Pressure ulcer incidence reporting

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DATA ON the incidence of pressure ulcers are needed to inform national and local policy and practice decisions, and to support the provision of appropriate resources to deal with this costly problem (Clark 2001). The emphasis in the NHS in recent years has been on demonstrating evidence-based, cost-effective and clinically effective health care (Nichol 1995). Indeed, there is now a legal duty of quality imposed on hospital trusts, which requires them to have in place systems for continuously monitoring, safeguarding and improving clinical quality (DoH 1997). The occurrence of pressure ulcers has been viewed by the Department of Health (1993) and the Audit Commission (1991) as a negative indicator of quality in healthcare organisations. Therefore, it is essential that trusts can collect accurate data.

Hampton (1997) suggested four reasons for obtaining pressure ulcer incidence data, which are to:

■ Establish a baseline measure.
■ Be able to assess performance in reducing pressure ulcer incidence.
■ Determine educational requirements.
■ Allocate resources efficiently.

abstract

Aim To examine the accuracy of data collected on pressure ulcer incidence. A system for monitoring incidence has been in place since 1991 at a medium-sized hospital trust. The data collected are used to calculate resource requirements for specialist mattresses, to audit compliance with pressure ulcer guidelines and to identify staff training needs.

Method A convenience sample comprising 211 inpatients from the medical, surgical, rehabilitation and orthopaedic wards was assessed by the researcher over a 14-day period. Ward staff continued their usual routine of assessment and treatment. At the end of the study period, the researcher-generated data and ward staff-generated data were compared.

Results A total of 343 assessments were carried out on 211 patients; 152 patients were found to have, or be at risk of having, pressure ulcers. The main finding after comparing both sets of data was that a significant number of patients at risk of, or with, pressure ulcers were not reported as such by ward staff (n=86, 57 per cent; p<0.0001). Twelve (14 per cent) of those not reported had pressure sores and were being cared for on specialist mattresses. Non-reporting was high from all wards. When reports were made of patients at risk of, or with, pressure ulcers, the reports were mostly accurate and complete.

Conclusion The data collection form is ‘user-friendly’ and the assessment skills of nursing staff at the trust are adequate. However, the high incidence of under-reporting indicates that the current system may not be adequate for generating accurate data.

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Pressure sores

These key words are based on subject headings from the British Nursing Index. This article has been subject to double-blind review.

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Literature review

Until an accurate local assessment of the size of the problem is made, it is difficult to set meaningful targets for reduction, agree educational needs, select an appropriate range of equipment or calculate the costs to the trust of prevention and treatment. However, the practical guidance available in the literature on measuring pressure ulcer incidence demonstrates confusion in what to measure and how to measure it, from audit as well as research perspectives. The literature is survey-focused, but the issue of accuracy of data collection is rarely addressed. Consequently, little is known about whether incidence data monitoring systems produce accurate data.
Gathering accurate data is fraught with difficulties, such as the subjectivity and unreliability of detection and grading of pressure ulcers, particularly in the early stages of their development (Cullum et al 1995). Pressure ulcer grading scales are used as tools to survey pressure ulcers, while risk assessment scales are used to detect patients’ levels of risk. Both measurement tools have the potential for error – in relation to the ways in which they have been developed (Edwards 1994) and the ways they are used (Dealey 1996). Questions have been posed about the completeness of data capture, the accuracy of the data collected and the methods used to calculate the incidence, locally and in the literature (Bridel 1993, Clark and Watts 1994, Dealey 1991, 1994, Edwards 1994, Hale 1990, Lockyer-Stevens 1994, Nyquist and Hawthorn 1987, St Clair et al 1995). The answers to these questions have implications for the quality of care that patients receive, the cost-effective use of resources and the need for education.

Although many institutions monitor pressure ulcer incidence, the accuracy of these data is rarely known. The author found only one paper investigating the accuracy of paper-based or computer-based patient records in general, which is surprising considering the importance of data accuracy in various areas, such as clinical research and health system management. Equally, little relating directly to the collection of incidence data or checking data for accuracy was found in studies undertaken by Anderson (1991), Dunford (1994), Lockyer-Stevens (1994), or St Clair et al (1995), among others.

### Current system for pressure ulcer reporting

The established process of pressure ulcer risk and incidence monitoring in the trust assessed by this researcher is detailed in Box 1. Ongoing incidence data collection requires considerable motivation, co-operation, knowledge, stamina and competence of large numbers of nurses. The allocation of pressure-relieving mattresses is co-ordinated centrally by the tissue viability office, so the use and location of mattresses should be known at all times. The mattress allocation records consistently show that these mattresses are in use in clinical areas from which few, if any, incidence-reporting forms are received, indicating the presence of ‘at-risk’ patients.

Using the above process, it should be possible to track improvement in or deterioration of pressure damage over time and to check that practice complies with the pressure ulcer guidelines. Reports based on the information received by the tissue viability nurse, containing summarised details of how many patients are assessed as being at risk of and/or having pressure ulcers, their locations, severity, treatment and management, are sent to wards every month. ‘Spot checks’ and communication with ward staff indicated that these monthly reports were often incomplete, which suggests that incomplete and/or inaccurate data were being submitted to the tissue viability nurse.

If no reports are received from a ward, it may be that no patients have been admitted with, or have developed, pressure ulcers. Alternatively, patients with or at risk of pressure ulcers may have been admitted but not reported. The significance of reporting patients at risk of pressure ulcers, even though they are nursed on special mattresses, is not always appreciated, and nurses may not feel inclined to report such patients. Even when an audit return is received, it may be

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**Box 1. Process for collecting pressure ulcer incidence data at the research site**

All patients are assessed using the Waterlow risk assessment tool by first-level nurse

<table>
<thead>
<tr>
<th>Score &lt;10</th>
<th>Score &gt;10</th>
</tr>
</thead>
<tbody>
<tr>
<td>- no action needed</td>
<td>- act according to pressure ulcer guidelines unless condition changes</td>
</tr>
<tr>
<td>- make necessary referrals to dietician, therapists</td>
<td>- supply appropriate mattress</td>
</tr>
<tr>
<td>- supply appropriate mattress</td>
<td>- document proposed care</td>
</tr>
<tr>
<td>- set evaluation date</td>
<td>- complete pressure ulcer incidence data collection form and send to the tissue viability nurse each Monday</td>
</tr>
<tr>
<td>- complete pressure ulcer incidence data collection form and send to the tissue viability nurse</td>
<td>- repeat assessment as required and send completed forms weekly to the tissue viability nurse</td>
</tr>
</tbody>
</table>

An inaccurate or incomplete audit return generates extra work for the clerical officer and ward staff, as telephone enquiries have to be made to obtain the missing data. The system is, therefore, expensive to run in terms of nursing and clerical time and effort. If the data collected are inaccurate, and therefore of limited use, this may represent an unacceptable inefficient use of resources.

**Aim of the study**

The aim of this study was to investigate the accuracy of the established method of measuring pressure ulcer risk and occurrence, and ultimately to inform decisions on how, if at all, the monitoring system should be modified. For the purposes of this study, the term accuracy encompassed measures of correctness and completeness (Hogan and Wagner 1997) of data produced by the pressure ulcer incidence monitoring system.

**Method**

The sample comprised all inpatients on four of the 18 wards from which pressure ulcer data are routinely received. This was a sample of convenience covering a wide range of medical and surgical conditions representative of those included in routine monitoring. The sample was considered to be manageable in the resources of the project, based on a pilot study in a non-research ward. To minimise the potential for researcher bias in the choice of wards, the nurse managers were asked to nominate one research ward in each of medicine, surgery, rehabilitation and orthopaedics. It was intended that the research would cause the least possible disruption to patient care routines and nursing practice.

Criteria defining the quality of staff assessments were developed from the pressure ulcer prevention guidelines, the literature and the experience of the researcher (Box 2). The research wards were visited every day for 14 days. All patients were assessed and the assessment data were recorded by the researcher on a form identical to that used by ward staff. Ward staff were asked to continue their usual routine of assessing and treating patients and sending their completed forms to the tissue viability nurse weekly. On completion of two weeks’ data collection, the researcher-generated data and ward staff-generated data were compared.

All data were entered into a computer spreadsheet. Statistical analysis was carried out to determine the significance of differences between the assessments carried out by the researcher and those carried out by ward staff, using the Chi-squared test where appropriate, or Fisher’s exact test where expected frequency for some of the variables was <5.

The necessary permission to conduct the study was obtained from hospital managers, consultants and the local research ethics committee, and arrangements were made for anonymised storage of data on paper and computer.

**Results**

A total of 343 assessments were carried out on 211 patients by the researcher over 14 days. The number of assessments per patient ranged from one to 14, depending on the length of stay of the patient. The mean length of stay varied between the specialties from 5.2 to 9.6 days (Table 1). These data illustrate the high turnover of patients in all wards except rehabilitation, where one patient had stayed for three months.

**Identification of patients at risk** Of the 211...
patients assessed, 152 patients were found to be at risk of pressure damage (Waterlow score 10 or >10). The highest number of patients at risk overall was found in the surgical ward (48, 31.5 per cent), and the lowest in the rehabilitation ward (30, 19 per cent). However, high-risk and very high-risk patients accounted for 77 per cent of rehabilitation patients, which was noticeably higher than in the other wards (60 per cent in surgery, 53 per cent in orthopaedics and 50 per cent in medicine).

Overall, a significant number of patients found by the researcher to be at risk of pressure ulcers were not reported by the ward staff (n=86, 57 per cent; Chi-squared = 68.7; p<0.0001). Non-reporting was found to be high in all wards, and was highest in the surgical ward (45 patients) (Figure 1). Excluding the surgical ward figures would have changed the final analysis to 61 per cent of patients reported and 38 per cent of patients not reported.

Statistical analysis of data on unreported and reported patients (total 152) Analysis of data collected by the researcher on patients at risk but not reported by ward staff was carried out to identify risk levels, frequency of pressure ulcers and interventions performed. The range of Waterlow scores (Table 2) did not vary widely between reported and unreported patients, except in the surgical ward, where 27 patients scored 20 or more (up to 25 denoting high to very high risk). Waterlow scores for patients reported in this ward were between 10 and 13. In the rehabilitation ward, the scores of unreported patients were similar in range to those of reported patients. In the medical and orthopaedic wards it was mainly the lower scoring patients who were not reported.

It was noticeable that 16 patients in the unreported group were found to have pressure ulcers (Table 3). The majority of patients with pressure ulcers in the medical and orthopaedic wards were reported, whereas a large number in the surgical ward (10) and rehabilitation ward (four) were not reported. This demonstrates that the occurrence of a pressure ulcer will not always trigger a report.

### Table 2. Range of Waterlow scores found in unreported patients

<table>
<thead>
<tr>
<th>Ward</th>
<th>Number of unreported patients</th>
<th>Range of Waterlow scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Surgery</td>
<td>45</td>
<td>10-25</td>
</tr>
<tr>
<td>B Medicine</td>
<td>12</td>
<td>10-20</td>
</tr>
<tr>
<td>C Rehabilitation</td>
<td>15</td>
<td>11-28</td>
</tr>
<tr>
<td>D Orthopaedics</td>
<td>14</td>
<td>10-17</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>86</strong></td>
<td><strong>10-28</strong></td>
</tr>
</tbody>
</table>

### Table 3. Number of patients with pressure ulcers found in reported and unreported patients

<table>
<thead>
<tr>
<th>Ward</th>
<th>Reported patients</th>
<th>Unreported patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Number with ulcers</td>
</tr>
<tr>
<td>A Surgery</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>B Medicine</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>C Rehabilitation</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>D Orthopaedics</td>
<td>18</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>66</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

### Table 4. Number (per cent) of assessments achieving minimum standards using the four criteria

<table>
<thead>
<tr>
<th>Specialty (number of assessments made)</th>
<th>Valid assessment (%)</th>
<th>Appropriate treatment (%)</th>
<th>Accurate terminology (%)</th>
<th>Complete form (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Surgery (3)</td>
<td>2 (67)</td>
<td>2 (67)</td>
<td>3 (100)</td>
<td>2 (67)</td>
</tr>
<tr>
<td>B Medicine (30)</td>
<td>28 (93)</td>
<td>27 (90)</td>
<td>26 (87)</td>
<td>21 (70)</td>
</tr>
<tr>
<td>C Rehabilitation (16)</td>
<td>14 (87)</td>
<td>10 (62)</td>
<td>15 (94)</td>
<td>14 (87)</td>
</tr>
<tr>
<td>D Orthopaedics (17)</td>
<td>15 (88)</td>
<td>14 (82)</td>
<td>16 (94)</td>
<td>16 (94)</td>
</tr>
<tr>
<td><strong>All wards (66)</strong></td>
<td><strong>59 (89)</strong></td>
<td><strong>53 (80)</strong></td>
<td><strong>60 (91)</strong></td>
<td><strong>53 (80)</strong></td>
</tr>
</tbody>
</table>
The analysis also assessed whether patients with pressure ulcers who had not been reported were being nursed on specialist mattresses. Twelve specialist mattresses were found to be in use by patients who had not been reported. The number of mattresses used and the number of patients reported to have pressure ulcers corresponded on only one ward (medical). These data indicate that a relatively large number of mattresses (12 from a stock of about 40) were in use by patients who had not been reported. Clearly, the use of a mattress does not always trigger a report.

**Assessment of quality** Where the staff had carried out assessments, these were compared with the ‘gold standard’ of the researcher’s assessment, using four criteria (Box 2). The results are shown in Table 4.

The figure of 82 per cent appropriate treatment takes into account a decision by the orthopaedic unit staff to adopt a Waterlow score of 15 as indicative of a patient being at risk (Healey 1996). Factors that influenced the classification of seven treatments as inappropriate included special mattresses not being available (four) and patients refusing to use them when they were available (three), as documented.

In 80 per cent of cases, the data collection form was complete; however, the remaining 20 per cent had relatively minor deficiencies or inaccuracies, such as not identifying from where the patient was admitted, or where and when the pressure ulcer occurred, or details of patient transfer, discharge or demise.

No significant differences were found between wards in the quality of the assessments that had been made using the above four criteria.

**Discussion**

The generalisability of the findings of this study is limited by the fact that it was conducted in only one healthcare institution and in a limited number of wards, as dictated by the resources available for the study. Few similar studies, which could serve as a comparison, have been undertaken in the past, so it is difficult to ascertain whether the findings represent an average or an extreme of the spectrum. Any interpretations should, therefore, be made with due caution and it is suggested that further research be undertaken to confirm or refute the findings.

Frantz (1997) makes four recommendations for good practice when collecting pressure ulcer incidence data. She states that:

- There should be a clear definition of what constitutes a pressure ulcer.
- There should be guidance for the grading of pressure ulcers.
- Information should be collected prospectively to control for accuracy.
- Relevant education should be provided for nurses so that assessment of pressure ulcers is consistent.

Even though all four recommendations were addressed in the present study by the implementation of guidelines and the appointment of a specialist nurse, the findings show that there are serious flaws in the volume and accuracy of data submitted. The most significant finding of the investigation was that more than half the patients sampled by the researcher and found to be at risk or to have pressure ulcers were not reported by ward staff. Twelve patients (14 per cent) who were not reported had established pressure ulcers and were being cared for on specialist mattresses, despite the fact that the use of a specialist mattress or having a pressure ulcer should prompt nursing staff to report patients to the tissue viability office.

These findings are similar to those reported by Gebhardt (1997, personal communication) – 50 per cent of patients with pressure damage were unreported – who used a different method of harvesting data from ward staff. On the other hand, the findings represent a higher level of under-reporting than was reported by Healey (1996), 6 per cent. This suggests that differences in under-reporting may not be due to the specific method of data collection chosen, but rather to random fluctuations and/or differences in educational methods, environmental factors and institutional cultures. Further research in the same institution should be carried out to estimate the effects of random fluctuation. If under-reporting were found to be consistent, a correction could be used to control for this variable in future estimations of incidence. Further trials using different wards in the same centre and multicentre trials would be required to control for educational, cultural and environmental differences.

One of the more interesting findings was that some patients scoring more than 20 on the Waterlow scale, who had pressure ulcers and were nursed on appropriate mattresses were not reported, while patients without ulcers, on standard mattresses and with low Waterlow scores – low-risk patients – for whom specialist management was not a priority were reported. In the medical and orthopaedic wards, only a weak trend towards mainly low scoring patients not being reported could be detected. Otherwise, there was little consistency in the manner of reporting; no other trends could be identified to explain why some patients were reported and some were not.

In only 24 unreported cases (28 per cent) was the treatment appropriate. Where reports were submitted by ward staff, the comparison of researcher-generated data with that reported by ward staff revealed high compliance with the recommendations of the clinical guidelines. In other words, when assessment was documented, it was documented accurately, suggesting that the pressure ulcer incidence data collection form is understandable and ‘user-friendly’. However, less than half of the cases were documented at all. This suggests that further research into strategies that prompt staff to complete audit returns is likely to be beneficial. There is a role here for various research techniques to explore the complexities of data collection in clinical practice. During this study, the researcher kept a semi-structured diary, recording how the systems for reporting data were organised in each ward and
The most significant finding from this study is that more than 50 per cent of patients at risk of, or with, pressure ulcers were not reported by ward staff. When patients at risk of, or with, pressure ulcers were reported, the reports were mostly accurate and complete, which suggests that the data collection form is "user-friendly" and that nursing assessment skills are adequate. Nevertheless, the high incidence of under-reporting suggests that the system may be inadequate for generating accurate data on which to base policy, practice or purchasing decisions.

**Conclusion**

The most significant finding from this study is that more than 50 per cent of patients at risk of, or with, pressure ulcers were not reported by ward staff. When patients at risk of, or with, pressure ulcers were reported, the reports were mostly accurate and complete, which suggests that the data collection form is "user-friendly" and that nursing assessment skills are adequate. Nevertheless, the high incidence of under-reporting suggests that the system may be inadequate for generating accurate data on which to base policy, practice or purchasing decisions.

**Implications for practice**

- Reporting of patients at risk of pressure damage was shown to be inadequate.
- Further research is needed to explore similar systems in other trusts and how the accuracy of data submitted can be improved in quality and quantity.
- Until the accuracy of pressure ulcer incidence data is improved, it should not be used as a basis for purchasing and practice decisions.
- Feedback should be sought via providing monthly incidence reports to high profile trust groups, for example risk management and clinical governance.
- Ward managers should be more involved in the process of monitoring pressure ulcer prevention.

**REFERENCES**


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