

# The impact of occupation on wound healing: a literature review on the holistic approach of wound management in high-risk patient groups

## KEY WORDS

- ▶ Wound
- ▶ Paramedic
- ▶ Occupational
- ▶ Stress
- ▶ Wellbeing

In order to understand the link between stress and wound healing within a biopsychosocial model of care, this paper has reviewed themes emerging from a profession with recognised high stress levels amongst its employees: paramedicine. The paper uses paramedicine in order to identify themes that may also be relevant across other professions and considers how the clinician can factor this occupational dimension into any future care plan, in order to enhance overall wound care.

Within western medicine, we are comfortable with the notion that poor mental health can have a direct link to our physical health (World Health Organization [WHO], 2016). These links have previously related to the immune system, cardiovascular health, metabolism and obesity and post-surgical recovery. However, we are only now starting to really engage with the opposing side of this partnership, thus unlocking the powers of the mind when it comes to healing the physical body and thus a belief that there can be 'no health without mental health' (WHO, 2016).

Through the production of pro and anti-inflammatory cytokines, our cellular immunity has an important part to play in the effectiveness and regulation of wound healing. Stress is noted to have a negative impact on wound healing, most importantly its effect on this cellular immunity (Autieri et al, 2012).

In 2007, a systematic review and meta-analysis was conducted into the relationship between psychological stress and wound healing. Twenty-two studies were reviewed in the 2007 systematic review and meta-analysis. Seventeen of these studies were found to show an association between patient stress and impaired wound healing. The meta-analysis produced an estimated relationship of  $r=-0.42$  (95% CI=-0.51 to -0.32)

(Pb.01) (Walburn et al, 2009). In a more recent 2017 study, this relationship was once again demonstrated where wound complications post-surgery were found to be statistically more likely in patients with pre-existing moderate anxiety or depression (Britteon et al, 2017).

Whilst a mental health diagnosis may already be in place, a holistic overview is important during the consultation process as some patients may appear to be coping or simply not recognise the stress levels within their daily lives, especially when these stresses are deemed a 'normal' and potentially acceptable part of their occupation and work life. Statistics have shown that mental health rates and moreover suicide rates, can be directly linked to occupation. The prevalence of suicide in the general populace is 1–2% per occupation; however, in healthcare professionals this rate can be as high as 2–4% (Gov.uk, 2017). Are healthcare professionals a patient group clinicians should be particularly mindful of then when considering presentations that may be effected by stress levels, such as wound care?

Before considering how patients' care may need to change to form a biopsychosocial care plan around their presenting complaint, we first need to understand the occupational stressors and to do so we need to review a profession with associated with high-stress levels. The paramedic

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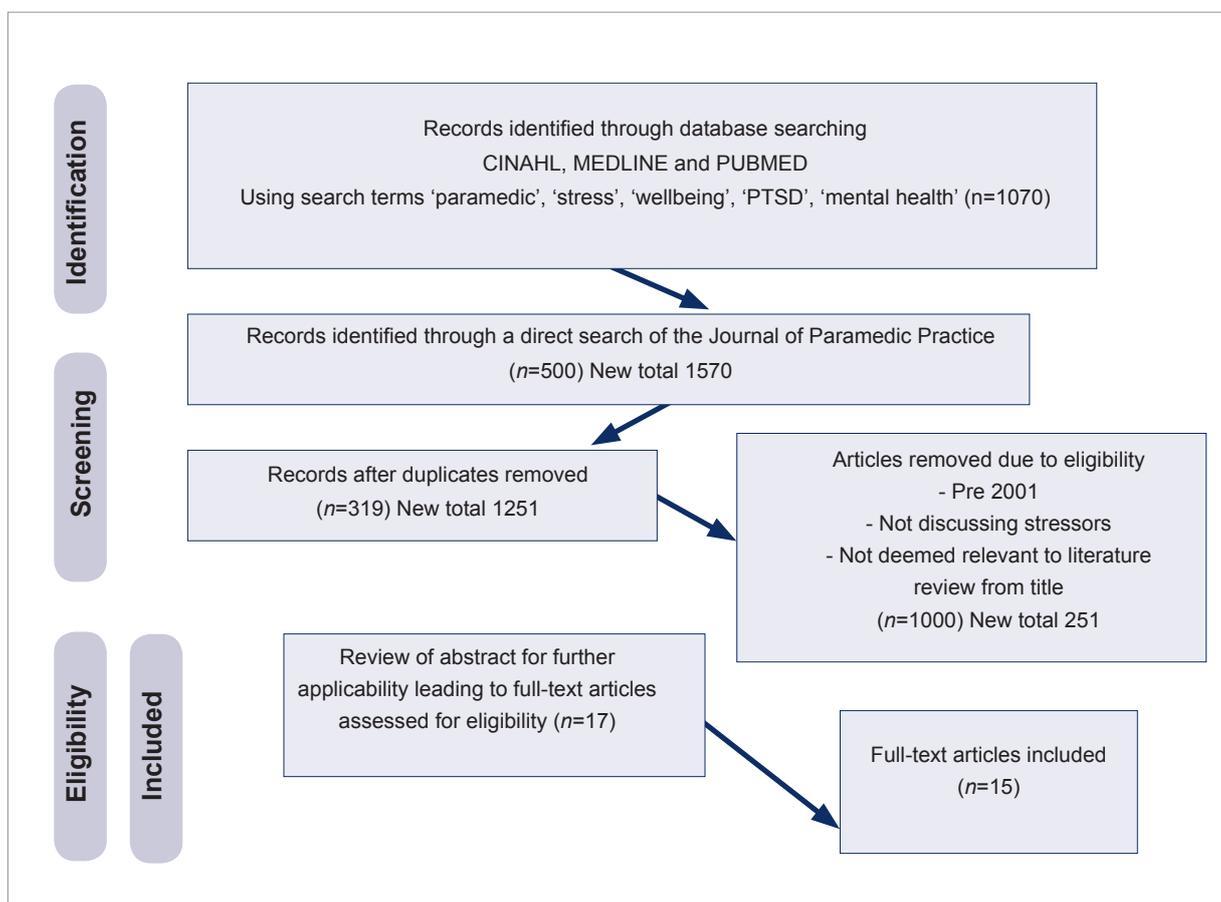


Figure 1. Adapted Preferred Reporting Items of Systematic reviews and Meta-Analyses (PRISMA) flow chart.

profession is one of the most stressful occupations worldwide (Oginska-Bulik and Kaflik-Pieróg, 2009). A recent survey of emergency services personnel, carried out between 5th December 2014 and 12th January 2015, revealed that of those personnel working in the ambulance service whom completed the survey, 87.57% had experienced stress, low moods or poor mental health whilst employed by the ambulance service, moreover, 71% felt that their organisation did not support them discussing their mental health as opposed to 45% in the general workforce population, 44% felt they would be treated differently if they did disclose while 79% would feel more comfortable talking about their physical health (Mind, 2015). These powerful statistics further support the previously identified need to not overlook the potential for underlying stress during a physical health consultation and perhaps argues that healthcare practitioners are one such group at risk of being missed.

## METHOD

In order to conduct a review of the evidence, the following databases were searched using key words (paramedic, stress, wellbeing, PTSD, mental health), for relevant studies: CINAHL, MEDLINE and PUBMED. The time period was later limited to post 2001 and extended to an identified occupation specific journal in order to acquire the most recent and appropriate articles for discussion. Credibility, validity and reliability were used to analyse and evaluate the resources found. A selection of these studies will now be described. *Figure 1* is an adapted Prisma flow chart (Mother et al, 2009).

## RESULTS

Of the 15 papers reviewed, thematic analysis revealed the following categories suggestive of underlying occupational causation for stress as seen in *Box 1* (Mahony, 2001; Regehr et al, 2002; Ploeg and Kleber, 2003; Crew, 2006; Sterud et al, 2011; Collopy et al, 2012; Courtney et al, 2012; Simpson,

Box 1. Underlying occupational causes for stress
Shift work
Sleep patterns due to night sleep working
Long working hours / overruns
No time for social events or family time
Unable to eat regularly or healthily
Lack of support within the organisation
Not enough debriefing time
No time for sporting activities

2013; Hegg-Deloye et al, 2013; Fjeldheim et al, 2014; Minnie et al, 2015; Barrett, 2016; Kirby et al, 2016; Quaile, 2016; Rybjad et al, 2016).

**DISCUSSION**

Although not all of the above causations can be addressed by the wound care clinician, as some are occupation specific and thus only correctable within the organisation, the clinician can, and arguable should, look to address those within their ability and with a proven previous link to wound care healing. The themes outside of the clinician's scope of influence should still be recognised as stress inducers and this screened for when considering the occupational link to impaired wound healing and thus recognise patients at such risk. These themes can be categorised into two main areas of clinical intervention; mental wellbeing, where the intervention may take the form of counselling or stress management techniques, and physical wellbeing, where a healthier lifestyle may be encouraged, including considering a period of sickness absence from work even if the isolated wound does not automatically warrant this. The clinician should consider if any interventions under either of these two categories can be made in order to enhance the patients overall wound recovery rate.

**SHIFT WORK AND WORKING PATTERNS**

Several publications have noted that shift work can have a detrimental effect on an individual's health and wellbeing (Courtney et al, 2012; Crew, 2006; Hegg-Deloye et al, 2013; Kirby et al, 2016; Mahony, 2001; Ploeg and Kleber, 2003; Sterud et al, 2011).

A recent qualitative study concluded that the main negative effects of shift work were sleep deprivation, adverse physical and psychosocial wellbeing and increased risk of human error. The authors concluded, however, that shift work could be more acceptable and tolerated at a younger age (Kirby et al, 2016).

Length of shifts was also noted as having a negative impact on mental health. (Collopy et al, 2012; Courtney et al, 2012; Kirby et al, 2016; Mahony et al, 2001; Sterud et al, 2011).

Public health campaigns are in place to try to raise awareness among the working public with regards to 'burnout'. One such web campaign focusses on excessive stress, insomnia, fatigue, depression, anxiety amongst other comorbidities are associated with 'job burnout' (Mayoclinic, 2015). Furthermore, long working hours, long commutes to work and lack of sleep, caused by shift work, has been noted within research to exacerbate to chronic stress (Collopy et al, 2012; Kirby et al, 2016). Long hours are an occupational stressor that is similar across many organisations however it is noted as a common factor associated with poor mental health among healthcare professions (Sterud et al, 2011). As well impacting mental health, there is also a noted link with increased risk of workplace accidents (Courtney et al, 2012). Although there is yet to be a proven direct link between sleep deprivation and delayed wound healing, it has been hypothesised on several occasions (Mostaghimi et al, 2005; Landis and Whitney; 1997; Egydio et al, 2011).

The link between sleep deprivation and stress is, however, proven, as is the subsequent link between stress and delayed wound healing. The clinician should consider whether a period of 'sick leave' may benefit the patients overall healing process even if the wound does not necessary directly suggest this; noting any working patterns suggestive of increased stress and by proxy delayed wound healing.

**SLEEP PATTERNS**

Poor quality sleep is a well-established outcome of shift work with a potential negative physical and psychological effect on employees (Crew, 2006; Courtney et al, 2012). A qualitative study identified the amount of sleep achieved after a night duty. Results noted a maximum of eight and minimum

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three hours recorded. Overall, participants agreed that the quality of sleep was poor after shifts and worst after night shifts; perhaps a result of the body's natural internal clock or circadian cycle, not being able to adjust (Crew, 2006). The patient's circadian cycle will tell the body when to sleep, rise, eat and regulates many physiological processes; when this cycle is disturbed, these processes are too (Mohawk et al, 2012). Research is currently examining the effects of a disturbed circadian cycle, including the correlation with neurological issues such as depression and other mental health illnesses and with a noted link between mental and physical health, this must be noted in a patient with wound care needs (Hickie et al, 2013). Also, previous research had been unable to establish a proven direct link between sleep deprivation and wound healing; recent research, however, has proven a positive link between circadian rhythm and wound healing in Siberian Hamsters (Cable et al, 2016). Whether the patient is still working or taking 'sick leave', there may be an inevitable change in sleep pattern due to a change in work/life patterns or perhaps a difficulty in sleeping directly related to the wound; thus sleeping patterns and the impact on the patients mental wellbeing should be considered by the clinician when providing holistic care to the wound care patient.

#### **MENTAL WELLBEING SUPPORT NETWORKS DURING PHYSICAL RECUPERATION**

Experiencing and coping with a physical wound is known to cause stress and even depression in some patients, especially if that wound is associated with a traumatic or life changing event and thus having a support network in place during the healing process can be key in a positive prognosis (International Consensus, 2012). Working unsocial hours has a negative effect on family life and social events and studies have shown that professionals who work shifts are more likely to experience social isolation (Ploeg and Kleber, 2003; Crew, 2006; Kirby et al, 2016). In addition to this, there is growing evidence to show that social isolation has a negative impact on an individual's mental and physical wellbeing with unmet social needs taking its toll on health, blood pressure, memory and shown to be a major precipitant of depression and alcoholism. (Askt,

2008; Cacioppo and Decety, 2009; Cacioppo et al, 2009a; Cacioppo et al, 2009b). Not spending enough time with friends and family leaves individuals feeling socially isolated, any additional recuperation needed after an acquired wound may further contribute to such isolation if support networks have not been formed.

It was also noted in these studies that support may not always be readily available within the patient's workplace and that a lack of social and employer support along with poor communication can be factors of post-traumatic, burnout and fatigue symptoms (Ploeg and Kleber, 2003; Sterud et al, 2011). In one particular cross sectional study 78% of participants felt an inadequacy in their companies support structures (Minne et al, 2015). When paramedics were asked to score the levels of support given to them by friends and family verses employers and unison, the later scored dramatically lower indicating that the support from employers were little to none (Regehr et al, 2002).

#### **DIET AND EXERCISE**

Most health care practitioners will routinely consider diet and exercise as part of a holistic treatment regime. In terms of wound care, this may naturally be considered in light of the direct link between a healthy diet and the ability of the skin to remain healthy and regenerate, especially in the presence of a prolonged catabolic phase and subsequent protein energy malnutrition (Todorovic, 2002; Wild et al, 2010). Evidence in the form of meta-analysis and systematic reviews now also indicates a link between a good diet and a patient's mental health and wellbeing (Psaltopoulou et al, 2013; Lai et al, 2014), thus also impacting on wound healing (Walburn et al, 2009). However, the indirect link between a patient's occupation and the ability to maintain a healthy lifestyle needs to also be considered. It is well known that paramedics adopt a poor diet and unhealthy eating habits due to the unpredictable call outs which can cause irregular meal times; it is reasonable to suggest that this may translate to other similar occupations such as other health care workers or members of the emergency and armed services (Crew, 2006; Collopy et al, 2012; Courtney et al, 2012). Paramedics found it hard to eat healthy and regularly due to not being

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able to take their breaks at normal meal times, with some paramedics stating that difficulties storing food during shifts would lead to unhealthy snacking and a poor diet; once again there could be a natural link with other similar professions (Kirby et al, 2016). Shift work also has frequent reports of gastrointestinal complainants such as constipation, potential due to the dietary issues described above (Crew, 2006). With these occupational links dietary issues in mind, along with the noted direct link between diet and skin health, the clinician may wish to refer to a dietician or occupational health therapist for a multi-disciplinary approach to patient care and thus improved wound healing.

When considering healthy lifestyle, diet and exercise is normally considered hand in hand. The direct link between wound healing and exercise is supported within evidence-based research among older adults and thus should be considered as a recommendation by health care clinicians, as part of a holistic treatment plan (Emery et al, 2005; Goh and Ladiges, 2014). Moreover, exercise programmes and other treatments such as meditation have been successful in reducing symptoms of anxiety and depression and improving cognitive function, thus improving the quality of life for those with a chronic mental health illness (Sharma et al, 2006; McGee, 2008). With regards to mild depression, physical activity can be as effective as antidepressant prescriptions or Cognitive Therapy (Blumenthal et al, 2007; Tzu-Ting et al, 2015). A high percentage of paramedics are classed as obese on the BMI; with a potential link to shift work compromising the chances of regular exercise and prohibiting team-sporting opportunities, this may also be a general concern amongst shift workers (Courtney et al, 2012; Barrett, 2016). Studies have found that paramedics had an overall negative attitude towards exercise due to an inability to engage regularly with some stated that they had to give up their team sports because of the lack of commitment they could provide whilst on shifts; thus potentially explaining the professions lower level of physical fitness and higher BMI than the general population (Courtney et al, 2012; Barrett, 2016; Kirby et al, 2016). Once again these issues could arguable translate to all shift workers and with this in mind and the

individual wound allowing, clinicians should explore the positives of potential time away from work, for the patient to engage in exercise where they may have found this difficult before.

## CONCLUSIONS

Although this literature review has focused on one profession; that profession has enabled a focus on many occupational themes that may impact on the holistic care of patients undergoing wound management. Themes such as sleep deprivation, circadian cycles, diet and exercise, have featured in wound care research in the past but it is important to note that links between these themes and the ability of a wound to heal are not only direct but also indirect as a result of subsequent mental health implications. The link between mental health and wound healing is proven and as such the clinician must consider a biopsychosocial approach to wound care, including an awareness of occupational barriers to compliance and concordance of such treatment plans, such as the ability and opportunity to attend appointments around work commitments. **WUK**

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