Coping with staff burnout and work-related post-traumatic stress

 in intensive care

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**ABSTRACT**

Objective: To examine the associations with symptoms of a) burnout and b) work-related post-traumatic stress, in adult and pediatric intensive care staff, focusing on the particular contributions of resilience and coping strategies.

Design: Point prevalence cross-sectional study

Setting: Three adult and four pediatric ICUs

Subjects: Three hundred and seventy seven ICU staff

Interventions: None

Measures: Brief Resilience Scale (BRS); abbreviated Maslach Burnout Inventory (aMBI); Trauma Screening Questionnaire (TSQ) and Hospital Anxiety and Depression Scale (HADS).

Main Results: Prevalence of burnout (defined as high emotional exhaustion or high depersonalization) was 37%. Prevalence of clinically significant post-traumatic stress symptoms was 13%. There was a degree of overlap between burnout and other measures of distress, most notably for anxiety (OR=10.56, 95% CI:4.12,27.02, p<0.001).

Hierarchical logistic regression demonstrated that self-reported resilience was strongly associated with decreased likelihood of meeting criteria for both forms of work-related distress (burnout: OR=0.52, 95% CI:0.36,0.74, p<0.001; post-traumatic stress: OR=0.28, 95% CI:0.16,0.46, p<0.001) and that physicians were twice as likely as nurses to be at risk of reporting burnout (OR=2.11, CI:1.18,3.78, p=0.012). After controlling for resilience, profession and setting, the following coping strategies were independently associated with outcomes: attending debriefing reduced risk of burnout (OR=0.45, 95% CI:0.21,0.95, p=0.036), while the odds of post-traumatic stress were less if staff used talking to seniors (OR=0.43, 95% CI:0.20,0.92, p=0.029) or hobbies (OR=0.46, 95% CI:0.23,0.93, p=0.030) to cope with stress at work. Venting emotion (OR=1.92, 95% CI:1.12,3.31, p=0.018) and using alcohol (OR=2.30, 95% CI:1.26,4.20, p=0.006) were associated with a doubling in risk of reporting burnout.

Conclusions: The use of particular coping strategies was systematically associated with symptoms of burnout and work-related post-traumatic stress in this group of intensive care staff, even after controlling for resilience and other factors. More research on how best to promote adaptive coping is needed in these challenging settings.

In the last decade a number of surveys have demonstrated high levels of burnout in health professionals [1], and particularly in those working in acute specialties such as intensive care (ICU) [2]. Less information is available on staff working in *pediatric* ICU settings, but recent evidence [3,4] suggests that rates of burnout in pediatric intensivists are more like those of their adult intensivist colleagues than those of pediatricians, who report lower rates of burnout than other doctors [1,5]. In addition, recent studies have demonstrated that ICU staff also report significant rates of *post-traumatic stress* in relation to their work [6-8].

Although prevalence studies are important, a recent Call for Action on this topic [9] has highlighted the need for more evidence as to which factors are protective, as well as which are associated with poorer outcomes. Authors in this field have also called for more research into associations with other factors such as resilience and coping strategies [2,3,5], in order to arrive at a more comprehensive understanding of the strains on staff in this setting, in the expectation that this could inform the development of effective interventions, the current evidence base for which is still in its infancy [10].

The main aim of this study was to add to the existing literature by establishing the relative impact of resilience and individual coping strategies on the two main outcomes of interest, burnout and post-traumatic stress, (as well as examining the degree to which these forms of work-related distress were related to the nature of the unit and other relevant socio-demographic and occupational factors). The rationale for this focus on resilience and coping was that these are elements which have the potential to be *modified*, unlike other variables such as age or profession. A secondary aim was to establish the degree of overlap between burnout status and post-traumatic stress, anxiety and depression.

It was hypothesized that a significant proportion of participants would report high levels of burnout and post-traumatic stress, and that resilience would be associated with lower rates of distress.

**MATERIALS AND METHODS**

The Joint Research and Development Office at the host site approved the study. The design was a point prevalence cross-sectional anonymous staff survey based in seven units on two sites. The first site (A) was a tertiary children’s hospital, with a 22-bed pediatric/neonatal ICU and a 17-bed pediatric cardiac ICU. The second site was a teaching hospital, which had three adult ICUs: a 21-bed general unit; an 18-bed cardiac unit and a 14-bed neurological/neurosurgical unit, and two pediatric units: a 10-bed general unit and a 39-bed neonatal unit. The surveys took place in the month of November in three consecutive years as follows: pediatric ICU 1 (site A) was surveyed in 2012; the adult ICUs 1 to 3 (site B) and pediatric ICU 2 (site A) were surveyed in 2013, and the pediatric ICUs 3 and 4 (site B) were surveyed in 2014.

Participants were sent the anonymous questionnaires electronically and by internal post. They were provided with an information sheet and were regarded as having provided informed consent by returning their completed questionnaire. Some of the provisional data from site A have been reported previously [11].

**Measures**

The *Brief Resilience Scale* (BRS) [12] contains six items which are scored on a 5-point scale from 1=‘strongly disagree’ to 5=‘strongly agree’ and then averaged. It asks how a person usually adapts to adversity, and includes statements such as ‘I tend to bounce back quickly after hard times’, with higher scores indicating greater resilience. It has been recommended for its internal consistency (Cronbach’s alpha=0.80-0.91) and test-retest reliability r=0.62-0.69) [13].

The *abbreviated Maslach Burnout Inventory* (aMBI) [14] comprises 9 of the original 22 items which make up the Maslach Burnout Inventory (MBI) [15], from which it is derived. It was constructed using three items from each of the three MBI burnout dimensions, namely emotional exhaustion (EE), depersonalization (DP) and low personal accomplishment (PA), scored 0=‘never’ to 6=’every day’, and has been found to retain the reported factor structure of the original instrument [16]. Scores on the aMBI were prorated so they could be compared with full MBI scores and categorized high risk on each dimension as follows: >=27 for EE, >=10 for DP and <33 for PA [15]. Staff were classified as displaying ‘burnout’ if they reported high levels of EE or DP, following the methodology of a recent landmark study [1] and given the lack of evidence for PA as a predictor of clinically diagnosed burnout [17].

The *Trauma Screening Questionnaire* (TSQ) [18] is a brief self-report scale, recommended as a screening measure for post-traumatic stress disorder (PTSD) [19]. It is used to identify the number of post-traumatic stress symptoms an individual has experienced in the previous two weeks, in relation to a particular event (here defined as ‘stressful incident at work’) and is made up of 10 statements (scored 0=‘no’ or 1=‘yes’) referring to symptoms of re-experiencing and hyper-arousal. A total score of >=6 has been found to predict PTSD six months later, with an overall efficiency of 0.87 [20].

The *Hospital Anxiety and Depression Scale* (HADS) was also completed by participants at site B. It is a self-report questionnaire which is frequently used in community samples as a screen for mental health problems [21]. It is made up of two subscales measuring anxiety (7 items) and depression (7 items), with responses weighted 0 to 3 for frequency. For each scale, scores of 8-10 indicate mild symptoms and >=11, moderate/severe symptoms. The HADS has been widely used internationally, has demonstrated good levels of internal consistency (anxiety 0.93; depression 0.90) and test-retest reliability (anxiety 0.54; depression 0.79) [22] and its factor structure has been confirmed in numerous different populations [23].

*List of Coping Strategies* Participants were asked to indicate which coping strategies they used in relation to managing work-related stress. They were provided with a list generated from a focus group at site A, prior to data collection [11], which includes examples of personal and organizationally-mediated strategies such as ‘attend debriefing meetings’ and personal strategies such as ‘try to be cheerful’.

*Preferred input* Staff were also provided with a list of options of additional forms of support and asked to indicate which, if available, they would be interested in receiving in the future, in relation to helping them better manage stress at work.

**Statistics**

Descriptive data are presented in the form of mean (SD) and *n* (%). Relationships with main outcomes were examined using Chi-square tests with odds ratios (ORs) and 95% confidence intervals (CIs). To analyse the combined contribution of resilience and individual coping strategies, multivariate hierarchical logistic regression models were constructed for each outcome measure (burnout and post-traumatic stress). Only variables showing significant associations (i.e., p<0.05) in univariate analyses (Chi-square and independent group *t-*tests) were included in regression models. In Model 1, resilience socio-demographic and occupational factors were entered as independent variables. In Model 2, significant individual coping strategies were added as independent variables. Multivariate tests of association are presented as adjusted ORs with CIs and Nagelkerke Pseudo-R2 as a measure of goodness of fit for each step. The level of significance was set at p<0·05. All statistical analyses were completed with the Statistical Package for the Social Sciences, Release 22.0 (SPSS, IBM).

**RESULTS**

Of a possible total available sample of *n*=744, 377 (51%) members of staff returned the questionnaire. Their socio-demographics, occupational characteristics and resilience scores are provided in Table 1. Across analyses, the number of participants varies slightly due to small numbers of participants with missing data on some measures; stated percentages reflect proportions of participants with data available.

**Prevalence of burnout and post-traumatic stress**

*Burnout* The proportion of the sample scoring in the high risk range for burnout for each of the three aMBI dimensions measured was as follows: EE 33% (*n*=117); DP 12% (*n*=44); PA 44% (*n*=156), with 60% (*n*=213) of participants scoring at high risk of burnout on at least one dimension, but only 6% (*n*=20) scoring in the high range for all three. The proportion meeting the criterion for burnout in this study (EE or DP) was 37% (*n*=131).

*Post-traumatic stress symptoms* Of those staff who completed the TSQ, 35% (*n*=118) of individuals reported no symptoms of post-traumatic stress in relation to their role on ICU. However, 52% (*n*=172) reported between one and five symptoms in the previous fortnight and 13% (*n*=44) reported six or more symptoms, indicating that they were potentially at risk of PTSD as a result of an experience they had at work and might benefit from further psychological evaluation.

**Relationships between burnout, post-traumatic stress, anxiety and depression** (site B only**)**

Overall, 13% (*n*=32) staff scored above 11 for anxiety on the HADS, indicating the presence of clinical levels of anxiety, while 4% (*n*=9) scored in this clinical range for depression. There was a significant degree of overlap between burnout status and clinically significant levels of post-traumatic stress, anxiety and depression (Figure 1). Staff reporting burnout were more likely to endorse post-traumatic stress symptoms, compared to staff without burnout (24% vs. 6%, χ2=14.68, OR=4.95, 95% CI:2.06,11.90, p<0.001) and evidenced a more than 10-fold risk of reporting significant levels of anxiety (29% vs. 4%, χ2 =32.58, OR=10.56, 95% CI:4.12,27.02, p<0.001).

**Coping strategies**

In all, 355 participants indicated which coping strategies they used in relation to managing stress at work (Figure 2). Staff endorsed personal strategies more frequently than organizationally-mediated ones, with the three most commonly used strategies given as ‘speak to colleagues’,‘speak to people outside work’ and ‘try to be cheerful’.

**Multivariate predictor models of associations with burnout and post-traumatic stress**

Hierarchical logistic regression models for burnout and post-traumatic stress status, including only those variables significantly associated in univariate analyses at p<0.05 (as provided in Supplementary Tables 1 and 2), are shown in Table 2. For each model, multicollinearity was within acceptable limits and there was no serious influence of outliers. Results indicated that resilience was the strongest predictor of both outcome measures but being a doctor remained a significant predictor of reporting burnout, associated with double the risk, even after controlling for resilience and coping. There was significant additional improvement in fit for the models for both outcomes, once coping strategies were added (Model 2), with increases in Nagelkerke Pseudo-R2 of 0.11 for burnout and 0.07 for post-traumatic stress. Attending debriefing was associated with a halving of the risk of endorsing burnout while venting emotion and using alcohol were associated with approximately double the risk. Talking to seniors and having hobbies were significantly more commonly used strategies for dealing with work-related stress among those who had lower post-traumatic stress scores.

**Preferred future input**

In relation to stress at work, 351 staff indicated which forms of additional input they would be interested in, if available. More than half, 57% (*n*=199), indicated that they would like more debriefing and 39% (*n*=137) stated that they would appreciate more opportunities for reflective practice. Over a third, 37% (*n*=131) of the sample indicated their interest in more organized social activities, whilst 31% (*n*=111) requested training in mindfulness or relaxation, 25% (*n*=88) wanted more time with their manager and 8% (n=28) requested more teaching.

**DISCUSSION**

The results of this study confirmed that a significant proportion of ICU staff report burnout and post-traumatic stress, in relation to their experiences at work. The finding that these symptoms were negatively associated with resilience is consistent with recent speculation that this aspect of personality is an important variable to consider in the assessment of work-related distress [3,5] and with the findings of Mealer et al (2012) [24].

The prevalence in this sample of high emotional exhaustion, which is regarded as the key symptom in burnout, was one in three, and as such, broadly similar to the rates reported in other studies [3,4,25-27]. However, the protective effects found in other studies of male gender [25]; female gender and older age [26]; marital status and having children [26,27] were not observed. The findings that attending debriefing and talking to seniors were associated with lower rates of distress have clear implications for practice and the fact that being a doctor continued to be independently associated with burnout in models controlling for other variables, is worthy of further investigation. The lack of association between length of professional experience and distress also warrants acknowledgment, since it suggests that burnout and post-traumatic stress are occupational hazards which can strike at any time in an intensive care career. Given that ICU staff will inevitably witness a number of traumatic events working in critical care settings, it seems likely therefore that they would benefit from being provided with more information on the range of psychological reactions they may experience, to help them identify and address symptoms earlier [9,28].

It has been suggested elsewhere [29] that burnout might usefully be conceptualized as evidence of depression but for the staff in this sample who completed all psychological measures, it was more closely associated with anxiety. Although anxiety and depression rates were similar to those of community samples [30], the rate of significant post-traumatic stress symptoms in this sample was high at 13%, and particularly so for staff on pediatric units, at nearly one in six. These rates are significantly elevated compared to the estimated lifetime community prevalence of PTSD of 7% [31] and consistent with other studies which have found higher rates of these symptoms in ICU staff than in other health professionals [6,8].

Interestingly, as found elsewhere [32], the most popular coping strategies were *not* the ones related to better outcomes, and staff made more use of personal coping strategies than organizationally-mediated ones. They did, however, indicate that they would appreciate more opportunity to reflect on difficult incidents – an activity associated with improved functioning [33,34].

*Strengths and Limitations*  Strengths of this study include the fact that two different forms of work-related stress were examined, namely burnout and post-traumatic stress, and that it included doctors and nurses from adult and pediatric settings. Furthermore, resilience was measured and controlled for in analyses and participants’ usual coping strategies were examined. Nevertheless, it is important to acknowledge a number of limitations, such as the study’s response rate, although higher than in some other studies [1,6,8], and the fact that it was not possible to compare responders with non-responders because the survey was anonymous. Also, the cross-sectional design meant that it was not possible to determine the direction of the associations found. The fact that only two sites were surveyed in three different years, because of limited resources, and that a local, unstandardized measure of coping was used, further limit generalizability. So too does the use of short-form questionnaires. However, these were chosen to minimize the burden on participants and there are a number of other studies in the burnout literature attesting to the value of abbreviated versions of the MBI, which demonstrate validity in terms of associations with important indicators of quality, including medical errors and suicidality [1,35]. Finally, although the PTSD screening measure used was not strictly diagnostic, it is recommended as a robust survey measure [19].

Further studies could explore the relative impact of other factors not studied here, but shown to be associated with burnout, such as the quality of staff relationships [25,27,36] and workload and shift practices [3,4,25,27], which, when addressed, have been associated with improved wellbeing [37]. It would also be interesting to explore how the dimension of moral distress - which is increasingly being recognized [38] and appears to be related, but different, to burnout [39] - covaries with burnout and post-traumatic stress.

**CONCLUSIONS**

This study confirms recent findings that symptoms of burnout are common in ICU staff and that a significant minority suffer clinical levels of work-related post-traumatic stress. It also suggests that, whilst doctors may be more likely than nurses to exhibit burnout, resilience, which has the potential to be enhanced, is inversely related to distress and particular coping strategies appear to be systematically associated with better functioning. On the basis of these results, units might usefully consider providing more opportunities for staff to attend debriefs and to talk to senior staff about the more difficult aspects of their work. On an individual level, staff may find the adoption of a new interest outside work beneficial to their wellbeing – a habit recommended over a hundred years ago by William Osler as a way for doctors to maintain their equanimity [40]. It is important that research in this area continues to add to our understanding of how work-related stress develops and how it can best be ameliorated. It is part of our duty of care to patients to take care of ourselves [35].

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**CONFLICT OF INTEREST STATEMENT**

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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| **Table 1.** Sample characteristics (*n* = 377)  |
| Variable | *n* (%) |
|  |  |
|  |  |
| Gender |  |
| Male |  62 (17) |
| Female | 311 (83) |
| Age group |  |
| ≤ 30y | 116 (33) |
| 31-40y | 141 (40) |
| ≥ 41y  |  99 (28) |
| Unit |  |
|  Adult ICU | 174 (46) |
| Pediatric ICU | 203 (54) |
| Living Alone |  72 (20) |
| Children at home | 143 (40) |
| Profession |  |
| Doctor |  76 (21) |
| Nurse | 294 (79) |
|  |  |
|  | Mean (*SD*) |
| Years since qualified |  12.6 (9.3) |
| Years ICU experience |  7.8 (7.5) |
| BRS (1-5) |  3.59 (0.67) |
|  |  |
| ICU = intensive care unit; BRS = Brief Resilience Scale (higher score indicates higher resilience); There was a small number of missing data on some variables - stated percentages and means refer to participants with data available for variable in question.  |

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| **Table 2**. Multivariate analysis of associations between coping strategies and burnout and post-traumatic stress status, controlling for other significant factors |
|  | Symptomatic | Not symptomatic | **Model 1** | **Model 2** |
| Variable | n (%) | n (%) | OR (CI) | *p* | OR (CI) | *p* |
| **Burnout (*n*=359)** | *n* = 131 | *n* = 228 |  |  |  |  |
| Professional role  |  |  |  |  |  |  |
| Nurse | 95 (33) | 190 (67) |  |  |  |  |
| Doctor | 36 (49) | 38 (51) | 1.87 (1.08,3.22) | **0.024** | 2.11 (1.18,3.78) | **0.012** |
| ICU type  |  |  |  |  |  |  |
| Adult  | 50 (31) | 114 (70) |  |  |  |  |
| Paediatric | 81 (42) | 114 (59) | 1.48 (0.94,2.36) | 0.094 | 1.44 (0.86,2.39) | 0.163 |
| Resilience (BRS; 1-5) | 3.28 (0.72) | 3.60 (0.61) | 0.47 (0.34,0.67) | **<0.001** | 0.52 (0.36,0.74) | **<0.001** |
| *Coping strategies* |  |  |  |  |  |  |
| Talk to seniors | 41 (33) | 108 (48) |  |  | 0.74 (0.45,1.24) | 0.253 |
| Attend debrief | 13 (10) | 47 (21) |  |  | 0.45 (0.21,0.95) | **0.036** |
| Hobbies | 64 (50) | 142 (63) |  |  | 0.70 (0.43,1.15) | 0.156 |
| Find solutions | 56 (44) | 138 (62) |  |  | 0.65 (0.40,1.06) | 0.085 |
| Vent emotion | 49 (39) | 48 (21) |  |  | 1.92 (1.12,3.31) | **0.018** |
| Drink alcohol | 38 (30) | 32 (14) |  |  | 2.30 (1.26,4.20) | **0.006** |
|  |  |  | *χ2* | *p* | *χ2* | *p* |
| *Block* |  |  |  |  | 33.97 | **<0.001** |
| *Model summary* |  |  | 27.76 | **<0.001** | 61.72 | **<0.001** |
| *Nagelkerke R2* |  |  | 0.105 |  | 0.223 |  |
| **Post-traumatic stress (*n*=334)** | *n* = 44 | *n* = 290 | OR (CI) | *p* | OR (CI) | *p* |
| Resilience (BRS; 1-5) | 2.97 (0.78) | 3.58 (0.62) | 0.28 (0.17,0.45) |  **<0.001** | 0.28 (0.16,0.46) |  **<0.001** |
| *Coping strategies* |  |  |  |  |  |  |
| Talk to seniors | 11 (25) | 131 (46) |  |  | 0.43 (0.20,0.92) | **0.029** |
| Hobbies | 20 (46) | 182 (63) |  |  | 0.46 (0.23,0.93) | **0.030** |
| Vent emotion | 19 (43) | 74 (26) |  |  | 1.88 (0.92,3.82) | 0.084 |
|  |  |  | *χ2* | *p* | *χ2* | *p* |
| *Block* |  |  |  |  | 13.41  |  **0.004** |
| *Model summary* |  |  | 29.47 |  **<0.001** | 42.88 |  **<0.001** |
| *Nagelkerke R2* |  |  | 0.157 |  | 0.224 |  |
| Notes: OR = odd ratios; CI = 95% confidence intervals; *p* values were calculated using (binary) hierarchical multivariate logistic regression; odds ratios indicate change in odds of scoring ≥ cut-off on relevant measure; reference category was nurse for professional role and adult ICU for ICU (Intensive Care Unit); descriptive values for resilience represent means and standard deviations; odds ratios for resilience reflect change in odds per 1 unit increase; *χ2* were derived from omnibus test of model coefficients; significant factors/model effects are highlighted in bold; for each model, multicollinearity was within acceptable limits (none of the independent variables had a standard error >0.39) and there was no serious influence of outliers (maximum Cook’s distance was 0.32). |

**Figure legends**

**Figure 1.** Venn diagram illustrating degree of overlap between burnout status and clinically significant scores for anxiety, post-traumatic stress and depression, for participants at site B with complete data on all four measures (n = 218). Burnout was defined as high prorated score for emotional exhaustion (≥ 27) and/or depersonalisation (≥ 10) on abbreviated Maslach Burnout Inventory; post-traumatic stress was defined as score ≥ 6 on Trauma Screening Questionnaire; Anxiety defined as anxiety score ≥ 11 on HADS; Depression defined as depression score ≥ 11 on HADS; HADS = Hospital Anxiety and Depression Scale.

**Figure 2**. Frequency of use of organizational and personal coping strategies in ICU staff (n = 355). Data labels represent percentages.

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