An overview of pressure ulcer risk assessment tools

Pressure ulcers are believed to largely be preventable, but in order to make best use of both human and physical resources, and maintain patient comfort and dignity, it is important to identify the people most at risk and deliver timely preventative care. Many ‘tools’ have been developed that purport to identify those who are most at risk; some of these are used generically across all patient groups, others are targeted to specific subgroups of patients; but all have some shortcomings. Clinical judgement should always be a key element of assessing a patient’s risk but this can be difficult to articulate and document. Newer ways of identifying at-risk areas rather than at-risk patients are just starting to be developed and used.

Preventing pressure ulcers from occurring within any healthcare setting is high on everyone’s agenda, as they impact significantly on patients’ quality of life, morbidity and mortality, as well as resulting in increased length of stay and additional costs (National Institute for Health and Care Excellence [NICE], 2014a). In order to make best use of limited resources, risk assessment tools (RATs) or pressure ulcer risk assessment scores (PURAS) are widely used across all healthcare settings to help clearly identify patients prevention strategies should be targeted towards.

NICE (2014b) recommends that a validated tool is used to support clinical judgement when assessing risk and the international guidelines (National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance [NPUAP, EPUAP and PPPIA], 2014) caution ‘do not rely on a total risk assessment tools score alone as a basis for risk prevention ... subscales and other risk factors should be examined to guide risk-based planning’.

There are a plethora of risk assessment tools available; some designed for almost generic use, others for specific populations such as those in critical care/intensive care units or paediatrics (Table 1). Equally, attempts have been made to elucidate risk factors specific to areas of the body deemed to be at risk such as heels (Delmore et al, 2015).

There is much discussion around the utility of RATs; in a Cochrane review of RATs, Moore and Cowan (2014) concluded that there is no reliable evidence to suggest that use of structured systematic PURAS reduces the incidence of pressure ulcers. Samuwiro and Dowding (2013) suggest that asking nurses to spend a lot of time, energy and effort assessing risk may not be the best use of resources, given that they do not objectively measure the risk. Nationally and internationally, however, they remain an almost compulsory component of care. Perhaps the main challenge lies in the understanding of what a RAT does or how they are used.

WHAT THE RAT DOES

The RAT is a collection of weighted factors believed to influence the patients’ risk of developing pressure damage. However, many of the components of RATs are not predictive of pressure ulcer occurrence (Anthony et al, 2010; Moore and Cowan, 2014). A systematic review of the literature on risk factors (Coleman et al, 2013) identified 365 papers of which 54 met the eligibility criteria; from these it was possible to determine that myriad factors were believed to increase individual patient’s risk, however,

KEY WORDS

- Pressure ulcer
- Prevention
- Risk assessment
- Skin
### Table 1. Some examples of RATS for specific populations

<table>
<thead>
<tr>
<th>Population type</th>
<th>Tools available</th>
<th>Reference</th>
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<tbody>
<tr>
<td>Used generically</td>
<td>Waterlow, 2005</td>
<td>- Waterlow, 2005</td>
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<td></td>
<td>Braden, 1992</td>
<td>- Bergstrom and Braden, 1992</td>
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<td>Norton, 1975</td>
<td>- Norton et al, 1975</td>
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<td></td>
<td>Shape, 2014</td>
<td>- Soppi et al, 2014</td>
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<td></td>
<td>PURPOSE T</td>
<td>- Nixon et al, 2015</td>
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<tr>
<td>Paediatrics</td>
<td>Braden Q</td>
<td>- Curley et al, 2003</td>
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<td></td>
<td>Glamorgan</td>
<td>- Willock et al, 2007</td>
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<td></td>
<td>PPUPET</td>
<td>- Sterken et al, 2015</td>
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<tr>
<td>End of life/Hospice</td>
<td>Hunter’s Hill</td>
<td>- Chaplin, 2000</td>
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<tr>
<td>Screening tools</td>
<td>Andersen, 1992</td>
<td>- McClemont et al, 1992</td>
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<tr>
<td></td>
<td>PURPOSE T</td>
<td>- Nixon et al, 2015</td>
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<tr>
<td>Orthopaedics</td>
<td>PSPS</td>
<td>- Lowthian, 1989</td>
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<tr>
<td>Community</td>
<td>Walsall</td>
<td>- Chaloner and Franks, 2000</td>
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<tr>
<td>Intensive care</td>
<td>Cubbin, 1999</td>
<td>- Jackson, 1999</td>
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<td></td>
<td>COMHON Sunderland</td>
<td>- Fulbrook and Anderson, 2016</td>
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<td>- Lowery, 1995</td>
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<tr>
<td>Critical care</td>
<td>CALCULATE</td>
<td>- Richardson and Barrow, 2015</td>
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<td></td>
<td></td>
<td>- Richardson and Straughan, 2015</td>
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<tr>
<td>Spinal cord injured</td>
<td>SCIPUS</td>
<td>- Delparte et al, 2015</td>
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The risk factors that emerged most frequently as independent predictors of pressure ulcer development included three primary domains of:

- Mobility/activity
- Perfusion (including diabetes)
- Skin/pressure ulcer status.

Skin moisture, age, haematological measures, nutrition and general health status were also important, but did not emerge as frequently as the three main domains. Body temperature and immunity may be important but require further confirmatory research. There was limited evidence that either race or gender is important.

In addition to the multiple and frequently unsubstantiated risk factors, the importance of these components is often not accurately reflected by their range of values (Anthony et al, 2010); for example, it is unclear why in some RATs a female scores differently to a male or why scores for diabetes may vary between 4 and 6.

The predictive ability of any RAT is determined by using statistical tests that determine what percentage of patients the tool correctly identifies as being at risk (i.e. that patient goes on to develop a pressure ulcer) and also those that the tool correctly predict to be not at risk (i.e. they do not develop a pressure ulcer). However, this assumes that no care will be given which is not the case (Olshansky, 2014). Once risk is identified, preventative action must be triggered; allowing a patient to succumb to a known or imagined hazard would be morally unsupportable (Maylor, 2011).

**HOW RATS ARE USED**

In the reality of clinical practice there are many challenges associated with the use of RATs, for example, the categories included within the tools are frequently open to interpretation. Even in tools such as Braden where descriptors of the main risk factors are given, there can be discrepancies in the way individual clinicians interpret the discrete categories. Many studies investigate both the inter- and intra-rater reliability of the RATs to determine how open to interpretation the factors are (Kottner and Dassen (2010); Wang et al (2015); Fulbrook and Anderson (2016)).

In an attempt to improve the reliability, Choi and Kim (2013) reviewed clinical notes to better understand how nurses used the operational definitions in the activity parameter of the Braden tool. They give examples of nurses using phrases such as: ‘walks occasionally during the day but for short distances’ and ‘spends the majority of each shift in bed or chair,’ which are probably common phrases — but when determining what they actually mean, could be interpreted and applied to the risk categories very differently.

In a busy clinical setting, complex RATs with multiple categories can frequently be poorly completed. Samuwiro and Dowding (2014) concluded that most nurses do not assess patients’ risk on admission, instead deferring assessment to the day after admission or even later. This is contrary to the guideline recommendations that stipulate assessment should be completed as soon as possible and at the maximum within 8 hours (NICE, 2014b). They also suggest that nurses prepared to manipulate a risk score in order to
ensure patients were eligible for a particular type of pressure-redistributing equipment. Johansen et al (2014), who compared assessment and preventative care in Ireland (where RATs are used) and Norway (where RATs are not used), found that staffing levels, a lack of time and staff competence hindered optimal documentation.

One of the frequently mentioned shortcomings of RATs is their presentation: they must be in a user-friendly format to encourage clinicians to use them. Kin et al (2014) developed a prototype mobile system called SAPPRIE (Skin Assessment for Pressure Ulcer Prevention, an Integrated Recording Environment) for an android device to assist nurses with skin assessment and documentation at bedside. The device was designed to demonstrate: data documentation conforming to the relevant terminology standards, data exchange using Continuity of Care Records standard and smart display of patient data relevant to risk parameters to promote accurate pressure ulcer risk assessment with the Braden Scale. The electronic platform allowed them to refine criteria and offer multiple options via a touch screen platform to encourage accuracy. Unfortunately, they do not present data on actual clinical use.

Creehan and Brindle (2011) identified that staff frequently recorded a risk score in their documentation but failed to enact interventions to prevent pressure ulcer development. They decide to make the Braden scale come alive and embedded recommendations for care in each of the categories and subcategories. To provide nurses with immediate understanding of their patients’ risk of skin breakdown, they used the traffic light system previously developed by the Royal Adelaide Hospital (2014) in Adelaide, Australia (Figure 1). As the Braden scale’s subscores are listed from low risk (4) to high risk (1), so the colours change with each risk level, from green (low risk) through yellow to red (high risk). Illustrations are used alongside the colour-coded chart to assist understanding of which aspect of the patient’s condition they’re assessing. They modified the tool to include subcategory interventions — thus really guiding the care that needed to be delivered.

This thoughtful consideration of how nurses access and use tools makes the tools considerably more user-friendly and therefore more likely to be used.

**ALTERNATIVES TO RATs**

**Clinical judgement**

Many studies identify that nurses also use their clinical judgement, frequently overriding the ‘score’ as determined by the RAT. This is perfectly acceptable; indeed, it is recommended in both the NICE (2014b) and NPUAP, EPUAP, PPPIA (2014) guidelines. Based on reflections of the methodological literature, a critical appraisal of available trials on this subject. Balzar et al (2013) conclude that there is no reliable evidence that RAT aided risk assessment is any better than clinical judgement in assessing risk. However, it can also be a further cause of differences; Balzar et al (2014) identified that nurses are likely to trade-off risk-enhancing conditions against factors they perceive are protective, for example, balancing risk factors with the patient’s willingness and ability to participate in preventative care. They also identified divergence when assessing the risk related to some patient characteristics. They cited two conditions that were differently interpreted as both risk increasing and risk lowering (use of an indwelling urinary catheter and smoking). Two of the nurses in their study associated the presence of a catheter with increased risk, as it would be likely to hamper mobility; four regarded this as protective as it reduced the exposure of the skin to moisture. Three nurses identified the increased risk from smoking, based on its effects on circulation/perfusion. One, however, suggested this was a possible risk-reducing effect as many smokers are early mobilisers, being more motivated to walk due to their nicotine dependence.

Johansen et al (2014) concluded that the use or not of a RAT did not make any difference to the identification of at-risk patients, planning, initiation and evaluation of pressure ulcer prevention strategies.

**Skin assessment**

Several alternatives to RATs have been proposed. Vanderwee and colleagues completed a randomised controlled trial comparing the use of the Braden scale to the presence of non-blanching
Figure 1. The Braden Traffic light tool (amended from Royal Adelaide Hospital, Australia)
erythema (NBE) as the trigger to instigate preventative equipment (Vanderwee et al, 2007a). In this large study (1,671 patients), the pressure ulcer incidence (grades 2–4) was not significantly different between the experimental (6.8%) and control groups (6.7%), however, in the Braden group, twice as many patients (32%) received preventative equipment with compared with 16% in the NBE group — a significant cost difference. However, the study acknowledges that there were no patients with dark skin included and that NBE is much more difficult to distinguish in those patients. McReath et al (2016) studied the use of the Munsell colour chart to identify damage (NBE) on skin of different colour tones and concluded that as populations become increasingly multiracial, tools such as the Munsell colour chart could become essential in assessing accurate skin colour baseline measurements, which are imperative assessments for detection of NBE development in patients with darker skin tones.

Akins et al (2016) studied the use of ultrasound as an imaging modality for acquiring measurements of anatomical features associated with deep tissue injury (DTI) in six participants (two controls, two with recent SCI and two with long-term SCI). They concluded that given the reliability and ability of ultrasound measurements to identify high-risk anatomies, as well as the cost effectiveness and availability, these show promise for use in future development of a patient-specific, bedside, biomechanical risk assessment tool to guide clinicians in appropriate interventions to prevent DTI.

Moore et al (2016) reviewed the literature on the use of a sub-epidermal moisture (SEM) scanner, suggesting that it can detect pressure damage some 3–10 days prior to damage being observed on the skin. Guihan et al (2012) assessed the SEM scanner in 34 SCI veterans and demonstrated the ability of the scanner to detect differences in the skin suggestive of early pressure damage. This is supported by O’Brien (2015), who used the scanner to compare with nurses’ skin assessment in 47 patients. Of the 47 patients, 34% (n=16) exhibited sustained elevated deviation in SEM levels and 100% went on to develop visual signs of pressure ulceration. However, more importantly, the scanner identified damage, on average, 3.9 days earlier than nurses’ visual assessment.

OTHER TOOLS

Some areas suggest alternatives to PURATs; for example, Hyun et al (2014) propose the use of body mass index (BMI) in patients within an intensive care unit. The incidence of pressure ulcers in the underweight, normal weight, obese, and extremely obese groups was 8.6%, 5.5%, 2.8% and 9%, respectively. When both the score on the Braden scale and the BMI were predictive of pressure ulcers, extremely obese patients were about two times more likely to experience an ulcer than were normal weight patients.

Dijkstra et al (2015) evaluated pressure ulcer risk using the Care Dependency Scale (CDS) for patients receiving home care or who where admitted to a residential or nursing home. They found that CDS items ‘body posture’ (home care), ‘getting dressed and undressed’ (residential homes) and ‘mobility’ (nursing homes) were the most significant variables which affect pressure ulcer occurrence. They concluded that the CDS was able to distinguish between patients at risk for pressure ulcer development and those not at risk in both home care and residential care settings. In nursing homes, however, the usefulness of the CDS for pressure ulcer detection was limited. They suggest that as the CDS is already used as a general assessment tool and appears to have the ability to identify risk, the use of a single (rather than two) risk assessment tools would simplify processes and increase the use of the tool.

Similarly, Carreau et al (2015) compared the use of the minimum data set 2.0 (MDS 2.0) to the Braden score in a complex continuing care setting using a retrospective chart review of 51 patients. They concluded that the MDS 2.0 PURS may be an alternative risk assessment tool option that utilises mandatory collected data, reduces workload duplication, and would generate a resident assessment protocol, when indicated, in complex continuing care.

RISK ASSESSMENT AND PREVENTION

Perhaps one of the biggest challenges for the RATs
is that a tool does not prevent a pressure ulcer — it is the care that is planned and implemented following the assessment that prevents the pressure ulcer occurring. Anthony et al (2010) state quite clearly that there is no evidence that the use of RATs reduces pressure ulcer incidence. Vanderwee et al (2007a) showed that there was a complete disconnect between risk assessment and preventative interventions. In their systematic review of nurses’ judgements and decision-making, Samuriwo and Dowding (2014) identified poor use of the risk assessment to underpin preventative plans and decision-making. However, Maylor (2011) presented a slightly different view, suggesting that is a false assumption that people act effectively on the basis of what they know and that risk can always be reduced. In order to trigger action, nurses must both believe that their intervention will make a difference and that it is within their power to change what is done (Maylor and Torrence, 1999). In many cases, the plan of prevention is overly simplistic and is based on what nurses have access to and feel they can control — frequently the use of specialist mattresses and cushions, skin care and a repositioning regimen. However, these simple actions form the basis of the SKIN (or SSKIN) bundles, and if implemented consistently alongside nutritional care and management of incontinence, should go some considerable way to help prevent pressure ulcers occurring. Perhaps if the RAT focused on fewer but more crucial risk factors, it would be easier to direct more appropriate care.

The PURPOSE T risk assessment tool (Nixon, 2015) was developed based on a systematic literature review and Delphi process: it includes only six key risk factors:

- Analysis of independent movement
- Sensory perception and response
- Moisture due to perspiration
- Urine, faeces or exudate
- Perfusion, nutrition
- The presence of diabetes.

There are no numbers to be added up, the higher risk in each category is colour-coded. Crucially, there is a short screening process for patients deemed not to be currently at risk and also a plan of action generated from the risk. It uses the same traffic light system used in the Royal Adelaide poster to make it quick and easy to understand.

CONCLUSION

While many RATs exist, it appears that no single one is universally liked or used and determining the reliability or validity of the tools is complicated by the need to intervene. There are many flaws associated with these tools including the fact that use of a risk assessment tool may not improve patient outcomes (Balzar et al 2013; Samuriwo and Dowding, 2014). The missing link between assessment, care planning and provision is a fundamental flaw. Johansen et al (2014) suggest that the practice of risk assessment should be re-evaluated. Nurses should be encouraged to use a combination of clinical judgement, information they have collected from other tools and risk assessment to develop a more focused assessment that leads to a good plan of care. Commissioners of healthcare may wish to focus on encouraging the development and delivery of plans of care rather than completion of RATs.

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PURPOSE T available from https://xforms.leeds.ac.uk/forms/form/465/en/accessing_purpose_t_and_pupps_resources


