Prevalence, Features and Workplace Factors Associated With Burnout Amongst Intensivists in Australia and New Zealand

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Abstract

Background

Burnout has been reported to be common amongst intensive care physicians and can be associated with staff absenteeism, drug and alcohol abuse, and suboptimal patient care. We aimed to investigate the prevalence and features of self-reported burnout amongst intensivists working in Australia and New Zealand (ANZ); and to evaluate workplace stressors associated with increased risk of self-reported burnout.

Methods

Electronic survey amongst registered intensivists in Australia and New Zealand. Burnout and professional quality of life were measured using the Professional Quality of Life Scale 5 (ProQOL-5). Socio-organisational factors were defined a-priori and assessed using a five-point Likert scale. Thematic analysis was conducted on an open-ended question on workplace stressors. Associations between the ProQOL burnout subscale and demographic characteristics were investigated using analysis of variance or Kruskal-Wallis.

Results

261 of 921 estimated intensivists responded (response rate: 28.3%). Overall, few participants (0.8%) demonstrated high scores (>75th centile) for burnout, and 70.9% of participants scored in the average range for burnout. Of note, 98.1% of participants scored in the average to high range for compassion satisfaction. No association was found between gender, age, or years of practice with the level of burnout or compassion satisfaction. Seven themes emerged regarding intensivists’ most stressful aspects of work: (1) interpersonal interactions and workplace relationships (25.5%); (2) workload and its impact (24.9%); (3) resources and capacity (16.3%); (4) health systems leadership and bureaucracy (16.1%); (5) end-of-life issues and moral distress (8.4%); (6) clinical management (4.9%); and (7) job security and future uncertainty (1.3%).

Conclusion

Fewer ANZ intensivists experienced burnout than has previously been reported. Many self-reported work stressors do not relate to clinical work, but instead potentially modifiable factors related to interpersonal interactions with other colleagues and, more importantly, hospital administrators.

Background

Burnout is a state of mental or emotional exhaustion resulting from persistent exposure to stressors in the workplace.1 The term was first described in the occupational psychology literature in the 1970s.2 Maslach and Jackson describe burnout as a syndrome characterised by emotional exhaustion, cynicism
or depersonalisation, and reduced personal accomplishment. Doctors, particularly those in critical care environments, are reported to be at increased risk of experiencing burnout. 

Burnout has been associated with measures of suboptimal care, medical errors, job turnover, absenteeism, low morale, self-reported measures of personal distress, increased use of alcohol and drugs, as well as relationship and family problems. It has been proposed that burnout is one of the associations between organisational culture and quality of care.

There are several limitations with previous studies evaluating burnout, including the use of different tools and the variable use of arbitrary cut-offs to define the presence or absence of burnout (usually the 75th centile) as a binary (yes/no) outcome. In addition, few studies have explored potentially modifiable workplace factors that might be associated with burnout. Furthermore, there is a paucity of studies exploring the potential positive mental health outcomes for staff working in the intensive care environment.

Increasing interest amongst medical training bodies, colleges and peak organisations in Australia and New Zealand (ANZ) in the area of burnout, physician welfare and wellbeing have resulted in position statements and the development of frameworks. In response to such concerns, the Professional Activities and Welfare (PAW) Committee of the Australian and New Zealand Intensive Care Society (ANZICS) commissioned this survey to assess the frequency of burnout amongst intensive care physicians practising in ANZ. An additional aim was to evaluate workplace stressors that may be associated with an increased risk of self-reported burnout to inform future strategies to prevent or mitigate the effects of workplace stress and burnout on the intensive care specialist medical workforce.

Methods
Summary of study design and research questions

We conducted an electronic survey to evaluate the frequency of burnout, self-reported professional quality of life, and self-reported workplace stressors experienced by intensivists in ANZ.

Burnout was evaluated using the Professional Quality of Life scale version 5 (ProQOL-5). Socio-organisational variables were evaluated using a Likert agreement scale in questions within a priori defined factors previously associated with workplace stress and burnout including: (1) interpersonal interactions and workplace relationships, (2) leadership and governance, and (3) self-determination and control. Finally, we used open ended responses to seek intensivists’ perspectives about the aspects of their work they perceived to be the most stressful.

Ethics
Ethics approval was provided by The University of Queensland School of Medicine, Low and Negligible Risk Ethics Sub-Committee (clearance number 2017001103).

**Participant eligibility and recruitment**

Recruitment occurred over a six-week period in August and September 2018. Invited participants needed to be registered medical professionals acting in the role of a consultant intensivist, whose primary place of practice was in an intensive care unit (ICU) in ANZ. It was not a requirement for participants to be ANZICS members or Fellows of the College of Intensive Care Medicine (CICM) of Australia and New Zealand. It was estimated that 921 intensivists were eligible to participate.\(^{24,25}\)

The survey was administered electronically using SurveyMonkey (SurveyMonkey Inc., San Mateo, California, USA). Invitations to participate were distributed via the ANZICS distribution list and weekly reminders were sent during the six-week study period. In addition, a notice and survey link were promoted in the CICM e-newsletter and via social media.

**Survey development**

The survey was developed, conducted and reported in accordance with published guidelines.\(^{26}\) A draft survey was piloted using a sample of vocational trainees working in a tertiary pediatric ICU who were not eligible to participate in the survey. The survey was then revised based on feedback regarding the understanding of the questions and was divided into four parts (Appendix 1). Part 1: Professional Quality of Life (ProQOL-5) instrument. Part 2: demographic information including age, gender, primary place of practice and duration of work as a consultant intensivist. Part 3: 16 questions addressing socio-organisational factors. Part 4: open-ended text response to the question “What are the three most stressful aspects of your work?”.

**The Professional Quality of Life Scale (ProQOL-5)**

The ProQOL-5 is an open-access, validated psychometric research tool used to measure both the positive and negative aspects of the work for employees in ‘helping’ or ‘caring’ professions.\(^{20,27}\) It contains 30 items with responses given on a 1-5 Likert scale with one corresponding to ‘never’ and five with ‘very often’. Responses to these items generate scores for three separate subscales:

1) The burnout (BO) subscale quantifies negative feelings associated with difficulties in performing work effectively and the sense of hopelessness associated with this.

2) The secondary traumatic stress (STS) measures the negative effects experienced when caring for those who have themselves experienced traumatic events. The ProQOL-5 instrument combines BO and STS and considers them both as compassion fatigue (CF).
3) Compassion satisfaction (CS) is defined as the pleasure derived from doing work well and provides a counter to CF.

The ProQOL tool developers maintain a registry of multiple previous studies using ProQOL-5 and previous versions of the tool from which cut scores indicating the $25^{\text{th}}$ and $75^{\text{th}}$ centiles have been published. Extrapolating back to the raw scores of the ProQOL-5, scores of 22 or less are indicative of a “low” level of that construct and scores of 42 or more correspond with “high” levels. Raw scores between 23 and 41 correspond fall between the $25^{\text{th}}$ and $75^{\text{th}}$ centile of this dataset and are considered “moderate”. This study adhered to the recommended cut-off scores.

**Statistical methods**

Descriptive analysis of the demographic data and the ProQOL scores were performed; categorical data are presented as counts and percentages, continuous as mean and standard deviation (SD) (if normally-distributed data) or median and interquartile range (IQR) (non-normally distributed). Associations between the ProQOL burnout subscale (ProQOL:BO) and demographic characteristics were investigated using analysis of variance or Kruskal-Wallis (dependent on ProQOL: BO distribution) with post-hoc testing. For categorical variables analysis of variance is used. Statistical analyses were conducted using StataIC v14.2 (StataCorp Pty Ltd, College Station, Texas). A priori sample size calculations were not undertaken, therefore while statistical significance was set at the 0.05 level, all results will be interpreted with caution.

**Thematic analysis**

Participants provided open-ended text responses to the question “What are the three most stressful aspects of your work?”. Using methodology described by Yin responses were analysed thematically through an iterative process of review using principles based in grounded theory. Data were compiled, disassembled and open-coded independently by two investigators (LC and SM). The emergent themes were then compared to assess inter-coder reliability and a coding framework was devised. Data was re-coded and reassembled into key themes and sub-themes to build a visual representation of the data and then re-reviewed by four members of the research team (LC, SM, MN and DJ) to ensure consensus and increase rigor.

**Results**

**Details of participants**

Of the 921 eligible participants, there were 261 completed surveys (response rate 28%). Males comprised 75.1% of participants, 82.8% of respondents practiced primarily in Australia, and 57.8% were aged between 41 and 55 years (Table 1).
Details of ProQOL scores

The distribution of participants’ scores on the ProQOL subscales (scale 10-50) are demonstrated in Appendix 2 and Figure 1. Scores in the domain of CS ranged from 16 to 50 (higher scores suggest greater satisfaction). The mean (SD) score was 36.1 (6.5), with 22.6% of participants demonstrating high CS, 1.9% showing low levels of CS, and 75.5% demonstrating moderate CS.

Participants’ scores for BO ranged between 12 and 42 (higher scores suggest greater burnout), with a mean (SD) score of 26.1 (6.0). Most participants (70.9%) demonstrated moderate levels of BO, with 28.4% demonstrating low levels of burnout and only 0.8% of participants had high burnout. There were no associations between BO score and age, gender, primary place of practice and duration of work as a consultant intensivist (Appendix 3).

The range of scores for STS was 11 to 40 (higher scores suggest more secondary traumatic stress), and the mean (SD) score was 22.7 (5.4). Almost half (46.4%) of the participants had low scores in the domain of STS. The remaining 53.6% had scores between the 25th and 75th centiles (moderate), and no participants had scores demonstrating high levels of STS.

Self-reported socio-organisational stressors

Two hundred and fifty-two [96.6%] participants responded to the sixteen questions assessing the impact of socio-organisational factors in the ICU workplace (Table 3). A summary of findings includes:

Interpersonal interactions and workplace relationships: Most participants reported collegial or effective working relationships ‘often or very often’ with their ICU medical colleagues (74.7%), nursing colleagues (81.7%), and other medical specialties (65.1%).

Leadership and governance: 58.6% of participants reported feeling supported ‘often or very often’ by those in leadership positions within their ICU. In contrast, 37.6% reported ‘never or rarely’ feeling supported by their hospital executive. Similarly, participants felt the needs of their ICU or specialty were ‘never or rarely’ adequately advocated for within their hospital (32.6%) or within their health system (34.5%).

Self-determination and control: 75.9% responded that they needed to ‘fight’ to get things done at work at least ‘some of the time’. The majority (86.2%) of participants identify that they are working in their job of choice.

Thematic analysis of open-ended responses

A total of 228 (87.4%) participants provided 638 free text responses for the open-ended question “What are the three most stressful aspects of your work?” Individuals who duplicated the same response only
had one answer recorded.

Seven themes emerged from the thematic analysis (Appendix 4). There was an overarching major theme of ‘mismatch of expectations’ between intensivists and their colleagues and trainees, societal expectations, and the system in which they are employed.

Interpersonal interactions and workplace relationships (163 responses): The most frequent perceived poor behaviour included bullying, incivility, conflict, and politics. Less dominant themes included, dealing with difficult patients and families as well as issues pertaining to and supervision of junior medical staff and trainees. Comments regarding sexist and racist behaviour were very infrequent.

Workload (159 responses): The dominant finding in this theme related to after-hours rostering and the impact on the lives of intensivists’ with frequent responses including “on call”; “night call”; “lack of sleep”; “tiredness”; “fatigue” and “after-hours work”. Time management, balancing competing demands, managing administrative workload and non-clinical portfolios were cited as adversely impacting participants’ personal lives, relationships and their families.

Resources and capacity (144 responses): Perceived resource constraints and inadequate ICU capacity was the third most frequently cited cause of concern, as well as bed management issues and its impact on patient flow.

Health systems governance, leadership and bureaucracy (103 responses): Interactions with members of the organisational hierarchy were listed as a cause of stress and expressed in responses such as “dealing with management” and “dealing with executive(s)”. Common responses included simply “administration”; “bureaucracy”; and “leadership”. Less commonly, participants raised concerns regarding leadership within the ICU.

End-of-life issues and moral distress (54 responses): Stress related to end-of-life decision making related mostly to a perceived mismatch of expectations with medical specialties outside of the ICU (“Mismatch of expectations with some non-ICU colleagues over patient care goals”), patient relatives (“Inappropriate continuation of curative care in the dying”), as well as a failure of hospital leadership to address setting of goals of care (“Hospital-wide failure to consider end-of-life planning”).

Clinical management (31 responses): Less frequent sources of stress and burden included responsibility for deteriorating or critically unwell patients: “Hoping that I haven’t missed anything clinically”, “Being responsible for the wellbeing of very acutely unwell patients with high incidence of morbidity and mortality”. Concerns on how to remain engaged in ongoing professional development and research were also notable, “Keeping up with the rapidly expanding knowledge”.

Job security and future uncertainty (8 responses). Eight responses related to job security, future uncertainty and the need constantly move to secure work and training which was stressful for themselves, their relationships and their families.
Discussion

Summary of major findings

This cross-sectional survey of intensive care specialists working in ANZ revealed that high levels of burnout and compassion fatigue was relatively uncommon, and levels of compassion satisfaction were high. Unlike previous studies on burnout among critical care physicians, there was no significant association between the measures of burnout and age, gender, or duration of work as a consultant intensivist.  

Overall intensivists reported a high quality and satisfaction with interpersonal interactions and workplace relationships for staff within the ICU. The major reported sources of workplace stressors included adverse interactions with clinicians and administrators outside of the ICU, the burdensome nature and quantity of on-call and administrative work as well as end of life care issues. We identified an overarching theme regarding 'mismatch of expectations' across the majority of the themes.

Comparison with previous studies

Shehabi and co-workers  explored the frequency of burnout amongst 115 (36%) ANZICS members in 2007 using the modified Maslach burnout inventory. Unlike the present study, they found a high incidence of burnout and self-reported under achievements in terms of personal accomplishment. However, the authors similarly found that mediation and conflict management were areas where intensivists required assistance. In contrast to these findings, Higheld and Parry-Jones, surveyed 799 (34.7%) members of the Faculty of Intensive Care Medicine (FICM) of the UK in 2017 using the ProQOL-5 tool. This study showed remarkably similar results to our study for each of the subscales.

It is difficult to precisely assess the prevalence of burnout in our study population as there are no widely accepted criteria of what constitutes burnout. A recently published systematic review concluded that there was “substantial variability in prevalence estimates of burnout among physicians and marked variation in burnout definitions, assessment methods, and study quality ... (which) preclude definitive conclusions about the prevalence of burnout”. The Maslach Burnout Inventory and other tools often report burnout as a binary diagnosis; burnout yes or no, whereas burnout needs to be viewed as a spectrum which exists in a dynamic state in response to social and work environments. A review of other studies using the ProQOL to examine the wellbeing of doctors or nurses in various settings revealed significant variation on how the results were presented (see Appendix 5). The developers of the ProQOL tool state that it is best used in its continuous form. However, the majority of authors prefer to report the prevalence of participants in each arbitrarily defined category and many do not acknowledge the continuous nature of the scoring system. While our study did not find high negative associations for ANZ intensivists in relation to burnout, secondary traumatic stress or compassion fatigue it did find
concerning systemic issues that were significantly impacting on the working relationships, levels of stress and risks to wellbeing for ANZ intensivists.

**Study strengths and limitations**

This study is the first known research using the ProQOL v5 with intensivists in Australia and New Zealand which allowed investigation of negative associations such as burnout, secondary traumatic stress, compassion fatigue as well as the positive association of compassion satisfaction. This study also asked questions relating to professional quality of life, socio-organisational stressors and sources of stress that has identified findings that may be resolved with organisational change and interventions with clinicians. It is a strength of the study that a relatively large sample size of 261 intensivists who demographically represent the ANZ intensivist cohort participated. In an era where intensive care medicine as a career is frequently reported negatively this is one of the rare studies that has evaluated positive associations with reports of high compassion satisfaction which may be encouraging for the attraction and recruitment of trainees to this field. The addition of qualitative data provides rich context and potentially tangible outcomes to targeted interventions that could create change and alleviate negative professional quality of life variables rapidly.

It is a limitation of our study in that we cannot state why over 70% of intensivists chose not to participate and the risk of non-responder bias. A conscious decision was made by the authors to use the ProQOL in favour of other psychometric tools used to measure burnout to capture the incidence of compassion satisfaction and secondary traumatic stress in order to have a more comprehensive understanding of the issues facing ANZ intensive care specialists. The ProQOL is a validated tool for the measurement of burnout but has been used relatively infrequently in studies of similar (medical professional) populations. This makes comparison to studies on other specialties difficult and prevents comparison against studies using the Maslach Burnout Inventory. Associations revealed in our analysis do not imply causation. The ANZ healthcare system differs to those in the United States and Europe and our findings may not be applicable to other countries.

**Implications for clinicians, researchers and policy makers**

Our study suggests that while recognising that there are grades of burnout that severe burnout appears to be relatively uncommon amongst intensivists in ANZ. This study found that issues related to burnout and stress were not clinical were commonly associated with systemic processes and structures beyond the control of individual intensive care specialists. Wellbeing of healthcare professionals is dependent on engagement, autonomy, connection, being valued and appreciated as well as respect. There are several findings in this study that demonstrate how health authorities can build on the commitment and job satisfaction for intensivists and what interventions could occur to negate the negative aspects of the job and culture. Managing interpersonal conflict and challenging communication is highlighted throughout the study and is an important skill set to build in intensivists.
Conclusion

Severe Burnout and compassion fatigue are relatively uncommon amongst intensive care specialists in ANZ, and most report positive interactions with other clinical staff. The major factor adversely affecting self-reported professional quality of life are interactions with hospital administrators and colleagues, rather than stress related to the nature of the clinical work.

Abbreviations

ProQOL-5: Professional Quality of Life Scale 5; ANZ: Australia and New Zealand (ANZ); PAW: Professional Activities and Welfare Committee; ANZICS: Australian and New Zealand Intensive Care Society; CICM: College of Intensive Care Medicine of Australia and New Zealand; BO Burnout; STS: secondary traumatic stress; CF: Compassion fatigue; CS: Compassion satisfaction.

Declarations

Electronic supplementary material

The online version of this article contains supplementary material, which is available to authorized users.

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Authors’ contributions
SM designed the study protocol. SM, and KG analysed the data. SM drafted the tables and figures. SM, DJ, LC, MN and SS interpreted the data and drafted the manuscript. DJ provided senior supervision and ensured governance of the study. SM, DJ, LC, and MN were responsible for the literature search; SM, DJ, LC, SS, and MN were involved in regular meetings and were involved in drafting and reviewing the manuscript multiple times. All authors were involved in the design of the study and reviewed and approved the final version of the manuscript.

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**Data availability**

All available data are published in the current manuscript.

**Compliance with ethical standards**

Ethics approval was obtained for the study to occur.

**Conflicts of interest**

The authors have no conflicts of interest to declare.

**Ethical approval and consent to participate**

Ethics approval was provided by The University of Queensland School of Medicine, Low and Negligible Risk Ethics Sub-Committee (clearance number 2017001103). Willingness to participate in the study was taken as an indication of consent, as this was voluntary and de-identified.

**Consent for publication**

Not applicable

**Tweet**

Burnout is uncommon in intensivists. Professional quality of life is adversely affected by hospital administrators not clinical work.

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Tables

Table 1: Characteristics of respondents to survey exploring burnout amongst Intensivists in Australia and New Zealand.
| Characteristic                | Category | (N = 261) |
|------------------------------|----------|-----------|
|                              | n         | %         |
| **Age (years)**              |          |           |
| ≤35                          | 6         | 2.3       |
| 36-40                        | 39        | 14.9      |
| 41-45                        | 60        | 23.0      |
| 46-50                        | 46        | 17.6      |
| 51-55                        | 45        | 17.2      |
| 56-60                        | 34        | 13.0      |
| 61-65                        | 21        | 8.0       |
| ≥66                          | 7         | 2.7       |
| Unknown                      | 3         | 1.1       |
| **Sex**                      |          |           |
| Male                         | 196       | 75.1      |
| Female                       | 62        | 23.8      |
| Unknown                      | 3         | 1.1       |
| **Primary place of practice**|          |           |
| Australia                    | 214       | 82.8      |
| New Zealand                  | 43        | 16.5      |
| Other                        | 1         | 0.4       |
| Unknown                      | 3         | 1.1       |
| **Number of years as intensivist** |       |           |
| 0-5                          | 62        | 23.8      |
| 6-10                         | 52        | 19.9      |
| 11-15                        | 36        | 13.8      |
| 16-20                        | 53        | 20.3      |
| 21+                          | 55        | 21.1      |
| Unknown                      | 3         | 1.2       |

**Table 2:** Details of ProQOL subscales showing the number (%) within the low, moderate and high range for each subscale.
| Subscale          | Low n (%) | Moderate n (%) | High n (%) |
|-------------------|-----------|----------------|------------|
| ProQOL: CS        | 5 (1.9)   | 197 (75.5)     | 59 (22.6)  |
| ProQOL: BO        | 74 (28.4) | 185 (70.9)     | 2 (0.8)    |
| ProQOL: STS       | 121 (46.4)| 140 (53.6)     | 0 (0)      |

**Table 3:** Details of level of agreement to questions regarding socio-organisational factors associated with intensivist well-being and burnout
| Question                                                                 | N   | Never n (%) | Rarely n (%) | Sometimes n (%) | Often n (%) | Very Often n (%) |
|-------------------------------------------------------------------------|-----|-------------|--------------|-----------------|-------------|-----------------|
| **Interpersonal interactions and workplace relationships**              |     |             |              |                 |             |                 |
| I enjoy collegial relationships with my ICU medical colleagues.         | 252 | 4 (1.5)     | 9 (3.5)      | 44 (16.9)       | 120 (46.0)  | 75 (28.7)       |
| I enjoy collegial relationships with my nursing colleagues.            | 253 | 1 (0.4)     | 4 (1.5)      | 35 (13.4)       | 127 (48.7)  | 86 (33.0)       |
| I enjoy effective working relationships with other medical specialties  | 253 | 0           | 11 (4.2)     | 72 (27.6)       | 135 (51.7)  | 35 (13.4)       |
| within my hospital.                                                    |     |             |              |                 |             |                 |
| When I am experiencing difficulties at work, I have someone to talk it | 254 | 13 (5.0)    | 39 (14.9)    | 70 (26.8)       | 85 (32.6)   | 47 (18.1)       |
| over with.                                                             |     |             |              |                 |             |                 |
| **Leadership and governance**                                           |     |             |              |                 |             |                 |
| I am supported by those in leadership positions within my unit.         | 254 | 10 (3.8)    | 25 (9.6)     | 66 (25.3)       | 88 (33.7)   | 65 (24.9)       |
| I am supported by the hospital executive                                | 254 | 25 (9.6)    | 73 (28.0)    | 96 (36.8)       | 54 (20.7)   | 6 (2.3)         |
| I feel as though the needs of my unit are adequately advocated for     | 254 | 11 (4.2)    | 74 (28.4)    | 93 (35.6)       | 60 (23.0)   | 16 (6.1)        |
| within my hospital.                                                    |     |             |              |                 |             |                 |
| I feel as though the needs of my specialty are adequately advocated    | 254 | 14 (5.4)    | 76 (29.1)    | 111 (42.5)      | 43 (16.5)   | 10 (3.8)        |
| for within my health system.                                           |     |             |              |                 |             |                 |
| I feel that there is a clear and widely understood vision for how the  | 253 | 14 (5.4)    | 53 (20.3)    | 98 (37.6)       | 68 (26.1)   | 20 (7.7)        |
| unit I work in is developing.                                          |     |             |              |                 |             |                 |
| The clinical workload in my unit is managed well.                      | 252 | 5 (1.9)     | 31 (11.9)    | 81 (31.0)       | 114 (43.7)  | 21 (8.1)        |
| **Control and self-determination**                                     |     |             |              |                 |             |                 |
| I find I have to fight in order to get things done at work             | 252 | 2 (0.8)     | 52 (19.9)    | 116 (44.4)      | 56 (21.5)   | 26 (10.0)       |
| I am concerned about my future in the specialty I have trained in      | 254 | 40 (15.3)   | 77 (29.5)    | 71 (27.2)       | 38 (14.6)   | 28 (10.7)       |
| I feel that I can influence the working of my unit.                    | 254 | 5 (1.9)     | 51 (19.5)    | 90 (34.5)       | 7 (28.0)    | 35 (13.4)       |
| I am currently working in the job(s) I want to work in.                | 253 | 6 (2.3)     | 22 (8.4)     | 64 (24.5)       | 111 (42.5)  | 50 (19.2)       |
| I have adequate access to rostered non-                                | 252 | 9           | 20           | 72 (27.6)       | 111 (42.5)  | 40 (15.9)       |
Figures

Figure 1

Boxplot of ProQOL subscales showing median and interquartile range

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Appendix1to5.docx