Assessment of pressure ulcer risk by ambulance staff in the pre-hospital setting

KEY WORDS

- Ambulance service
- Paramedic
- Pressure ulcers
- Risk assessment
- Wound care

Pressure ulcers (PU) occur across a range of healthcare settings and have a significant impact on patients' quality of life, and can result in prolonged hospital stays (Wood et al, 2019). Frontline ambulance staff, including emergency care assistants, technicians and paramedics, attend a large numbers of patients at risk of developing a PU. However, there is little research published on their role in PU identification, risk assessment, or PU prevention for those patients who are left at home following an ambulance attendance. This article will analyse three PU risk assessment tools and will attempt to determine which one might be appropriate for use by ambulance staff when attending patients in the pre-hospital setting.

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Pressure ulcers (PU) are an injury that occurs when skin and underlying tissue is subjected to sustained pressure, usually over a bony prominence, with or without shear, resulting in localised tissue damage that can present as an open ulcer or with the skin intact (Wood et al, 2019). They occur across a range of healthcare settings and have a significant impact on patients' quality of life, sometimes resulting in prolonged hospital stays (Wood et al, 2019). There were over 202,000 PUs recorded in the UK in 2018, costing over £500 million to the NHS (Guest et al, 2020). To reduce the healthcare burden of PUs, the National Institute for Health and Care Excellence (NICE) has set out guidance for health professionals to identify those at risk and prevent PU formation with the use of a structured risk assessment tool to guide preventative interventions (NICE, 2014). This article will analyse the various PU risk assessment tools used for assessing PU risk, to determine which may be appropriate for use by frontline ambulance staff when attending patients in the pre-hospital setting.

Despite frontline ambulance staff, which includes emergency care assistance, technicians and paramedics, attending many patients who are at risk of a PU developing, there has been little research published examining their role in PU identification, risk assessment, or PU prevention, for those individuals who were not taken to the emergency department following ambulance attendance. Only a small number of studies have assessed the role of ambulance staff in identifying PUs in patients conveyed to a hospital (Dwyer et al, 2014; Bååth et al, 2016; Fulbrook et al, 2019; Mains et al, 2020; Mäkinen et al, 2020). In 2015/2016 the UK ambulance services figures reported 10.7 million 999 calls and 6.6 million face-to-face patient encounters. Falls accounted for 8–10% of these calls, most of them involving elderly patients, 48% of whom remained at home without being transported to an onward facility (National Audit Office, 2017; Snooks et al, 2017). Most of the calls relating to falls required a Category 3 response, meaning they are classified as an urgent call rather than life threatening or an emergency. In March 2020, the mean ambulance response time, from time of call to attendance on scene was 90 minutes, but this does not reflect the time patients may have spent immobile on the floor before the call was made (Nuffield Trust, 2020). It is known that prolonged immobility on a hard surface represents a significant risk factor for PU development (Coleman et al, 2013). Frontline ambulance staff are taught to conduct a primary and secondary survey to identify injuries

or illnesses requiring assessment or treatment in hospital, but few ambulance staff have received training or awareness of skin assessment and the risk of PU development (Brown et al, 2019).

Frontline ambulance staff follow clinical guidelines set by the Joint Royal Colleges Ambulance Liaison Committee (JRCALC; Brown et al, 2019). These guidelines incorporate a section covering falls in older adults that follows NICE advice to perform a skin inspection on patients who have had a fall (NICE, 2014). This is useful at prompting frontline ambulance staff to examine the skin for damage resulting in skin tears, lacerations, and abrasions; it is observed in local practice that few frontline ambulance staff are confident in assessing for PUs. In addition, PU prevention/management is not part of the training syllabus for any clinical grades in the ambulance service. With training on PU prevention/management and the use of a suitable pressure ulcer risk assessment (PURA) tool, frontline ambulance staff are ideally placed to identify those at risk of PU formation and could initiate initial PU prevention strategies.

Pressure ulcer risk assessment tools

In our area three PURA tools are commonly used: Waterlow; Braden; and PURPOSE-T. The Waterlow tool was developed in 1985 and was designed for use on surgical and medical patients in hospital. It incorporated a total of 13 elements that were believed to be risk factors for PU development (O'Tuathail and Taqi, 2011). The tool has been assessed for the level of inter-rater agreement between different health professionals and was found to have an 86% concordance when allowing for a two-point difference in total score. In a literature review, Walsh and Dempsey (2010) looked at the validity of the Waterlow scale and found that the scale had high sensitivity but low specificity in many of the studies they reviewed. This could result in patients being wrongly considered at risk of developing a PU, with the potential to go on to receive time-consuming and costly interventions they did not need. The Waterlow scale has some limitations as a tool for use by ambulance staff since they would need access to medical records to complete the sections on medications and malnutrition (this is often not available at the scene, and staff rely on the patient to provide the relevant details). Completion of the form would therefore be a relatively lengthy and time-consuming addition to the ambulance workload, and this taken with the potential for overprediction using this PURA, makes this tool impractical for ambulance use.

The Braden scale was formulated in the US (Braden and Bergstrom, 1987), and incorporates what was known at that time about the aetiology of PU development, primarily the duration and intensity of pressure, and factors affecting the tolerance of tissue for pressure (Braden and Bergstrom, 1987). Several studies went on to test the validity of the Braden scale with many being evaluated in subsequent systematic reviews (Baris et al, 2015; Pancorbo-Hidalgo et al, 2006). These studies found that the Braden scale (with risk scores ranging from 6 [high risk] to 24 [low risk]) was a useful tool across a wide range of hospital and community settings. When a cut-off value of 19 was used for being at risk within community-based care, the weighted average values for sensitivity and specificity for the Braden scale were 61% and 68% respectively (Bergquist and Frantz, 2001). To introduce this tool into ambulance practice, staff would need a basic level of training on PU awareness and what advice to give patients around PU prevention. This training can be carried out easily, and the advice supplemented with a patient information leaflet.

In considering which tool may be the most effective in clinical practice, several systematic reviews and meta-analysis compared the validity of these scales against each other (Pancorbo-Hidalgo et al, 2006; Anthony et al, 2008; Coleman et al, 2013; Park and Lee, 2016; Moore and Patton, 2019).

Pancorbo-Hidalgo et al (2006) concluded that the use of any PURA tool was effective at prompting staff to put into place interventions for PU prevention. The Braden scale was the most studied for validation across various settings including residential care and home settings, where ambulance staff often operate. The Braden scale was also found to have the best balance of sensitivity and specificity, as well as positive predictive value and inter-rater reliability. Despite the Braden scale having the highest

level of validity, there is not enough evidence to demonstrate that the application of this, or any of the PURA tools, will reduce PU incidence; they are, however, aide memoirs for clinical staff. A systematic review by Park and Lee (2016) identified several issues with trying to assess the validity of a PURA tool. The authors found that different studies used different cut-offs in scores to determine PU risk; sensitivity varied with age; and different studies elicited different results in different clinical settings. They concluded that the heterogeneity between studies meant that neither tool could demonstrate consistent value at predicting PU development across all settings. The findings from these two systematic reviews were supported further by a recent Cochrane review conducted by Moore and Patton (2019), in which randomised control trials in hospital settings were reviewed. Each study had 3 arms that compared the use of PURA tools with no structured PU risk assessment, or with unaided clinical judgement, or compared different PURA tools. The authors concluded that they could not be certain whether the use of a PURA tool made any difference to PU prevention compared with the use of clinical judgement alone, and rated the certainty of evidence as low or very low. Since there appears to be no difference between clinical judgement and a PURA tool at reducing PU incidents, it seems both feasible and pragmatic to raise awareness and knowledge of pressure ulcers with frontline ambulance staff and then later develop a PU pathway that incorporates a formal PURA tool.

It is evident that different PURA tools use different graded risk factors that are believed to determine the likely risk of a patient developing a PU. Coleman et al (2013) conducted a systematic review of 54 studies and found that the risk factors that emerged most frequently as independent predictors of PU development were: mobility/activity, perfusion to the skin, and skin/PU status. Coleman et al (2013) also noted that having a category I PU increased the likelihood of a subsequent ≥category II PU by 2–3-fold. This is a significant finding when considering the potential progression of a newly formed PU in patients who have had a long lie on the floor following a fall. Ambulance staff should be able to confidently identify a category I PU and provide self-care advice and make an urgent referral to community nursing for a review of the patient's skin, as well as assessing the ongoing risk factors that may contribute to the development of that PU.

Looking at where there has been agreement that a specific tool is best suited to a specific situation, there is still no consensus on the cut-off score that should be used to indicate which patients are at risk (Park and Lee, 2016). Lahmann and Kottner (2011) noted that patients who scored 'completely immobile' in the mobility category of the Braden scale were more likely to develop category III and IV PUs, while patients recorded with 'problem' in the friction and shear category were more likely to develop category I and II PUs. This has implications for PU development in patients who have fallen and are immobile on the floor but who may also be subject to friction and shear as they try to move and get themselves up, as well as on the manual handling techniques employed by frontline ambulance staff in assisting patients up off the floor, and also for the transportation of these patients on ambulance trollies in the back of moving vehicles where friction and shearing forces are significantly exaggerated by the movement of the vehicle.

PRESSURE ULCER RISK PRIMARY OR SECONDARY EVALUATION TOOL (PURPOSE-T)

Nixon et al (2015) developed a new PURA tool to overcome some of the conceptual limitations of the existing PURAs and developed the 'Pressure Ulcer Risk Primary Or Secondary Evaluation Tool' (PURPOSE-T). This instrument underwent five phases of development; a systematic review of the literature; a consensus study using questionnaires and face-to-face interactions with international experts in the various fields of PU; conceptual framework development; and design and pre-testing, and clinical evaluation (Coleman et al, 2013; 2018). The systematic review and consensus study set out to establish a minimum data set of risk factors for PU development. These were identified as being mobility, perfusion, and skin status (Coleman et al, 2013). Clinical evaluation involved hospital inpatients, as well as community nursed patients (Coleman et al, 2018). Ward and community nurses had online training on the use

of PURPOSE-T and simultaneously performed paired PURPOSE-T and skin assessments with an expert nurse. This demonstrated that inter-rater reliability was "good" for agreement on the decision pathway through the tool, and "very good" for agreement on "at risk/not at risk" status of patients. This would suggest that a similar level of online training, alongside additional training on PU prevention, could be delivered to ambulance staff to improve their level of competence at assessing the patient at risk using this PURA tool.

PURPOSE-T has consistent assessment outcomes when used by expert and non-expert staff. It is a time efficient tool that quickly identifies those who are at risk and those who are not. If a patient is deemed "not currently at risk" in step one, the PURA is complete. Where patients are assessed as being at risk, the tool prompts a more detailed and guided skin inspection with a simple tick box assessment that leads to a recommendation of either primary prevention or secondary prevention measures. While these measures cannot be provided by ambulance staff themselves, it does mean that those patients (who would usually receive no onward referral) would be referred to community nursing for review of any wounds sustained in the fall, as well as their care needs to prevent PU development. Various regional initiatives, such as the NHS Improvement "Stop the Pressure" campaign and the North East and North Cumbria "Pressure Ulcer Collaborative", have demonstrated that 50% reductions in PU incidents across all care settings can be achieved through a programme of staff education, PURA, implementation of the SSKIN care bundle, and collaboration between organisations through the National Wound Care Strategy Programme (NHS, 2017; Wood et al, 2019).

DISCUSSION

We have highlighted that frontline ambulance staff have minimal training and awareness of PUs and that they seldom assess skin for PUs. An educational programme alongside the implementation of PURA tool has the potential to identify many more PUs at an earlier stage and has the potential to decrease PU development, as ambulance staff could identify many of those at risk and refer them on for secondary prevention. Ambulance services have an ever-increasing role to play within this domain. They are increasingly attending an ageing population with greater comorbidity, requiring more frequent attendances by ambulance services for unscheduled care of minor injuries. Many frontline ambulance staff within East of England Ambulance Service are trained in wound closure techniques for acute minor injuries including lacerations and skin tears. Latterly, the addition of PU awareness has started to be embedded into this training, but a formal pathway incorporating a skin assessment and onward referral is yet to be developed. A potential limitation to this referral process is the work capacity of community nurses to follow-up on the number of referrals that they may receive from ambulance staff. This will require collaborative working in setting up a realistic referral pathway.

The extent that falls in older adults contribute to the incidents of PUs is not known and needs further research. Prolonged periods of immobility on a hard surface present a high risk of PU development (McInnes et al, 2015). Frontline ambulance staff attend over 500,000 such events each year and are ideally placed to assess these patients for risk of PUs (National Audit Office, 2017; Snooks et al, 2017). But it is also the 6 million other patients they attend each year, many of who have risk factors for PU development, such as age, frailty, immobility, comorbidities, and incontinence, which could also be assessed by ambulance staff.

In reviewing the literature, it is apparent that no one tool is perfect for all settings. There are no published reports showing that the use of a PURA tool will reduce the incidents of PU development. What is evident though, is that PU education is a more relevant factor when implementing a PURA tool (Anthony et al, 2009). PURA tools can act as a useful adjunct prompt for staff to complete a more thorough skin assessment. In reviewing the literature, PURPOSE-T appears to be user-friendly and a time-efficient method in carrying out risk assessment for PU development. To test this assumption in clinical practice within the ambulance service setting, training would be required, followed by an audit cycle of the use of PURPOSE-T. In addition, it is important to recognise PURPOSE-T can also quickly identify those patients not at risk of PU development who will not require further assessment. WUK

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