Pressure ulcer risk assessment

In this article...

- The main risk factors for the development of pressure ulcers
- The benefits and disadvantages of risk assessment tools
- How to prevent development of pressure ulcers

Author
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Abstract

The Department of Health wants to “eliminate harm” from pressure ulcers dramatically. Identifying which patients are at risk is an important part of prevention.

This article discusses the most common risk factors, the advantages and disadvantages of risk assessment tools, and challenges in prevention.

Pressure ulcers cost the NHS an estimated £1.8-2.6bn a year (Posnett and Franks, 2007) (see Box 1 for a general definition of pressure ulcers). The Department of Health (2011) wants to “eliminate harm” from avoidable hospital and community-acquired pressure ulcers in 95% of patients through the Quality, Innovation, Productivity and Prevention (QIPP) safe care workstream.

The DH (undated) defined an avoidable pressure ulcer as one that occurs when risk assessments, preventive actions and continued re-evaluations have not been implemented. Box 2 summarises some definitions of unavoidable pressure ulcers.

While tissue viability nurses have always tried to reduce the incidence of pressure ulcers, government targets now mean chief executives and finance directors are also interested (DH, 2011).

Risk assessment
Recognising which patients are at risk of developing pressure ulcers early on is an essential part of the prevention care pathway.

Risk assessment is not exclusive to the prevention of pressure ulcers; it is used in many aspects of life and healthcare. The Health and Safety Executive (2011) argues that it helps us to “focus on the risks that have the potential to cause harm”. These risks need to be identified and processes initiated to reduce the likelihood of harm occurring.

In the case of pressure ulcers, many risk factors have been identified within different risk assessment tools (Table 1). These tools usually give a numeric result associated with the level of risk; in most tools the higher the score the higher the risk.

There are many risks associated with pressure ulcer development but, essentially, people with no impairment to sensation and mobility are unlikely to develop a pressure ulcer. However, this could oversimplify the risk as it implies that the only risk factors are reduced mobility and loss of sensation, which is not the case.

Each identified risk factor needs to be considered. For instance, a patient with dementia may have both an intact sensory pathway and be able to move. What this person may lack is the cognitive ability to recognise the pain signal associated with the beginnings of pressure damage (European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel, 2009). This would normally trigger movement, sometimes subconsciously.

In addition, patients in pain may stay still because moving increases discomfort; they may be taking analgesics, sometimes opiates. Pain is an early warning signal for pressure damage and the use of strong analgesics may diminish this, which delays a trigger to move.

Risk factors
The most common method of assessing risk of pressure ulcers is by using a risk assessment tool (Table 1). Some tools are better suited to specialist clinical areas; using different tools for different areas may be more effective than using the same tool throughout an organisation.

The variety of risk factors used by many of the tools have been considered and compared elsewhere (Webster et al, 2011; Tannen et al, 2010; Mortenson et al, 2008; Bolton, 2007; Sharp and McClaws, 2006; Seongsook et al, 2004). This article discusses only the most frequently mentioned.
Discussion

Nursing Practice

**Box 1. Definition of a Pressure Ulcer**

A pressure ulcer is a localised injury to the skin and/or underlying tissue, usually over a bony prominence, as a result of pressure, or pressure in combination with shear. A number of contributing or confounding factors are associated with pressure ulcers; the significance of these is yet to be elucidated.

Source: EPUAP and NPUAP (2009)

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**Box 2. Unavoidable Pressure Ulcer Definition**

In summary, a pressure ulcer can be deemed unavoidable when:

- All risk assessments and preventive care have been implemented and re-evaluated, yet a pressure ulcer still occurs;
- A life-threatening event may have occurred;
- A patient may have end-of-life skin changes;
- A patient with mental capacity may have refused preventive interventions;
- A patient may have been in a collapsed state, unknown to health professionals.

Source: Bedfordshire and Hertfordshire TVN Forum (2010); NPUAP (2010); DH (undated)

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**Reduced mobility or immobility**

The longer pressure is exerted over a bony prominence, the higher that pressure will become. This results in increased period of reduced or occluded blood flow to the tissues, which results in tissue hypoxia leading to tissue death.

The pressure at the point of the bone is higher than at the skin surface (Collier and Moore, 2006). Pain is a warning signal that pressure has been exerted for too long (EPUAP and NPUAP, 2009), and this usually triggers movement. If patients cannot move, they need to be advised to report the pain to someone who can help them to do so (EPUAP and NPUAP, 2009).

**Lack of sensation**

If pain signals are absent because of a lack of sensation, patients will not be aware that damage is occurring and will not realise they should move.

This increases the risk of pressure ulcer development in those with, for example, cerebrovascular accident, multiple sclerosis, spinal cord injury and neuropathy.

Nurses should consider other medical conditions that may impair sensation, as well as temporary sensory loss due to unconsciousness, spinal anaesthesia or analgesia, or alcohol or substance use.

A source of pain elsewhere may distract from the pain associated with pressure, reducing the likelihood of the patient responding to this pain trigger.

**Skin marking**

The change of colour in the skin associated with pressure damage is an early warning sign of risk.

In pale skin a visible circular pink/red blanching mark, known as blanching erythema (the area of redness blanches white when pressed lightly with a finger), over a bony prominence is an indication that pressure damage is starting (Bethell, 2003). If this is not noticed and continued pressure is sustained, the discolouration will become darker until it is purple/black (EPUAP and NPUAP, 2009).

Identifying skin colour changes can be difficult in patients with darker skin colours (EPUAP and NPUAP, 2009), as areas of redness are neither visible nor blanch white (Bethell, 2005). This means these patients may be at increased risk of pressure damage (Fogerty et al, 2008).

Erythema may also be masked by physiological illnesses that alter the skin colour. These include cellulitis, necrotising skin infections, bruising, dermatological disorders and incontinence-associated dermatitis.

**Nutritional status**

It is widely accepted that undernourished people are at increased risk of pressure ulcer development (EPUAP and NPUAP, 2009), although the evidence base behind this is not robust (Mathus-Vliegen, 2004; Langer et al, 2003).

Indicators of malnutrition include serum albumin (Reed et al, 2003), BMI (Allman et al, 1995) and nutritional risk assessment (National Collaborating Centre for Acute Care, 2006).

**Compromised vascular supply**

An already compromised vascular supply will be further hampered by pressure, resulting in a more rapid deterioration of skin. Patients with peripheral arterial disease may be at increased risk of damage to their heels. In one area, 88% of hospital-acquired grade 4 ulcers were on patients’ heels (Guy, 2011).

Patients who experience events such as cardiac arrest or hypovolaemic shock may be at increased risk of skin damage because the blood supply to the skin is diminished by a sudden drop in blood pressure.

**Shear**

This force is additional to pressure, and further hampers blood flow to the skin by stretching and contorting blood vessels (Collier and Moore, 2005).

Shear is commonly seen over the sacrum and heels, where patients may slide down a surface and use their heels to resist this movement. Considering their seated position in the chair and bed will help to reduce this risk.

**Surface**

The surface on which patients sit, lie or lean can influence their risk of pressure ulcers (Norton et al, 2011). Bony prominences resting against a hard surface result in high pressures at the bone/tissue interface and pressure damage may occur relatively quickly.

Changing the mattress or cushion on

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**Table 1. Examples of Risk Assessment Tools by Specialty**

<table>
<thead>
<tr>
<th>Risk assessment tool</th>
<th>Specialty</th>
</tr>
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<tbody>
<tr>
<td>Waterlow (2005)</td>
<td>Orthopaedic/generic</td>
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<tr>
<td>Norton (1975)</td>
<td>Older people/generic</td>
</tr>
<tr>
<td>Jackson/Cubbin (1999)</td>
<td>Intensive care</td>
</tr>
<tr>
<td>Hunters Hill (2000)</td>
<td>Palliative care</td>
</tr>
<tr>
<td>Glamorgan (2009)</td>
<td>Paediatric</td>
</tr>
<tr>
<td>Braden Q (1996)</td>
<td>Paediatric</td>
</tr>
<tr>
<td>Plymouth maternity pressure sore risk assessment scale (2001)</td>
<td>Midwifery practice</td>
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</table>
which patients lie or sit can reduce the risk of pressure ulcer development. Areas such as operating theatres, accident and emergency and radiology may need to consider the surfaces on which patients will lie while in their department (Haugen et al, 2011). The additional use of gel, polymer or air products may help to protect patients.

Risk assessment tools
The ideal risk assessment tool will:

- Correctly identify patients at risk of developing a pressure ulcer (including those who have one already);
- Correctly identify those who are not at risk (including those who do not have a pressure ulcer);
- Do so consistently with each subsequent assessment regardless of who carries out the assessment, that is, the same person or different people.

A tool that achieve these aims is deemed to have reliability and validity (Table 2). Many studies have compared the validity and reliability of different risk assessment tools (Bolton, 2007; Thompson, 2005; Seongsook et al, 2004; Schoonhoven et al, 2002).

Weaknesses
Some possible weaknesses of the available assessment tools and their use are:

- User subjectivity – risks may not be clearly defined so assessors may over- or underestimate risk (Anthony et al, 2010);
- The factors described in the tool may not be related to risk (Anthony et al, 2010);
- The tool may not have been tested for its reliability and validity (Table 2);
- Inter-rater reliability may not be 100% - two nurses using the same tool may obtain different risk scores for the same patient under the same circumstances (Baath et al, 2008);
- The tool may not accurately predict people with an existing pressure ulcer as being at risk (low sensitivity);
- Those assessed as not at risk may go on to develop a pressure ulcer (negative predictive value);
- Using the tool may not reduce the incidence of pressure ulcers (Moore and Cowman, 2010);
- The tool may assess patients as being at risk who may not be (low specificity), which has implications for resources, as they may be allocated to patients who are not at risk (Moore and Cowman, 2010).

Strengths
Some possible strengths of the tools and their use are:

- Their use raises the profile of pressure ulcer risk among the multidisciplinary team and prompts actions to prevent their development;
- When used appropriately and accurately, reliable and valid tools can provide a useful guide to determining an individual’s risk of pressure ulcer development;
- They are a useful educational tool to highlight the risks associated with pressure ulcers to staff, carers and patients.

Risk assessment for pressure ulcer development is the first step in the process of prevention. Using a tool is usually part of that first step and must be combined with clinical judgement, skin assessment and considering the surface. An assessment then triggers care interventions that prevent pressure ulcers from developing (Fig 1).

Challenges in prevention

Patient refusal
On occasion, patients may not wish to change their position as often as needed to protect their skin, or they may refuse to use a pressure-relieving mattress. In such instances, nurses should first consider patients’ mental capacity (Mental Capacity Act 2005).

To ascertain whether patients lack capacity, consider the following:

- Do they have an impairment to mind or brain, temporary or permanent?
- If no, then they have capacity to make decisions, however unwise these may appear to health professionals?

If yes, then further questions must be asked:

- Can they understand the information relevant to the decision when it is presented in a manner that helps them to understand?
- Can they retain this information?
- Can they use this information in the process of making their decision?
- Can they communicate this decision in some form appropriate to their ability?

If the answer to these is yes, then they have the capacity to make their own decisions. In these circumstances, the processes used to consider the above must be documented and patients’ decisions respected.

The Mental Capacity Act recommends that patients should be given the opportunity for them to change their decision and agree to interventions continually.

If a pressure ulcer occurs under these circumstances, it would be deemed to be an unavoidable one (Bedfordshire and

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**TABLE 2. VALIDITY AND RELIABILITY DEFINITIONS**

<table>
<thead>
<tr>
<th>Validity and reliability of tool</th>
<th>Definition</th>
<th>Resulting challenge</th>
</tr>
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<tbody>
<tr>
<td>High sensitivity (Bolton, 2007; Sharp and McClaws, 2006)</td>
<td>The ability of a tool to identify patients with a pressure ulcer among those at risk</td>
<td>If low, a tool may miss people with an ulcer by scoring them not at risk</td>
</tr>
<tr>
<td>High specificity (Bolton, 2007; Sharp and McClaws, 2006)</td>
<td>The ability of a tool to identify those without a pressure ulcer among those not at risk</td>
<td>If low, the tool may over-predict risk of pressure ulcer development</td>
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<tr>
<td>Positive predictive value (Bolton, 2007; Sharp and McClaws, 2006)</td>
<td>The ability of a tool to identify patients as at risk who could develop a pressure ulcer if optimal preventive care is not given</td>
<td>If low, the tool is too sensitive and may over-predict the risk of developing a pressure ulcer when there is no risk</td>
</tr>
<tr>
<td>Negative predictive value (Bolton, 2007; Sharp and McClaws, 2006)</td>
<td>The ability of a tool to identify patients who do not go on to develop a pressure ulcer</td>
<td>If low, the tool is not sensitive enough and may falsely identify patients who are at risk as not being at risk</td>
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<tr>
<td>Intra- and inter-rater reliability (Bolton, 2007)</td>
<td>The level at which the same person or two people assessing the same set of subjects with the same tool will obtain the same score</td>
<td>Poor reliability will result in different scores for the same patient</td>
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</tbody>
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For articles on wound care, go to nursingtimes.net/woundcare
Hertfordshire Tissue Viability Nurses Forum, 2010).

End of life
The skin is an organ and, like the heart, kidneys and other organs, may fail at some point in a person’s life (Sibbald et al, 2009). This is most likely to occur at the end of life and may result in unavoidable skin damage (Bedfordshire and Hertfordshire TVN Forum, 2010; NPUAP, 2010).

Skin changes at life’s end (SCALE) may well be an inevitable event that cannot be averted despite all preventive measures being implemented (Sibbald et al, 2009).

The SCALE consensus document provides further explanation on the care needed under these circumstances (Sibbald et al, 2009). One aspect of this care involves helping patients and family members to understand that skin breakdown is unavoidable and may be part of their terminal illness. This allows for sensitive management of the skin and the patient’s situation, as well as reducing the likelihood of a complaint.

Conclusion
Preventing pressure ulcers is an essential aspect of patient safety. The process of prevention begins with a risk assessment incorporating evaluation of identified risk factors and skin inspection.

Recognising the risk factors for skin damage should prompt preventive care interventions, including consideration of support surfaces, repositioning and nutritional support. Any skin damage should trigger a re-evaluation of preventive strategies.

All members of the healthcare team, healthcare organisations, patient safety organisations, patients, relatives and carers need to accept that some pressure ulcers are unavoidable, while taking a zero-tolerance approach towards the development of avoidable ones.

References
Department of Health (undated) Defining Avoidable and Unavoidable Pressure Ulcers. tinyurl.com/pressure-avoidable.