doctors, and nurses regarding wound dressing characteristics: A conjoint analysis

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ABSTRACT

The different choices doctors, nurses, and patients make regarding wound dressing materials are generally based on personal preferences, because strong evidence and guidelines on local wound care for open wounds are lacking. We studied which attributes of a wound dressing doctors, nurses, and patients consider the most important. A conjoint analysis questionnaire comprising paper-based descriptions with six attributes, and questions regarding the willingness-to-pay for these attributes were sent out to surgical patients, (assistant)-surgeons and nurses. Preferences for wound dressing attributes were similar for doctors ($n=50$), nurses ($n=150$), and patients ($n=74$). Pain during dressing changes, duration of hospitalization, and wound healing time were ranked highest. Doctors would spend more money on a shorter hospitalization, nurses on pain reduction, and patients on quicker wound healing. Patients were willing to pay a relatively small monthly amount out of pocket for a dressing that would result in a quicker and less-painful wound healing. Doctors, nurses, and patients prefer similar attributes of wound dressing materials, but differ in their willingness-to-pay. To achieve a more consistent local wound care, clinical decision-making should be in accordance with these preferences. These should also be the focus for manufacturers and researchers to obtain more evidence on which materials best match these attributes.

Local wound care is an integral part of treating (chronic) wounds. Nowadays it is acknowledged that this should generally comprise wound bed preparation in terms of debridement of nonviable tissue, infection control, moisture regulation, and wound edge protection (the “TIME”-concept),^{1,2} including the choice of an appropriate dressing. In daily wound care, doctors and nurses face a wide variety of dressing materials when treating patients with wounds. Guidelines or high-level evidence are lacking as to which dressing should ideally be applied to these wounds.^{3–5} Subsequently, personal preferences play an important role in the choice of dressings, leading to inconsequent wound care. In addition, the different characteristics of each dressing contribute to the large variation in wound care.

Those primarily involved in wound care (doctors, nurses, and patients) may prefer different characteristics of dressing materials. Disagreement or conflict between them, especially regarding patients with slowly healing wounds or wounds healing by secondary intention, is seen in many centers.^{6,7} For example, doctors in some centers desire daily wound inspection and therefore prefer a relatively inexpensive gauze dressing. Nurses may prefer a less-adherent dressing, which reduces pain during dressing changes. Patients, in turn, when dismissed from the hospital, may have to depend on the help of a community nurse, and might therefore prefer a dressing that can stay on the wound for several days. Despite these apparent

differences, it is unknown what the actual preferences are for each group regarding the choice of wound dressing materials and what they would be willing to pay for such an “ideal” wound dressing.

In this study, we investigated the preferences of doctors, nurses, and patients regarding local wound care in a clinical setting in order to determine the relative importance of the various dressing-related attributes, and to identify any differences among these three groups. We also studied their willingness to pay for an “ideal” dressing as compared with the standard, gauze-based dressings as a specific way to assess the relative importance of these attributes in relation to the budget. A better insight in preferences and differences, especially when these preferences converge, will help in arriving at a more consistent and rational choice of dressing materials and, eventually, at a guideline for local wound care.

METHODS

Setting and participants

To assess the preferences and willingness to pay for essential attributes of wound dressings and especially for wounds with significant importance (slow healing wounds, or wounds healing by secondary intention), the study was

conducted on six (five general and one plastic) surgery wards of the Academic Medical Centre, a tertiary teaching hospital. Three stakeholder groups, i.e., doctors (surgeons and surgery residents), (registered and student) nurses working on these wards, and patients, were asked to contribute during the first half of 2005. Patients were eligible if they were discharged with an open wound between January and June 2005, were capable and consented to fill out a Dutch questionnaire.

Conjoint analysis questionnaire

Several ways exist to assess dressing preferences. To determine the relative importance of various attributes of these dressings, factorial conjoint analysis (CA) is a well-established method of electing consumer preferences in market research,⁸ and is being applied increasingly throughout the surgical, nursing, and social sciences.⁸⁻¹² It derives preferences by asking respondents to rate descriptions (vignettes) of goods by its characteristics (or attributes). The technique is based on the assumption that any good or service can be described by its characteristics and that the extent to which an individual values a good or a service depends on the levels of these characteristics.⁸ With the resulting preferences, one can identify which attribute most strongly drives the choices nurses and doctors make regarding the patients' treatment. This knowledge is important in present day evidence-based medical decision making. In addition to CA, the willingness to pay (WTP) for these attributes can be assessed simultaneously.^{8,13,14}

To perform this CA we first identified the attributes for an ideal wound dressing. We derived three attributes ("wound healing time," "pain," and "costs") from the Cochrane Wounds Group, which have listed the most patient-relevant outcomes for wound research.¹⁵ Another three attributes ("change frequency," "hospitalization," and "independency as to wound care") were derived from group discussions with surgeons and nurses involved in wound care and are also pertinent issues discussed in the literature on wound care.¹ This resulted in six attributes highly relevant to an ideal wound dressing. Next, we assigned two or three levels to these attributes: (a) long or short wound-healing time, (b) high or low frequency of dressing change, (c) considerable or little pain during dressing changes, (d) high or low costs of wound care, (e) long or short duration of hospitalization, and (f) dressing changes by the patient, a proxy, or district nurse.

By means of an orthogonal main-effects design, 18 paper-based descriptions were randomly chosen from the 96 possible descriptions.¹⁶ With this technique, the independent effect of each attribute on the appreciation score is estimated, although it does not allow evaluation of interaction effects between attributes. The participants rated their preferences for each description on a 10-point scale, ranging from 0 ("least ideal dressing") to 10 ("most ideal dressing"). To avoid an effect of the order of the descriptions on the response, the order was changed in each group.¹⁷ A (translated) example of such a description is shown in Table 1.

We also added four monetary or budgetary trade-off questions. The first was meant to investigate the relation between type of dressing and costs. We asked doctors and nurses how many patients they were willing to treat with

Table 1. Example of a case description

Suppose a new dressing material is introduced to treat open wounds.										
The attributes of this dressing are as follows:										
Time needed to complete wound healing:	Short									
Pain during dressing change:	Considerable									
Frequency of dressing changes:	High									
Costs of wound care:	Low									
Required duration of hospitalization:	Short									
Help needed for out-patient wound care:	None									
How ideal do you judge this combination of attributes of this dressing material?										
Encircle your answer:										
	1	2	3	4	5	6	7	8	9	10
Least ideal										Most ideal

inexpensive gauze-based or the more expensive occlusive dressings when allowed the yearly hospital budget for dressing materials of 500,000 Euros. In this case, we assumed that wound care using modern, occlusive dressings is approximately twice as expensive. The wording of this question is shown in Table 2. In the second trade-off question, doctors, nurses, and patients were asked to divide 1,000 Euros among the five noncost-related dressing attributes. The cost attribute was obviously not included in this budget question. Thus, we were able to rank the importance of the attributes according to the three participating groups' willingness to pay for these attributes, and to compare this with the rating as derived from the case descriptions. Given the importance of costs in healthcare (about 20% of health care costs are paid out of pocket in the United States¹⁸ and in Europe health insurance companies tend to reimburse only basic care), we also formulated two monetary questions to assess patients' willingness to pay out of their own pockets (Table 3). The first focused on how much money patients were willing to pay monthly out of pocket until their wound had completely healed. The second question addressed their willingness to pay for a 10% quicker wound healing, which would focus more on patients with chronic, slowly healing wounds. In order to relate the patient's willingness to pay to their financial status, his or her yearly gross income group was asked, i.e., below average (i.e., 29,000 Euros; the Dutch standard in 2005), between average and twice average, and above twice the average. The resulting data from these questions merely give an impression of what patients are willing to pay, as an exact amount in Euros suggests an unrealistic precision.

These 18 paper case descriptions and the four monetary or budgetary trade-off questions were sent out as an anonymous questionnaire to three stakeholder groups. To characterize each group, the questionnaires also included questions on personal characteristics (age, gender, and years of professional experience). The complete

Table 2. Budgetary case description for doctors and nurses

A	0 occlusive/500 gauze-based
B	50 occlusive/400 gauze-based
C	100 occlusive/300 gauze-based
D	150 occlusive/200 gauze-based
E	200 occlusive/100 gauze-based
F	250 occlusive/0 gauze-based

In your hospital the yearly budget for dressing materials is 500,000 Euro. With this budget 500 patients can be treated yearly, only if inexpensive gauze based dressings are used. You know that occlusive dressing materials are (commercially) available, which are more expensive, but reduce wound healing time and hospital duration. They also cause less pain during dressing changes. Because these occlusive materials are twice as expensive, you can treat only 250 patients with these dressings within the same budget. Alternatively, you could choose for a mix of patients treated with occlusive and gauze-based dressings. Below you find six trade-off options. Encircle the one you would prefer.

Table 3. Willingness-to-pay questions for patients

Question 1

Suppose you have to pay the dressing materials that are used for your wound care out of your own pocket. How many euros are you willing to pay monthly until your wound is completely healed? Please put a mark (x) on the line below. Watch the scale!

0 5 10 50 100 500 1,000 Euros

Question 2

Suppose you can get a better dressing material that will heal your wound 10% quicker. However, for this advantage you have to pay an out-of-pocket amount, how much (in Euros) are you willing to pay for this advantage? Please put a mark (x) on the line below. Watch the scale!

0 5 10 50 100 500 1,000 Euros

questionnaire was tested after a pilot study on a dermatology ward, again including doctors, nurses, and patients.

Doctors and patients received the questionnaire by mail and were personally reminded (by personal contact during outpatient clinic visits or by phone) several times if necessary. The patients received the questionnaire 2 weeks after leaving the hospital, to make sure they were capable of recollecting their period of wound care, during both hospitalization and the out-patient situation. The nurses were invited to attend presentations about this study on their wards and to fill out the questionnaire immediately

following the presentation. Nonattending nurses were contacted personally to fill out the questionnaire.

Analysis

The results were analyzed using a fixed effects linear mixed model analysis. Thus, the main effect of each factor as well as the differences between the three groups regarding their mean preferences could be estimated. First, we assessed whether the 18 vignettes varied sufficiently on the basis of their mean preference scores. Secondly, we established for each attribute whether there were significantly different preferences among the three groups.

The contribution of the six attributes was tested by means of the type 3 test of fixed effects. The effect size of each attribute was expressed as β -coefficient and its 95% confidence limit. By considering the individual respondents as random effects, we took into account the preference score originating from 18 repeated measurements.

Differences between the three groups regarding their budgetary trade-off questions were analyzed using the Mann–Whitney *U* test. All statistical analyses were performed using SPSS for Windows version 12 (SPSS Inc., Chicago, IL).

RESULTS

Of those who received a questionnaire, 50 of the doctors (86.2%), 150 (92.6%) nurses, and 74 patients (64.3%) completed their questionnaires. Characteristics of the three participating groups are summarized in Table 4.

CA

Only one case description never scored a zero (“least ideal”), while two never received a 10 (“most ideal”), indicating sufficient variability in preferences. The highest average scores were 9.55 (SD 0.78) in nurses, 9.80 (SD 0.45) in doctors, and 8.44 (SD 2.05) in patients. The lowest scores were 2.62 (SD 1.64), 2.4 (SD 1.25), and 3.11 (SD 2.10), respectively. The overall mean scores over the 18 case descriptions were 4.46 (SD 0.047) in nurses, 4.58 (SD 0.071) in doctors, and 4.53 (SD 0.074) in patients. All attributes significantly influenced the judgments of the case descriptions ($p < 0.001$).

The hierarchy of the attributes was similar in the three participant groups. Little pain during dressing changes, short duration of hospitalization, and quick wound healing were the most preferred attributes in the description scores (i.e., scored a high β -coefficient; see Figure 1). However, the magnitude of the preference for some attributes was significantly different among the groups ($p < 0.05$): Doctors had a stronger preference than nurses and patients for a short wound healing time. Doctors and nurses preferred a short duration of hospitalization more than the patients did, nurses had a stronger preference than patients for less pain and a lower frequency of dressing changes, and doctors appreciated self-care regarding dressing change higher than nurses. As this last attribute has three levels (self, proxy, or district nurse), this attribute is displayed twice in Figure 1; both times the reference standard is wound care by district nurse.

Table 4. Characteristics of doctors, nurses, and patients

	Doctors	Nurses	Patients
Number (%)	50 (18.3%)	150 (54.7%)	74 (27.0%)
Age; mean (sd)	35 (9.9)	33 (12.1)	56 (15.9)
Years of experience (median, iqr)	10 (4.8–16)	6 (1.5–20)	na
Professional background			
Surgeon (n, %)	22 (44%)		
Resident (n, %)	28 (56%)		
Registered nurse (n, %)		114 (76%)	
Student nurse (n, %)		36 (24%)	
Wound etiology			
Postoperative			52 (70.3%)
Trauma			9 (12.2%)
Arterial or venous insufficiency			6 (8.1%)
Diabetes			5 (6.7%)
Pressure sore			2 (2.7%)
Patients' gross yearly income			
< 29,000 Euros			38 (51.3%)
29,000–58,000 Euros			26 (35.1%)
> 58,000 Euros			5 (6.8%)
Missing			5 (6.8%)

SD, standard deviation; IQR, interquartile range; NA, not applicable.

Monetary outcomes

Three doctors and four nurses did not answer the trade-off question completely. More doctors preferred gauze-based dressing (trade-off: 100 patients with occlusive and 300 with gauze-based materials), whereas nurses preferred to treat less patients in total, but relatively more with the expensive occlusive dressings (trade-off: 200 patients with occlusive and 100 with gauze-based dressings) (Table 5). This difference was statistically significant ($p=0.009$).

On the basis of the ranking of attributes when asked to divide the 1,000 Euros among these attributes, the hierarchy was slightly but significantly different among the three groups (Table 6). Doctors spent the highest amount (mean: 275 Euros) on a short hospitalization, nurses on little pain during dressing changes (mean: 252 Euros), and patients on rapid wound healing (mean: 280 Euros). Independence in wound care and frequency of dressing changes were unanimously considered the least-important attributes.

Patients were willing to pay out of their own pocket a monthly median sum of 50 Euros (interquartile range: 10–100 Euros) until complete wound healing and the same amount (median 50 Euros; interquartile range: 2.50–70 Euros) for a more expensive wound dressing that would yield a 10% quicker wound healing. The gross income

group was filled in by 69 out of the 74 patients (93.2%). Patients' willingness to pay for these advantages was not significantly related to their income category.

DISCUSSION

This CA study shows that little pain during dressing changes, short duration of hospitalization, and quick wound healing were the most preferred attributes of an "ideal" wound dressing for local wound care. We found no important difference among doctors, nurses, and patients. The same attributes appeared to be of similar importance in monetary terms. The number-one attribute for doctors was a shorter duration of hospitalization, for nurses little pain during dressing changes, and for patients a quick wound healing. This difference in hierarchy is understandable as doctors are more focused on managerial tasks with budget responsibilities in which a shorter duration of hospitalization is always a hot issue. Nurses on the other hand feel more responsibility to stand for the patients' well being.

Knowing the most important attributes of an "ideal" dressing has an important clinical value for four reasons. First, patients' preferences can now be incorporated in clinical decision making, which is an acknowledged part of evidence-based practice, particularly when in want of high-level evidence. Second, the hierarchy can be used to explicitly balance different outcomes in the development of guidelines regarding dressing materials. Third, knowing these attributes is useful in selecting the most relevant outcomes in future wound research. Fourth, manufacturers of wound care materials should use this knowledge to focus their research and development of new dressings accordingly. At present, their main focus is on dressing-change frequency and on costs, whereas this study showed these attributes are not considered highly important to healthcare professionals and patients, who appear more sensitive to length of hospital stay, pain, and wound healing.

The method of analysis has been advocated as a valid and comprehensive method that directly focuses on the process of care provided in actual clinical practice.¹⁹ In the realm of local wound care, however, this study is the first application of CA to appreciate wound dressing preferences. It can help reduce the variation in practice, which is a widespread problem in health care. As preferences for the desired attributes of dressings appear the same, we can improve wound care by selecting the dressing that fits best to these preferences. However, one needs to realize wound care is more than choosing the optimal dressing material and should be part of an overarching approach, including wound bed preparation and systemic treatment as determined by the patient's condition and the etiology of the wound.¹

Nowadays, uniformity in care is pursued ideally on the basis of evidence derived from well-performed studies. Therefore, wound care can be improved not only by selecting dressings on the basis of preferences but also on high-level evidence on which dressing to use. Together, this should be incorporated into wound care education. But as long as strong evidence is lacking with respect to the (cost) effectiveness of dressing materials for local wound care, personal preferences can flourish and dominate patient care.²⁰ The results of this study should increase the awareness among health care professionals about these differing individual preferences and their impact on clinical decision making.

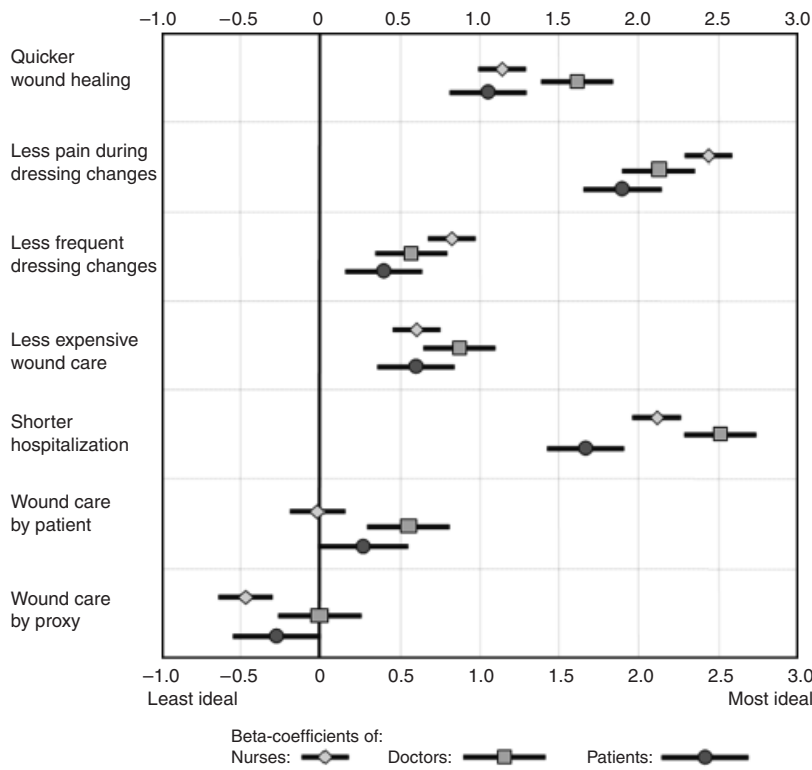


Figure 1. Independent impact (expressed as β -coefficients with 95% confidence intervals) of the six varied attributes on the preference scores of doctors, nurses, and patients.

Table 5. Preferences for treating patients with inexpensive gauze-based or with expensive occlusive dressings

Trade-off	Doctors (N=47)		Nurses (N=146)	
	N	%	N	%
0 occlusive/500 gauze-based	5	10.7	4	2.8%
50 occlusive/400 gauze-based	1	2.1	2	1.4%
100 occlusive/300 gauze-based	18	38.3	30	20.5%
150 occlusive/200 gauze-based	8	17.0	25	17.1%
200 occlusive/100 gauze-based	7	14.9	75	51.4%
250 occlusive/0 gauze-based	8	17.0	10	6.8%

Significant difference in preferences between doctors and nurses ($p=0.009$).

High-level evidence is lacking about materials that could lead to a shorter hospitalization as preferred by doctors, and about the nurses' preference for materials that reduce pain. As long as this evidence is absent, the choice for dressing materials should at least be patient-centered, as the incorporation of patients' preferences into treatment decisions is an essential component of optimal medical care.^{21,22} Patients were found to prefer quicker wound healing, as well as pain reduction and a short hospitalization time, which was largely matching the judgment of the professionals. Hence, further research should focus on which wound dressing materials best match these

Table 6. Hierarchy of the dressing attributes, according to doctors', nurses', and patients' willingness to pay for these attributes when allowed a 1,000 Euro budget

Attributes	Doctors	Nurses	Patients	Total
Wound healing time	2	2	1	5
Frequency of dressing changes	5	4	5	14
Pain during dressing changes	3	1	3	7
Duration of hospitalization	1	3	2	6
Self-care regarding dressing change	4	5	4	14

Attributes are ranked according to their importance. The lower the scores, the more important is the attribute.

criteria. Then, the merits of these materials can be weighed against their costs. In addition, high quality research in this area should cope with the impending confounding by the large number of wound etiologies and dressing options by addressing overarching treatment principles instead of comparing individual dressing types.

The attributes studied here were based on the endpoints chosen by the Cochrane Wound Group as well as on data derived from the literature.^{1,13} Yet, this will never completely mirror the reality of daily wound care practice. In

addition, "pain" is known as a rather subjective endpoint and depends on the technique of dressing removal. Other attributes, such as recurrence rate (more appropriate for venous or diabetic wounds) or quality of life (particularly in chronic wounds), can play an important role too. This would, however, increase the number of attributes under study, which would have led to a considerably higher, and therefore impractical, number of descriptions to be scored.

The incorporation of WTP questions into the CA questionnaire is a good combination to gain a more clear insight into the preferences of the professionals and patients. We realize this combination has resulted in a more bulky questionnaire. Furthermore, the intangibility of the CA as well as the WTP questions makes filling out the questionnaire a rather complex task. Nevertheless, the response rate of the patients was relatively high. Considering the results of the WTP questions from the patients, it became clear that the WTP of 50 Euros for each question is just the middle point on the scale. The difficulty of filling out these questions may be due to the desire to give a socially accepted answer or a stoic attitude. Taking this into account, no strong statements can be drawn from these patients' results.

The grounds on which preferences in local wound care are funded and in which direction they go are interesting topics for decision makers. They generally want to improve clinical practice or foresee which problems they have to deal with when new methods are being implemented and to which arguments the professionals involved are sensitive. By means of this study, we know that among doctors, nurses, and patients there is agreement on the three most important and most patient-relevant outcomes. These can guide doctors, nurses, and decision makers in selecting the most ideal dressing, while awaiting new high-level wound care research incorporating these outcomes.

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