Pressure ulcers: the case for improving prevention and management in Australian health care settings

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Abstract

The causes of pressure ulcer development have been the subject of investigation for centuries. It is commonly accepted that the majority of pressure related tissue injuries (pressure ulcers) which are caused by unrelieved external pressure are preventable. In spite of this knowledge, the prevalence of pressure ulcers worldwide remains unacceptably high. Lack of nursing care, in particular, is still seen as one of the primary causes for their development. Pressure ulcers are increasingly used as an indicator of the quality of care.

Whilst pressure ulcer research in Australia is in its infancy, accumulated data indicate that pressure ulcers and their sequelae are a significant problem, the extent of which is not fully appreciated by government, institutions or clinicians. This failure to acknowledge the problem may be because pressure ulcers are not viewed in the same context as other acute or chronic diseases such as heart disease.

Despite this, clinical practice guidelines for pressure ulcers are gaining prominence in Australia in an endeavour to reduce pressure ulcer prevalence, morbidity, cost and litigation. Institutional risk management strategies for pressure ulcers are believed to contribute to improved patient outcomes. Both of these measures need to be evaluated to ensure that they do meet the needs of the consumer.

This paper briefly highlights the history of pressure ulcers, the extent of the problem in Australia and the need for improvement through education, risk management strategies and adoption of Australian clinical practice guidelines for their prevention.

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Historical descriptions of pressure ulcers

Pressure ulcers are not a modern phenomenon. An Egyptian mummy dating from the Egyptian XXI dynasty shows evidence of large pressure ulcers, on both buttocks and shoulders, that have been covered with gazelle skin.

In 1749, Quesnay divided pressure ulcers into two groups; those caused by pressure and those by other diseases. Brown-Sequard’s studies of paralysed animals in 1852 showed that skin ulceration was not directly attributable to neurological damage; skin did not ulcerate if pressure was relieved and that skin pressure and moisture were the main aetiological factors involved.

Charcot, in 1879, proposed that nerve injury did release a neurotrophic factor leading to tissue necrosis. This theory prevailed virtually up until the time of World War II in spite of attempts by people like Marie and Roussy who, in 1914, argued that all debilitated patients, not just paraplegics, developed pressure ulcers. More importantly, they proposed that both prevention and treatment were feasible.

In the 1930s, Trumble and Landis, respectively, published their landmark research into the effects of prolonged pressure and blood flow and capillary thresholds within blood vessels. Both Koziak and Husain examined the effects of pressure and time-pressure relationships in the 1950s, confirming the existence of an inverse relationship between the amount of time and the amount of pressure required to

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produce irreversible tissue changes. Dinsdale, in 1974, further proposed that friction be examined for its role in pressure ulcer development. Exton-Smith and Sherwin, in the 1960s, surmised that in the healthy individual the limits of tissue tolerance to pressure were not exceeded. Patients with impaired mobility, however, are highly susceptible to developing these ulcers and require frequent intermittent relief from pressure.

Nursing research into pressure ulcers commenced in the 1960s with investigations focussing on the geriatric population with the intent to identify risk factors and develop risk assessment tools. Throughout the 1970s, 80s and 90s, additional areas of investigation have included multiple prevalence and incidence studies, spinal cord injury-induced pressure ulcers, preventative and treatment strategies, cost factors, measurements of pressure ulcer healing, evaluations of support surfaces, and nursing collaboration in the development and evaluation of clinical practice guidelines for managing pressure ulcers.

Pressure ulcers have been known by a variety of terms such as bedsores, decubitus ulcers, ischaemic ulcers, pressure sores or pressure ulcers. Latterly the term pressure ulcer(s) has been promoted as it is thought to more accurately reflect the aetiology of pressure derived tissue degradation and the characteristics of the resulting lesion. The Australian Wound Management Association (AWMA) supports the use of this term when describing alterations in skin and tissue integrity related to the effects of pressure.

**Pressure ulcers in Australian health care settings**

**Prevalence and incidence**

In Australia, epidemiological data on pressure ulcers is limited. The information that is available is fragmented and is held in isolation at either individual hospitals or State and Commonwealth Departments of Health. The Australian Bureau of Statistics, personal communication, October 1999.

Prevalence refers to the number of patients with a disease or event at a given time and incidence refers to the number of new cases of a disease or event in a population during a specific period of time. Childs and Rimmington, in 1983 at the Caulfield and Alfred Hospitals, identified a point prevalence of 4.5 per cent; one of the first prevalence surveys of pressure ulcers in Australia. Studies undertaken in major Australian teaching and rural hospitals over the last 9 years in Brisbane, Sydney, Melbourne, Launceston and Perth have identified the prevalence of pressure ulcers as being between 4.5-27 per cent [Grant S, Gold Coast Hospital, personal communication, July 1999] and 11 per cent in a Perth orthopaedic unit and 6.5 per cent in a rural base hospital. An extensive audit of surgical cases has also been reported.

No data on the incidence and prevalence of pressure ulcers in either neonates or paediatric patients in Australia has been published that the authors are aware of. The New South Wales Health Department has established a committee to investigate the incidence and prevalence of pressure ulcers and develop policies for the prediction and prevention of pressure ulcers for both paediatric and adult populations [Manning W, Senior Analyst Quality Branch, NSW Health Department, personal communication, November 2001].

**Patient demographics**

It is beyond the scope of this paper to provide a critical analysis of Australian data in respect to age, gender, risk factors and location and number of ulcers found. No studies have reported statistically significant differences for gender as a risk factor. In respect to age, these studies have identified a trend between pressure ulcer development and people aged over 50 years. The authors have found, with statistical significance, that people over the age of 75 are more likely to develop one or more pressure ulcers [unpublished data].
predominantly been classified as Stage 1 or 2 with lesser numbers of Stage 3 and Stage 4 ulcers over recent years.

The number of hospital acquired ulcers forms a high proportion of ulcers found\textsuperscript{76-87}. A number of studies have endeavoured to assess their patient populations’ level of risk and associated risk factors using commonly known risk assessment tools or nurse judgement\textsuperscript{50, 77, 78, 85, 88, 93}.

**Mortality**

Prior to 1979 and the introduction of *International Classification of Diseases*-9 (ICD) the Australian Bureau of Statistics (ABS) did not record any data specifically related to pressure ulcers; they were included under the ICD category of chronic ulcer of skin. In 1997/98, the ABS introduced the automated coding system (ACS), which allowed coding and recording of both the underlying cause of death as well as all other contributory causes listed on the death certificate [Australian Bureau of Statistics, personal communication, October 1999].

Pressure ulcers were cited as the underlying cause of Australian deaths in 54 cases (19 males and 35 females; total deaths 129,350) in 1997, and in 47 cases (18 males and 29 females; total deaths 127,202) in 1998. Pressure ulcers were also noted, on death certificates, to be a contributory cause of death in a further 181 cases in 1997 (79 males and 102 females) and 227 cases (104 males and 123 females) in 1998. In these cases, the underlying causes of deaths were predominantly diseases of the nervous, circulatory and respiratory systems and mental disorders. An analysis of Australian deaths in 1997/98 involving pressure ulcers, whether an underlying or contributory cause, by age and sex, is given in Table 1 [Australian Bureau of Statistics, personal communication, October 1999].

**Table 1. Number of Australian deaths in 1997/98 involving pressure ulcers.**

<table>
<thead>
<tr>
<th>Age range (years)</th>
<th>Male deaths 1997</th>
<th>Female deaths 1997</th>
<th>Male deaths 1998</th>
<th>Female deaths 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-24</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>25-44</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>45-54</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>55-64</td>
<td>6</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>65-74</td>
<td>13</td>
<td>11</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>75-84</td>
<td>42</td>
<td>68</td>
<td>41</td>
<td>65</td>
</tr>
<tr>
<td>85+</td>
<td>31</td>
<td>36</td>
<td>73</td>
<td>74</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>98</strong></td>
<td><strong>122</strong></td>
<td><strong>137</strong></td>
<td><strong>152</strong></td>
</tr>
</tbody>
</table>

**Cost**

Porter and Cooter have estimated that a pressure ulcer will affect 60,000 people in Australia each year. They did not estimate the costs that these cases would incur\textsuperscript{95}. Data collection tools and databases to capture and record cost factors associated with episodes of pressure ulceration are not coordinated across the Australian health system. At best, they are *ad hoc* within individual institutions if indeed they are present at all [Medical Records Department, Sir Charles Gairdner Hospital, Perth, personal communication, October 1999].

In 1997, Woolridge conservatively estimated that pressure ulcers cost the Australian community $350 million per annum\textsuperscript{96}. It is surmised that this cost includes extended hospital stays, surgical correction, nursing time and material resources.

Australian literature that specifically addresses the issue of cost and pressure ulcers is sparse. Two attempts to quantify hospital costs have been reported. In 1996, Davenport, at Knox Private Hospital, identified that the cost of 20 patients with pressure ulcers at Stage 2 or above, was $11,172 for a 12 month period. Dressings and nursing time were the only factors considered in this calculation\textsuperscript{86}. Young, in 1997, reported that a Stage 5 (Torrance classification) pressure ulcer cost the Tasmanian health system $61,230\textsuperscript{97}. Carville, in 1999, identified that the average cost of healing a pressure ulcer in the community was $1096; one case cost $10,388\textsuperscript{98}.

Opportunistic costs – those which arise as a result of a person with a pressure ulcer having an extended length of stay, thus preventing the use of a hospital bed for another patient – are unknown. Davenport, however, indicated in her study that there were 293 ‘step down days’ incurred by the 20 patients with pressure ulcers. For those additional 293 days, the institution did not receive health funding to cover these additional patient costs. Consequently ‘opportunistic costs’ for those 293 days occurred as a result of reduced patient throughput and therefore reduced income for the institution\textsuperscript{86}.

Injury, particularly back injuries, to health care workers (from lifting and turning procedures in order to provide pressure relief) is an additional and underestimated factor which is difficult to quantify. In each Australian state, the various Work Safe and Work Cover agencies have different systems for sequestering, recording and tabulating this data [Carravick P, Director Occupational Health and Safety, Sir Charles Gairdner Hospital, Perth, personal communication, October 1999]\textsuperscript{99}. 


The Victorian Work Cover Authority states that back injuries secondary to the lifting and manual handling of patients/residents are the most significant cause for 1000 new claims for compensation made by nurses each year. The Canberra Hospital’s ‘No Lifting’ system introduced in January 1995 is reported to have reduced “time lost due to injury” from 250 weeks to 30 weeks per year. During this period, the average cost associated with back injury claims fell from $25,000 to less than $5,000 99. The overall costs associated with back injuries inclusive of sick leave, medications, physiotherapy, rehabilitation programmes and redeployment are not known [Carravick P, Director Occupational Health and Safety, Sir Charles Gairdner Hospital, Perth, personal communication, October 1999].

It is difficult to place a dollar value on altered lifestyles, quality of life, changing roles and relationship stress and financial burdens that are incurred by individuals or families when a pressure ulcer develops 64, 100-102. Direct and indirect costs associated with treatment, health services, morbidity and mortality, loss of productivity, sickness and carers’ benefits as a result of pressure ulceration have not been formally recorded. The effect of multiple pathologies in conjunction with, or leading to, the development of pressure ulcers is also a confounding factor when estimating these costs 101. Thus they are an unknown and probably highly underestimated cost to the Australian health system.

Litigious action in Australia between patients and health care facilities over the development of pressure ulcers is increasing. Successful actions in favour of the patient as the plaintiff have already been found, with one patient being awarded over $630,000 103.

Management
Pressure ulcers jeopardise the general health of patients and increase their morbidity. In addition, they are frequently associated with connotations of neglect, mis-management, feelings of failure on behalf of the caregivers and tarnished reputations of health care facilities 6, 8, 24, 104, 105.

Pressure ulcer development is multifactorial; the primary variables being pressure, shearing forces and friction. People most at risk of developing pressure ulcers are the frail elderly, the immobile, the neurologically impaired, the critically ill and hospitalised patients in general 7, 24, 32, 51, 73, 104, 106-111.

As a result of Charcot’s theory 11, 14 and comments accredited to Nightingale 11, 13 and by Harmer and Henderson 112, the care of pressure ulcers has largely been seen as belonging to the domain of nursing or a reflection of poor nursing care 6, 8, 9, 24, 51, 104, 112-116.

Nurses need to dispense with the historical myths and the sense of blame and shame associated with pressure ulcers 71, 112, 117, 118. Quality nursing care is recognised as being one pivotal factor to preventing and minimising the effects of altered skin integrity 1, 49, 72, 86, 118-125.

A multidisciplinary approach to this problem should be advocated in all clinical settings; the benefits of which are well documented 66, 70, 106, 126-128. Members of the medical profession have identified the need to adopt a greater sense of responsibility for the occurrence of pressure ulcers in the acute and chronically ill person, not just those with spinal cord injuries 106, 113. Health departments and health institutions need to carefully reassess how best they can meet their obligations towards provision of a duty of care to their patients in respect to preventing pressure ulcers 3.

Reduced staffing numbers, decreased nurse/patient ratios, increased patient acuity, lack of pressure redistributing devices and lifting and turning aids have been commonly cited as reasons for the continued high prevalence and incidence of pressure ulcers in Australia and overseas 9, 40, 51, 66, 70, 78, 107, 129. Nurses and other health professionals need to be more aware of their responsibilities in this area of patient care 14, 32 and become more adept at reviewing and adopting research findings that support changes in clinical practice 38, 107, 130, 131.

Clinicians’ knowledge
It has been demonstrated that many clinicians do not fully understand the aetiology, pathophysiology and management of pressure ulcers 131-137. The authors, on evaluating clinicians’ knowledge of pressure ulcers, have found that junior doctors and nurses have a surprisingly low level of knowledge related to risk factors for pressure ulcers and the management of pressure ulcers.

Doctors and nurses have cited insufficient information on pressure ulcers in their undergraduate programmes and inadequate continuing education. An absence of clinical leadership and instruction at the bedside from their peers results in failure to identify patients at risk and to prevent or to manage patients with pressure ulcers. Clinicians have also demonstrated poor understanding of human and material resources available within their respective facilities.
Documentation

Documenting the events and outcomes of an episode of care is a legal requirement. Records should be comprehensive, accurate and legible. Information recorded should be relevant to the patients’ current and future care. Health professionals who fail to record clinical observations, clinical actions and outcomes and patient explanations may be liable for negligent care.

Pressure ulcer documentation should reflect aspects that relate to the patient, the pressure ulcer and the plan of care. Non-documentation of multiple factors inclusive of lack of nursing assessments/nursing care plans, turning schedules, doctors visits, orders or progress notes; treatment has been cited in overseas cases of successful litigation of malpractice related to pressure ulcers.

The authors have found that approximately 81 per cent of 453 patients with pressure ulcers in their study had no documentation, in either the medical or nursing record, of the patients’ level of risk for developing pressure ulcers, of the treatment and management strategies or of the healing progress of ulcers found. McGowan et al. also found similar deficits. Relatively few health care facilities have protocols for pressure ulcer risk assessment that records a patient’s level of risk; this then guides clinicians toward early interventional strategies if required.

Use of support surfaces

The benefits of repositioning the recumbent or seated individual to relieve point pressure, prevent pressure ulceration and aid the healing of established pressure ulcers in conjunction with support surfaces are well documented. The authors found that only 59 per cent of patients with pressure ulcers had a support surface in place; in many instances the type of surface in use was inappropriate or not recorded. Similar discrepancies have been described within other Australian studies.

Risk management strategies

A continuous quality improvement process for pressure ulcers is recommended. This is because pressure ulcers are seen as a high-volume, high-risk problem.

The literature offers many examples of how health carers can assess and address this issue within their respective environments. Multidisciplinary working parties with specific outcome criteria are usually established to collect baseline information, undertake analysis and interpretation of the data, develop and implement action plans and review processes.

Risk management strategies may encompass:

- Conducting retrospective medical record audits to establish a historical perspective if none exists.
- Obtaining patient demographics – age, disease process, ethnicity, length of stay, admission category.
- Listing methods used to identify and quantify patients at risk of developing pressure ulcers.
- Identifying associated risk factors.
- Conducting prevalence and incidence surveys to establish the number of patients with pressure ulcers.
- Adopting a classification system for staging pressure ulcers.
- Compiling an equipment inventory and documenting inappropriate use of equipment.
- Identifying pressure ulcer equipment to be purchased.
- Assessing the knowledge base and skill of clinicians involved in assessment, detection, prevention and management of pressure ulcers.
- Identifying current practices relating to prevention and treatment.
- Identifying the level of staff education provided.

Progressive risk management strategies have also included the appointment of tissue viability or wound care specialists and pressure ulcer committees. These key people assist with the identification of the extent of the problem, implementation of ensuing policies and changes in practices, and continuing education programmes.

Clinical practice guidelines

Clinical practice guidelines evolved in the 1980s in an attempt to reduce inappropriate clinical practices, reduce costs and improve patient outcomes through effective and efficient evidence based health care. They summarise for health carers the general principles of care and decision making processes for a specific health problem.

Pressure ulcer guidelines were first developed in the Netherlands in 1985, the United States of America in 1989 and 1994 and Europe in 1998. The AWMA formed a Pressure Ulcer Interest Subcommittee in 1996, primarily to develop and maintain clinical practice guidelines for the prediction and prevention of pressure ulcers.
ulcers. These guidelines are now ready for circulation and adoption into clinical practice. The AWMA actively encourages and promotes the use of risk management strategies and the development and implementation of treatment policies in order to deal with this problem.

**Discussion**

In Australia there are relatively few reported studies in the literature about pressure ulcers. To date, published studies are mostly limited to the acute care clinical settings in major teaching hospitals [Grant S, Gold Coast Hospital, personal communication, July 1999; Purdy H, St Andrew’s War Memorial Hospital, personal communication, July 1999] 76-87, nursing homes 88, 89 and rural settings 83, 84.

This low level of data collection on pressure ulcers in Australia contributes significantly to an overall lack of readily accessible information. Comparison of the data from these prevalence surveys is difficult because of the differing methodologies used as well as the differences within the clinical settings themselves. The main differences relate to the level of knowledge and education of surveyors, interrater reliability testing, patient recruitment, thoroughness of physical assessment, data collection tools and the classification system used to stage the ulcer [Grant S, Gold Coast Hospital, personal communication, July 1999; Purdy H, St Andrew’s War Memorial Hospital, personal communication, July 1999] 76-87, nursing homes 88, 89 and rural settings 83, 84.

It could also be proposed that this lack of data exists for a variety of other reasons, mainly:

- Under reporting of the existence of pressure ulcers across all clinical settings.
- Poor documentation by medical and nursing staff of existing pressure ulcers.
- Non standardised reporting mechanisms for recording the incidence and prevalence of pressure ulcers.
- Poor compliance with coding of pressure ulcers on patient discharge summaries.
- Lack of recognition of the value of available incidence and prevalence data at a national level.
- Lack of cross sectional data analysis of data currently collected by State or Commonwealth Departments of Health and the ABS on pressure ulcers [Medical Records Department, Sir Charles Gairdner Hospital, personal communication, October 1999; Carravick P, Director Occupational Health and Safety, Sir Charles Gairdner Hospital, Perth, personal communication, October 1999] 74, 76.

At present, pressure ulcers do not receive the same degree of attention as do other significant causes of death such as cancer and cardiac disease [Australian Bureau of Statistics, personal communication, October 1999] 78. The need to examine and correct the above deficits and collect and establish reliable databases is clear.

Support surfaces are commonly categorised according to the effect on the patient (clinical classification) or the physical characteristics of the surface and its ability to reduce or relieve pressure. The AWMA supports the Cochrane Collaboration’s method of categorising devices as either ‘constant low pressure’ or ‘alternating pressure’ devices.

Health care facilities need to purchase replacement mattresses or advanced support surfaces relevant to their overall patient population’s level of risk. The immobile patient with existing pressure ulcers, for instance, will require a different support surface from someone who is just ‘at risk’, but has no pressure ulcer. It is prudent management to have access to a range of devices from static overlays to specialty beds. Decision-making algorithms are available to assist clinicians to select support surfaces.

Pressure ulcer prevention policies and guidelines are gaining prominence in the face of rising costs, evidenced base care and litigation. Health care organisations and clinicians have a responsibility and a role to play in developing pressure ulcer risk management strategies in order to reduce the suffering and demand for resources caused by pressure ulcers. Staff should be informed and educated about any policy or practice changes. Institutional and administrative support of strategies to address the problem of pressure ulceration is critical to successful outcomes.

The effectiveness of evidence based clinical practice guidelines on increasing practitioners’ knowledge and changing clinical practices is subject to increasing scrutiny and evaluation. Results of any audits can be benchmarked between internal units or similar external agencies to establish levels of best practice.

Retrospective and anecdotal evaluations of the American guidelines have reportedly demonstrated a decrease in the prevalence and incidence of pressure ulcers. Cost savings have also occurred, as well as a reduction in patient morbidity and mortality, pain and suffering. Conversely, the Netherlands reported poor assimilation of their guidelines 6 and 15 years after their introduction. It is acknowledged that the existence of these guidelines were not widely publicised.
The Joanna Briggs Institute’s evaluation of their guidelines in three Australian hospitals did not identify any significant change in prevalence. The European guidelines have yet to be evaluated.

The authors in a multicentre study of 10 Australian hospitals are currently examining whether or not AWMA’s guidelines, in combination with an education programme, are effective in reducing the prevalence of pressure ulcers, and secondly, whether they influence the clinicians’ knowledge and behaviour in relation to pressure ulcers.

**Conclusion**

Pressure ulcers are thought to occur at unacceptable levels within Australian health care settings, despite the fact that they are a preventable cause of injury. Allocation of resources to detect, prevent and treat pressure ulcers is, in general, a low priority. Pressure ulcers, however, are increasingly being used as key quality indicators of patient care nationally and internationally. That they have been and remain debilitating, painful and costly encumbrances to patients and the Australian health care system alike, and is an issue that requires urgent redress.

Whilst it is generally acknowledged that our understanding of the epidemiology, aetiology, prevention and treatment of pressure ulcers has increased, the anticipated decrease in the prevalence and incidence of pressure ulcers has not occurred.

The development of the AWMA’s Guidelines for the Prediction and Prevention of Pressure Ulcers, provides all health care providers at federal, state and institutional level with an opportunity to re-examine their policies and procedures for identifying patients at risk. Clinicians also have a responsibility to be aware of, and familiarise themselves with, these guidelines which are there to promote evidence based care for the prediction and prevention of pressure ulcers.

The anticipated benefits to patients, clinicians and health care facilities in adopting these guidelines are improved patient care outcomes, increased patient satisfaction, reduced costs and length of stay, and improved collaborative practice between health professionals.

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