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Occupational Stress in the Emergency Department:

A Systematic Literature Review

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Abstract

Introduction

Occupational stress is a major modern health and safety challenges. Whilst the Emergency Department (ED) is known to be a high-pressure environment; the specific organisational stressors which affect ED staff have not been established.

Methods

We conducted a systematic review of literature examining the sources of organisational stress in the ED; their link to adverse health outcomes, and interventions designed to address them. A narrative review of contextual factors that may contribute to occupational stress was also performed. All articles written in English, French or Spanish were eligible for conclusion. Study quality was graded using a modified version of the Newcastle-Ottawa scale.

Results

25 full-text articles were eligible for inclusion in our systematic review. Most were of moderate quality, with two low and two high quality studies respectively. Whilst high demand and low job control were commonly featured; other studies demonstrated the role of insufficient support at work, effort-reward imbalance and organisational injustice in the development of adverse health and occupational outcomes. We found only one intervention in a peer-reviewed journal evaluating a stress reduction programme in ED staff.

Conclusion

Our review provides a guide to developing interventions that target the origins of stress in the ED. It suggests that those which reduce demand and increase workers' control over their job; improve managerial support; establish better working relationships and make workers' feel more valued for their efforts could be beneficial. We have detailed examples of successful interventions from other fields which may be applicable to this setting.

What is already known on this subject?

Occupational stress is associated with increased sickness absence, high staff turnover and early retirement. The ED is known to be a pressured work environment but the specific organisational stressors that affect staff are not well characterised; nor the types of interventions designed to address them.

What this study adds?

This review demonstrates that there is a diverse range of work stressors in the ED beyond work volume alone, but a dearth of interventions to address them. We suggest methods to develop these, and examples of successful interventions from other fields that may be of value.

Main Paper

Introduction

Occupational stress, defined as when the resources of the individual are not sufficient to cope with the demands of a situation, is a leading modern health and safety challenge.[1] Stress has been linked to several adverse health and occupational outcomes. Acute exposure can lead to sleep disturbance, fatigue and gastrointestinal upset. [2] Chronic stress exposures have been linked to early onset cardiovascular disease, hypertension, insulin resistance, musculoskeletal illness, anxiety and depression. [3,4] Adverse lifestyle behaviours include higher rates of smoking and substance misuse, making mistakes and involvement in accidents. There is also a substantial body of literature suggesting that cumulative stress can lead to 'burnout' , a syndrome characterised by emotional exhaustion, cynicism and feelings of personal underachievement. [5] The Health and Safety Executive (HSE) in the United Kingdom (UK) has identified work-related stress as a leading cause of sickness absence, high staff turnover and early retirement in the UK workforce.[6]

Occupational stress is recognised hazard in the education, agriculture, fishing and forestry industries. [7] Teachers, police officers, social workers, prison officers and those working in call centres have also been affected.[8,9] In hospital settings, studies have indicated that long work hours, high work intensity and lack of role clarity are associated with anxiety and depression amongst doctors and nurses.[10] A study of family doctors identified that patient demands and work interruptions were strongly associated with symptoms of anxiety and depression.[11]

Evidence suggests that Emergency Department (ED) staff may experience higher rates of anxiety, depression and burnout than their hospital colleagues.[12,13] Although in the ED setting high work volume and time pressures are likely to be significant contributors; the potential influence of other factors should not be overlooked. These may include the quality of support and relationships with colleagues and managers; how valued and appreciated individuals for their work efforts, and staff members' perceptions of the decisions made about their job.[14,15,16] For example, a recent UK study has established the importance of support at individual and organisational level in addressing compassion fatigue amongst ED consultants.[17] A short narrative paper published in 2013, highlighted that job factors such as high work demands and long career length, as well as personal factors such as increasing age and work-family conflict are contributors to burnout in ED physicians.[18] Nonetheless, the specific job-related stressors that lead to mental ill-health in ED staff

are not known. This is essential to developing interventions to reduce stress and prevent burnout.[6,18]

Accordingly, the primary aim of this review was to identify the main organisational stressors that are associated with psychological illness, burnout and adverse occupational outcomes in clinical ED staff. We have focussed on work factors because these are more amenable to organisational interventions than personal vulnerabilities such as maladaptive coping behaviours and attribution styles.[19] Additionally we wished to understand some of the contextual factors that contribute to stress in the ED, and examine interventions designed to reduce stress amongst ED staff.

Methods

We conducted a systematic literature review of studies examining sources of organisational stress in clinical ED staff (medical, nursing, support workers) leading to psychological illness, burnout and adverse occupational outcomes. The review was conducted using the process suggested by the Centre for Reviews and Dissemination at the University of York, England.[20] This provides structured guidance for conducting systematic reviews of clinical trials, public health interventions and economic evaluations including the development of appropriate research questions; identifying a suitable search strategy; selecting studies; extracting data; assessing quality and documenting findings. Methodological recommendations are also provided for narrative reviews where meta-analyses are inappropriate.

Full-text articles written in English, French or Spanish examining were eligible for inclusion. The exclusion criteria are listed in Table 1. Specifically, we excluded articles pertaining to trauma and violence since such events are more likely to lead to periods of acute stress which require different interventions to those of cumulative stress. Studies with less than 50 participants were arbitrarily excluded given the higher probability of random error (chance) with small sample sizes.

Exclusion Criteria
Only acute stressors such as violence, trauma or bereavement
Reports of adverse health outcomes or evaluations of stress-management programmes without assessment of occupational contributors
Studies examining biomarkers of stress response as clinical outcomes
Less than 50 participants
Dissertations, abstracts for which the full-text was unavailable, case reports of emotional ill-health
Full-text articles written in a language other than English, French or Spanish
Studies where diagnostic criteria were not appropriately assessed

Table 1: Exclusion Criteria

The following databases were searched with the support of a health information specialist based at the School of Health and Related Research (ScHARR) at the University of Sheffield from the years 1990 to 2016: Embase; Medline; PsycInfo; British Nursing Index; DH-Data; Emcare; King's Fund; Health and Safety Science Abstracts and grey literature. An internet search using Google Scholar was also conducted. Keywords were grouped under four themes and included a variety of synonyms for occupational stress, hospital staff, emergency medicine and terms for psychological illness (anxiety, depression or burnout). Terms were combined with the Boolean command "OR" and themes with the command "AND" where appropriate. An example of the search strategy used for Medline is included in Supplement 1. Abstracts of all identified articles were screened by SB and the health information specialist to determine their relevance to this study. References of selected full-text articles were also examined for publications which may be relevant to our study.

Two authors (SB and HQ) assessed study quality using a modified version of the Newcastle-Ottawa Scale. [21] A points-based system for selection bias, comparability and outcome was applied as shown in Table 2. Studies were scored on a scale of nine points with a maximum of five for selection, two for comparability and two for outcome. We assigned a high quality study as scoring 7-9 points; Moderate quality 4-6 points, and low quality 0-3 points. The systematic review was conducted under the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, with the findings of the literature search recorded using the PRISMA flowchart. [22] Our analysis was intended to provide a descriptive summary of results and a meta-analysis would only be undertaken if suitable data were identified.

Selection Bias Max 5 points	Is the sample representative of the population from which it was drawn? Was the sample adequately powered (calculation performed or likely to be)? Were response rates adequate (>50%)? Were non-responders assessed? Did the authors use validated measurement tools to assess exposures and outcomes?
Comparability Max 2 points	Was confounding factors adequately assessed? Did the study employ an appropriate control group?
Outcome Max 2 points	Were statistical tests appropriate? Was the potential for common method bias considered?

Table 2: Modified from Newcastle-Ottawa Scale

A narrative review of other contextual factors such as compassion fatigue, high communication loads, interruptions and performance-based targets was also conducted from the results of the literature search. The literature was also examined for interventions designed to reduce stress in ED staff. Given that our methodology included both systematic and narrative approaches, the study was not registered with a systematic review database.

Results

Systematic Review of Organisational Stressors in the ED

Our search identified 63 full-text articles. All included studies used questionnaire surveys to assess underlying stressors associated with the presence of psychiatric symptomatology. The heterogeneity of data precluded a meta-analysis.

Insert Figure 1 here

Of the 38 full-text articles excluded, twenty three were removed as acute sources of stress such as trauma, violence and cardiopulmonary resuscitation were examined. Six were excluded on the basis that only adverse health outcomes were reported. Seven were removed as personal rather than occupational sources of stress were considered. Three were removed as the efficacy of behavioural techniques such as coping strategies in managing mental ill-health were assessed.

The majority of the 25 assessed full-texts were of moderate quality, with two low and two high quality studies. Most were conducted in high-income countries, and all used questionnaire to assess stress exposures and outcomes. Four studies (marked by an * in Table 1) used longitudinal designs, with the remainder cross-sectional.

Study	Total Sample Size and Response Rate	Main Factors Assessed	Summary of Main Findings	Quality Rating
Gallery et al, 1992 [23]	1350 ED Physicians in the United States (USA) 56.5%	Work-Related Strain (WRSI); Clinical Depression (CES-D) and Intention to Leave Specialty	Work-related strain (demand) associated with higher reported depressive symptoms	Moderate (5/9)
Lloyd et al, 1994 [24]	395 ED Residents in Canada 68%	Work Demands. Job Satisfaction (Emergency Physician Job Satisfaction Scale), Burnout (Maslach's Burnout Inventory - MBI), Depression (CES-D)	Greater amount of annual leave associated with lower depression scores (p=0.01).	Moderate (5/9)
Whitley et al, 1994 [25]	1056 ED Physicians from the USA, Australia and UK 56.5% USA 82.7% AUS 72% UK	Work-Related Strain (WRSI). Clinical Depression (CES-D)	High work volume and depression correlated (r=0.61, r=0.63, r=0.65; p=0.0001) respectively, most prominently in UK ED physicians	Moderate (6/9)
Goldberg et al, 1996* [26]	1272 ED Physicians in the USA. Response Rate not known	Correlates of burnout (MBI) to occupational, personal factors and	Low involvement in job and low job satisfaction predicted development	Moderate (4/9)

		physical parameters	of burnout (p=0.000).	
Williams et al, 1997* [27]	171 junior ED physicians during a four-month placement in the UK. 82% (140) at baseline, 77% (132) at one-month, 67% (115) at month four	Occupational Stress. Psychological distress. (General Health Questionnaire and Mental Health Inventory)	Work intensity identified as a predictor of distress	Moderate (5/9)
Goh et al, 1999 [28]	732 ED Physicians in Australia 50.7%	Burnout (MBI) Depression, Anxiety, Somatic Symptoms and Social Dysfunction (GHQ-28)	Higher burnout and GHQ scores associated with longer working hours (p<0.001), low work satisfaction (p<0.001)	Moderate (4/9)
Adeb-Saeedi, 2002 [29]	160 ED Nurses in Iran 75%	Work Demands; Interpersonal Relationships; Work Patterns;	Female nurses more likely to report higher stress levels (t=3.16, p=0.002). Patient suffering most frequently reported stressor.	Moderate (4/9)
Burbeck et al, 2002 [30]	479 ED Consultants in the UK 73%	Work demands, work relationships. Mental distress (GHQ- 12). Depression (SCL-D) scores.	SCL-D predicted by "dealing with management" (OR=1.28) GHQ caseness predicted by long hours (ρ=0.126, p<0.03)"Being overstretched" (OR=1.18), "effect of hours on family life" (OR=0.82), "lack of recognition" (OR=1.32).	Moderate (5/9)
Erdur et al, 2006 [31]	213 ED Physicians in Turkey 90%	Occupational Characteristics (Pay, Length of Time in Job). Anxiety and Depression (Beck Inventory Scales)	Lower income (p=0.03), longer length of time working in the ED (p=0.03) correlated with higher anxiety. High anxiety correlated with depression (p<0.001)	Moderate (5/9)
Escribà-Agüir et al, 2007 [32]	945 ED Physicians and Nurses in Spain 67.6%	Work Demand and Control (Karasek Demand-Control Model). Mental Health and Vitality (SF-36). Emotional Exhaustion (MBI)	Burnout associated with greater work demand, (OR 4.66, CI 2.75–7.90), low job control (OR 1.65, CI 1.04–2.63), and low manager support (OR 1.64, CI 1.01–2.59). .	Moderate (6/9)
Cydulka & Korte, 2008 * [33]	1008 ED Physicians in the USA. 94% in 1994; 82% in 1999; 76% in 2004	Burnout and Career Satisfaction	Burnout associated with low work control (OR 1.9, CI 1.1-3.4); low personal reward (OR 2.8, CI 1.2-6.4); longer shifts (OR 3.7, CI 2.0-6.9); number of night shifts (OR 3.6, CI 2.0-6.2); problems with colleagues (OR 3.7, CI 1.8-8.0); and fewer educational	Moderate (6/9)

			opportunities (OR 3.0, CI 1.5-5.8).	
Wu et al, 2011 [34]	510 Emergency Nurses in China 77.9%	Role Overload, Role Ambiguity and Responsibility. (Chinese version of Personal Strain Questionnaire)	High work demand found to be the most significant source of occupational stress. Role ambiguity also found to be predictive of strain	Moderate (5/9)
Estryn-Behar et al, 2011 [13]	Physicians in France 66% (n=3196) of those accessing the survey responded including 538 ED physicians	Influence at Work (Swedish Demand-Control Scale); Teamwork (COPSQQ); Work Relationships; Burnout (Copenhagen Burnout Inventory); Health (Work Ability Index)	Rates of burnout higher in ED Physicians compared to hospital peers (p<0.001).Work-Family Conflict (OR 6.14, CI 2.89-13.04) and poor quality of teamwork (OR 5.44, CI 2.81- 10.53) associated with burnout.	Moderate (6/9)
Rugless & Taylor, 2011[35]	180 ED physicians, nurses and allied healthcare staff (88%)	Sickness absence data and job stress (Job Content Questionnaire)	Sick leave higher in ED nurses than ED physicians. Higher work demand and lower management support for ED nurses	Moderate (5/9)
Garcıa-Izquierdo & Rıos-Rısquez, 2012 [36]	191 ED nurses in Spain 73%	Demand, interpersonal conflict and support and relationship with burnout (Nursing Stress Scale & MBI)	Excessive workload predicted emotional exhaustion. Cynicism and personal underachievement predicted by low support, interpersonal conflict and high workload.	Moderate (4/9)
Nielsen et al, 2012[37]	118 Danish ED Nurses and Physicians 95%	12 Work-Related Stressors including interruptions, aspects of workload and interpersonal relationships. Adverse clinical events	Occurrence of stressors positively correlated with adverse emotional impact and adverse clinical events.	Moderate (4/9)
Sende et al, 2013 [38]	318 French Emergency Physicians 44%	Work Related Stress (WRSI), Burnout (MBI)	High work demand and pressure from patients/relatives associated with greater stress	Low (3/9)
Chakroun et al, 2013 [39]	107 ED Staff in Tunisia 61.5%	Job Demand, Control and Support	Low managerial support correlated with development of stress (p=0.04)	Moderate (5/9)
Jalili et al, 2013 [40]	188 ED Physicians in Iran 88%	Aspects of Work Demand, Control, Perceptions of ED Environment. Burnout (Maslach's Burnout Inventory)	Work overload (OR=3.1, p<0.05) and career insecurity (OR 2.28, p<0.05) associated with burnout.	Low (3/9)
Xiao et al, 2014 [41]	250 ED Physicians in China 82%	Work Satisfaction (Minnesota Satisfaction Questionnaire). Burnout (MBI); Anxiety and Depression (HADS-A,	Anxiety (t = 1.526, p < 0.05) and Depression scores (t = 1.567, p < 0.05) greater than general population. Lower intrinsic (r=-0.483, p<0.05) and	High (7/9)

		HADS-D);	extrinsic (r=-0.355, p<0.05) job satisfaction associated with burnout.	
Takayesu et al, 2014 [42]	289 ED Physicians in USA 75%	Burnout (MBI); Physicians' Reaction to Uncertainty Scale; Emergency Physician and Global Job Satisfaction Scales	Burnout related to low job autonomy and low global job satisfaction	Moderate (6/9)
Rasmussen et al, 2014 [43]	124 Danish ED Physicians and Nurses 91%	Copenhagen Psychosocial Questionnaire; Safety Attitude Questionnaire	High job demands, poor interpersonal relationships and poor teamwork correlated with more frequent adverse patient safety events	Moderate (4/9)
Johansen & Cadmus 2015 [44]	222 ED Nurses in USA 40%	Perceived Stress Scale, Organisational Support, Organisational Conflict	Supportive work environment and avoidance of conflict predicted lower perceived stress	Moderate (4/9)
Adriaenssens et al, 2015 * [45]	254 Belgian ED Nurses at T1 - 82.5% 204 at T2 - 83.3% 18 months later	Leiden Quality of Work Questionnaire. Burnout (MBI)	Changes in demand, control and support predicted job satisfaction and emotional exhaustion	High (7/9)
Ansari et al, 2015 [46]	120 ED doctors and nurses across two Pakistani hospitals 100%	Workplace Stress Scale (WSS), Emergency Worker Stress Inventory (EWSI)	Longer work hours and working in a public sector hospital significantly associated with greater stress (p<0.05)	Moderate (6/9)

Table 3: Occupational Sources of Psychiatric Morbidity and Burnout in ED Staff

Psychological Health and Burnout

The existing literature suggests that high work volume, long working hours and high work intensity are common predictors of occupational stress and burnout.[13,23,27,28,32-35] These findings reflect those of hospital nurses and doctors practising in other specialties both in the UK and internationally.[47,48,49] Nonetheless, a number of studies in this review have identified that role ambiguity; low managerial and peer support; insufficient pay; lack of professional recognition and limited opportunities to attend educational conferences may also contribute to psychological morbidity and burnout.[30-32] Again, these findings are consistent with the existing literature examining burnout in other clinical specialities.[50, 51] Although not specifically highlighted in the table above, several studies reported higher rates of anxious and depressive symptoms in female healthcare workers, but findings according to age and years of experience were not consistent. Burnout was most prevalent amongst younger staff and those with fewer years of experience in the specialty.

Compassion Fatigue and Contextual Factors

Our search identified some articles examining the occupational causes of compassion fatigue (CF) in ED clinicians. CF includes features of burnout, but is also characterised by a lack of concern or empathy towards the misfortunes of others. Accordingly, the literature suggests that similar work factors underlie both CF and burnout such as high demands and low job control. Two articles also specifically highlighted the role of low managerial support in developing CF, with the former study also purporting a link between CF and irritability, clinical errors and plans for early retirement. [17, 52] Other studies suggest high levels of compassion fatigue are not unique to the specialty, with similar rates found in doctors and nurses from fields such as nephrology, intensive care and oncology. [53 ,54]

We also found some articles examining the role of communication load, interruptions, multi-tasking and performance-based targets in contributing to ED work stress. One study established that the nurse-in-charge may be involved in an average of 1.68 communication interactions per minute. [55] A Swedish study also identified that information exchange was the most common ED activity to be multi-tasked. [56] Gender differences in communication loads for ED consultants suggest that females engage in higher activity. [57]ED physicians have been shown to encounter up to fifteen interruptions per hour, with senior doctors and nurses more frequently affected. [58,59]

We found relatively few studies examining the impact of communication load and interruptions specifically on perceptions of stress. A study amongst UK general practitioners suggested that these may be significant stressors, [11] and in ED settings that interruptions may lead to clinical errors and decreased patient satisfaction. [60] Other work however has provided inconsistent information. Although not included in our table due to the small number of participants; no individual cited interruptions as a contributor to occupational stress in an interview study of 22 UK ED staff. [61] A later Danish study assessed the relationship between 12 work-related stressors and adverse clinical outcomes. [37] Although both nursing and particularly specialist medical staff cited interruptions as a frequent stressor; their emotional impact was not found to be high. This led the authors to suggest that ED staff may see interruptions as a 'normal' part of their work.

We also found some articles assessing the relationship between performance targets and perceptions of stress. The 'four-hour target', an English government initiative to admit or discharge 98% of ED patients within four hours of arrival was most commonly featured. This target was the most frequently-cited occupational stressor in a sample of 22 clinical staff. [61] A qualitative study of ED nurses suggested that this target was one of several contributors to higher work demands in their department. [62] Another interview study of 27 ED clinical leaders in England suggested that lack of organisational ownership of this target contributed to conflicts between staff and concerns for patient safety. [63]

Interventions

We found only one intervention designed to reduce workplace stress amongst ED staff published in a peer-reviewed journal. This assessed the effect of a twelve-week intervention of aromatherapy and massage sessions on perceived stress amongst ED nurses working within a single department. [64] Changes in anxiety levels were measured using a standardised questionnaire administered pre and post-intervention. The authors concluded that their intervention was effective in reducing short-term anxiety.

Our search of the grey literature and Internet identified reports of other programmes designed to reduce stress amongst ED staff. A Mindfulness, Emotion Regulation, Distress Tolerance and Interpersonal Relationship (MEDI) programme found no significant improvements in perceptions of occupational stress between the intervention (n=6) and control groups (n=13) following completion of the programme; but improvements in both groups with respect to job satisfaction. [65] In response to reports of high stress levels, one UK ED implemented a "marines-style" intervention to help staff recognise and manage symptoms of stress and emotional responses to trauma. [66] We were unable to find evidence that this intervention had been subject to scientific review in an academic journal. An intervention in an ED in the United States consists of a 'buddy' system between pairs of ED physicians to develop stress-management plans. Reported techniques include physical activity and increasing family contact. [67] Once again, we were unable to identify any published evaluations of the programme.

Discussion

Workplace stress in the ED is of international significance given its established relationships with sickness absence, high staff turnover and early retirement. In addition, those workers encountering stress but remaining in work may experience physical and psychological illness, be prone to making errors and develop maladaptive lifestyle behaviours. It follows that work stress; burnout and intention to leave the specialty may often be related. This is of practical significance given high attrition rates amongst clinical ED staff both in the UK and abroad. [68]

Our review highlights the relevance of a number of factors including job demand and decision latitude, as well as managerial support and peer relationships in influencing perceptions of work stress. Importantly, these organisational stressors appear to be common contributors in the development of work-related mental illness; burnout; compassion fatigue; intention to leave the specialty and early retirement. These underlying occupational stressors are also common to many workforces. [69] This provides a template from which to design interventions that target the origins of stress within the ED; which this review demonstrates are currently lacking. A review of sixty-three stress orientated interventions in 2003 identified that only three reported changes in burnout, with most focussing on secondary-level approaches such as increasing resilience through mindfulness and cognitive-behavioural therapy. [70] Nonetheless, research elsewhere has demonstrated the positive and long-lasting effects of primary-level management interventions designed to improve communication and relationships amongst healthcare staff, such as through the CREW (Civility, Respect and Engagement in the Workplace) programme in Canada. [71] A 2015 Cochrane review of stress interventions in healthcare staff found that that those designed to improve or interrupt work schedules may improve stress, but found no evidence for mentoring programmes. [72]

The studies presented in this review have a number of limitations. Most are cross-sectional and thus causal relationships are uncertain. Many studies were based at a single site, limiting the generalisability of findings. Few studies employed a control group, either from the general population or an appropriate hospital unit. This is of relevance since, in practice, it is important to distinguish whether particular workplace stressors are specific to the ED, a feature of the hospital, or representative of the entire healthcare sector. The use of questionnaires in all of the studies also raises the possibility of reporting bias, and few studies considered the role of common method

variance when reporting results. This study has predominantly reviewed the quantitative evidence for workplace stress in the ED. Such studies have tested pre-defined hypotheses of stress rather than attempted to generate new theories. This may in part explain why the majority of studies have focussed on the demand –control-support model of occupational stress and far fewer considered other frameworks such as effort-reward imbalance and organisational justice.[73,74] Our review has concentrated on organisational sources of stress; and we have not discussed the relevance of individual factors such as personal vulnerabilities to mental illness and ineffective coping strategies. Finally, our review has focussed on clinical staff. It is likely that non-clinical staff encounter substantial levels of occupational stress, as indicated in a study of ED clerical and administrative workers.[75] Thus a holistic, whole-department based approach towards tackling stress is advised. Further work should explore the role of these issues in causing occupational stress, and those of contextual concerns such as performance targets, high communication loads and interruptions. In addition, the relationship between chronic stress, compassion fatigue and moral distress merits further study.[76] The impact of daily ethical challenges in the ED such as illness disclosure, providing care with limited resources and where relevant, an inability to continue care due to financial constraints is also of interest.[77]

Despite the dearth of scientifically evaluated stress-reduction programmes in the ED; the findings from this review suggest that such interventions are plausible. It is probable that different EDs will experience different stressors, and thus we advise a tailored approach. This should first identify the root causes of stress and use this data to develop primary-level preventative interventions. These, for example, may include management interventions to provide additional staff support, increasing workers' autonomy over the job or improve relationships through building morale. Secondary-level interventions for those staff that may benefit from stress-reduction techniques may be relevant. These could include counselling, mindfulness and cognitive-behavioural therapies. Finally, tertiary level interventions such as individual case management with support from trained specialists such as occupational health professionals may be of value for complex cases.

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Supplement 1

Search Strategy

ti,ab,su("emergency department*" OR "accident and emergency" OR "a and e" OR "a & e" OR "a&e" or "ER" OR "emergency room*" OR "urgent care" OR "trauma centre*" OR "trauma unit*" OR "casualty department*" OR "casualty unit*" OR "emergency medicine" or "emergency ward*" or "emergency unit*")

AND

ti(staff OR employe* OR worker* OR occupation* OR nurse* OR doctor* OR consultant* OR registrar* OR "healthcare assistant*" OR "health professional*" OR radiologist* OR surgeon* OR physician* or student* or paramedic*)

AND

ti(anxiety or depression or depressive or "mental health" or stress or burnout or fatigue)

ti,ab,su(“compassion fatigue*” or “secondary traumatic stress” or “secondary tramatization” or “secondary traumatisation” or “moral distress” or ((performance or productivity or time) near/2 (target* or goal* or indicator*)) or ((communication*) near/2 (burden* or load or high))