

## Article in Press

# Well-being in intensive care: reflections from a multinational survey

---

Received: 04 Mar 2026

---

Accepted: 30 Apr 2026

---

Published online: 08 May 2026

---

**Cite this article as:** Battaglini, D., Aragao, I., Veloso, A. *et al.* Well-being in intensive care: reflections from a multinational survey. *J Anesth Analg Crit Care* (2026). <https://doi.org/10.1186/s44158-026-00401-y>

---

**Denise Battaglini, Irene Aragao, Ana Veloso, Silvia Rosa, Joana Santos, Sónia Gonçalves, Brigitta Fazzini, Isabel Silva, Catarina Brandão, Maria Delgado, Luciana Mascia, Olfa Hamzoui & Francesca Rubulotta**

---

We are providing an unedited version of this manuscript to give early access to its findings. Before final publication, the manuscript will undergo further editing. Please note there may be errors present which affect the content, and all legal disclaimers apply.

If this paper is publishing under a Transparent Peer Review model then Peer Review reports will publish with the final article.

# Wellbeing in Intensive Care: Reflections from a Multinational Survey

Denise Battaglini<sup>1,2,\*</sup>, Irene Aragao<sup>3,4</sup>, Ana Veloso<sup>5</sup>, Silvia De Rosa<sup>6,7</sup>, Joana Conduto Vieira dos Santos<sup>8</sup>, Sónia P. Gonçalves<sup>9</sup>, Brigitta Fazzini<sup>10,11</sup>, Isabel Soares Silva<sup>5</sup>, Catarina Brandão<sup>12</sup>, Maria Cruz Martin Delgado<sup>13</sup>, Luciana Mascia<sup>14</sup>, Olfa Hamzoui<sup>15,16</sup>, and Francesca Rubulotta<sup>17</sup>

1 Department of Surgical Sciences and Integrated Diagnostics, University of Genoa, Genoa, Italy

2 Anesthesia and Intensive Care, IRCCS Azienda Ospedaliera Metropolitana, Genoa, Italy

3 Intensive Care, Hospital Santo Antonio, ULSSA, Porto, Portugal

4 ICBAS (School of Medicine and Biomedical Science), University of Porto, Portugal

5 CICS. NOVA. UMinho; School of Psychology, University of Minho, 4704-553, Braga, Portugal

6 From the Centre for Medical Sciences - CISMed, University of Trento, Trento, Italy.

7 Anesthesia and Intensive Care, Santa Chiara Hospital, APSS Trento, Trento, Italy.

8 University Research Centre in Psychology (CUIP), Faculty of Human and Social Sciences, University of Algarve, 8005-139 Faro, Portugal

9 Centre for Public Administration and Public Policies, Institute of Social and Political Sciences, Universidade de Lisboa, Rua Almerindo Lessa, 1300-663, Lisbon, Portugal

10 William Harvey Research Institute, Barts and The London School of Medicine & Dentistry, Queen Mary University of London, London, United Kingdom, United Kingdom

11 Intensive Care Medicine, Royal London Hospital, Barts Health NHS Trust, London, United Kingdom

12 Center for Psychology at University of Porto (CPUP), Faculty of Psychology and Educational Sciences, University of Porto, 4200-135, Porto, Portugal

13 Hospital Universitario 12 Octubre. Universidad Complutense de Madrid, Madrid, Spain

14 UniSalento University, Lecce, Italy.

15 Université de Reims Champagne-Ardenne, Unité HERVI "Hémostase et Remodelage Vasculaire Post- Ischémie" - EA 3801, Reims, F-51100, France

16 Unité de Médecine Intensive et Réanimation Polyvalente, CHU Reims, Reims, F-51100, France

17 Department of Anesthesia and Critical Care CHIRMED university of Catania, Catania, Italy

**Words count: 3194**

**Authors have no conflicts of interest**

**\*Corresponding Author:** Denise Battaglini, MD, PhD

Department of Surgical Sciences and Integrated Diagnostics, University of Genoa, Italy

SIAARTI member

E-mail: denise.battaglini@unige.it

## Abstract

**Background:** Intensive care unit (ICU) professionals face high levels of stress, burnout, and work-related psychological strain. However, comprehensive multinational assessments of their wellbeing—particularly those exploring gender differences and work-life dynamics—are scarce.

**Methods:** A cross-sectional survey was conducted by the International Women in Intensive and Critical Care Network (iWIN) between October 2023 and June 2024. The 113-item questionnaire assessed well-being using the WHO-5 Well-Being Index and other validated instruments across eight domains. ICU professionals were recruited via email, professional meetings, and the iWIN website. Descriptive statistics, T-tests, chi-square, and Mann–Whitney U tests were used for analysis.

**Results:** 158 ICU professionals from diverse roles responded (62% female, 37% male, 1% other). The median WHO-5 score was 68 (IQR 52–80); males reported significantly higher scores than females (72 vs. 60;  $p=0.0051$ ). Respondents reported high workload, moderate job autonomy, and frequent stress. Temporary employment was common, with 41.1% considering job transfers. Despite generally positive diversity ratings, gender disparities remained in perceptions of hiring, promotion, and career advancement fairness.

**Conclusions:** This exploratory survey found generally positive well-being among ICU professionals, with a gender difference observed in WHO-5 scores. Concerns related to workload, job insecurity, and career development were also reported. Findings should be interpreted with caution and warrant further investigation.

**Key words:** wellbeing, anaesthesia, critical care medicine, intensive care, gender, disparities

## Background

Critical care teams operate in environments of constant urgency and complexity, often making life-or-death decisions under pressure. Constraints such as the need to clearly communicate with critical care personnel, conduct sophisticated clinical decision-making, and include patients and families in treatment decisions characterize the activity of these teams<sup>1</sup>. High degrees of burnout, post-traumatic stress disorder, and moral distress are often experienced by critical care staff. These psychological burdens can be accompanied by depersonalization, emotional tiredness, and a weakened sense of personal achievement. Additionally, headache, exhaustion, irritability, emotional instability, and compassion fatigue have also been described<sup>2</sup>. Despite growing awareness of burnout, few studies have explored the broader well-being of the multidisciplinary ICU workforce across countries, especially considering the complex interplay between professional roles, job demands, and personal life<sup>3</sup>. Furthermore, international comparisons may reveal systemic factors that either exacerbate or buffer wellbeing, offering valuable insights for more effective interventions. Wellbeing is impacted by our work and personal environments. Women, in particular, may face additional, often under-recognized challenges that impact their professional fulfillment and mental health<sup>4</sup>. Health professionals need to be well to provide high-quality health care to their patients, to experience critical care medicine as a rewarding and satisfying career and to be truly present for their family and friends<sup>5</sup>. Critical care professionals deserve to have joy in professional and personal lives despite working in a high intensity workplace<sup>6</sup>.

To address this concern, the International Women in Intensive and Critical Care Network (iWIN) conducted a multinational survey to explore how work and personal environments are associated with the wellbeing of ICU professionals. The primary aim of this survey was to describe the wellbeing among ICU professionals using the World Health Organization (WHO) scale. Secondary aims were to describe other key factors of wellbeing at the workplace.

## Methods

### Study Design

Between October 2023 and June 2024, we conducted an exploratory, cross-sectional survey distributed through the iWIN network and related professional meetings. For designing this study, the Consensus-Based Checklist for Reporting of Survey Studies (CROSS) method was followed<sup>7</sup>, Supplementary Material (SM) Item S1. The complete survey is presented in SM Items S2.

### Eligibility and Data Collection Methods

All healthcare practitioners working in ICU settings were eligible for participation. The questionnaire comprised 113 questions divided into four sections. We explored eight domains, as shown in Figure 1.

### Operational definitions of key study variables and data collection

Well-being and related domains were assessed using validated instruments. The WHO-5 Well-Being Index was used to assess general well-being. Interpretation of the WHO-5 scale<sup>8</sup>: the WHO-5 Well-Being Index ranges from 0 to 25, with higher scores indicating better wellbeing; scores are commonly expressed as percentages (0–100%), and values  $\leq 13$  (or  $\leq 52\%$ ) may indicate clinically relevant depression. Work environment and organizational factors were evaluated using selected subscales of the Work Environment Scale (WES-10) and work autonomy scales. Meaning at work was assessed using the Work and Meaning Inventory (WAMI), while interpersonal dynamics were evaluated using the Work Relationships Scale (WRS, range 15–90). Work–life interaction was measured using the Work–Family Conflict (WFC, range 5–35) and Family–Work Conflict scales. Workload was assessed using the NASA Task Load Index (TLX; range 0–100), and perceived job insecurity was measured using the Job Insecurity Scale (JIS, range 4–20). Higher scores generally indicate greater levels of the construct measured (e.g., higher workload, greater job insecurity), unless otherwise specified. Detailed operational definitions are provided in the SM Item S3. Questions were provided by using a Likert scale, multiple or single choice questions depending on the nature of the explored domain.

The following data were collected: (1) General information/socio-demographic characterization [country of clinical/research work, nationality, ethnicity, type of hospital (university, non-university, private institution), age, gender, disability

(yes/no), profession in ICU (ICU nurse/advanced clinical practitioner, ICU respiratory therapist, fellow/resident/doctoral student, ICU consultant, associate professor, head of department/full professor, other), years of experience in health care]; (2) Measure of wellbeing [the WHO-5 scale<sup>8</sup> – was used to assess general well-being]; (3) Factors which influence well-being at work using previously validated questionnaires [work setting/environment, job autonomy and control, organizational justice, meaning at work, relationships at work, work-life balance (family environment, work-family conflict scale, family work scale), workload (mean hours, subjective work, and mental demand), security and change (intention to leave work, work situation), other general factors (influence of environment)<sup>9</sup>.

### **Survey Administration**

Participation was voluntary and anonymous. This targeted outreach aimed to engage participants who are already familiar with the relevant topics and can provide valuable insights. The survey link was emailed to 185 individuals, which comprises participants from the annual meetings organized by the network, individuals with specific interests in equality, diversity, and inclusion, as well as personal contacts established by experts in Intensive Care. The survey was made available also via the network website. Among the 185 individuals directly contacted via email, approximately 85% responded. However, as the survey was also disseminated through open channels (e.g., website and meetings), the overall response rate relative to the target population cannot be determined. The survey was additionally mentioned during three significant events: the iWIN 2023 Annual Meeting in Catania, Italy, the World Day of the Critical Lung 2023 (virtual meeting), the 35<sup>th</sup> SMART anesthesia and intensive care medicine meeting in Milan, 2024, and the 26<sup>th</sup> Jornadas Medicina Intensiva held in Porto, Portugal, 2023. At these events, the content and objectives of the survey were explained to attendees, fostering engagement and allowing them to understand its significance. To further enhance participation, the survey was translated into Spanish while presented during the international online meeting World Day of the Critical Lung 2023. This meeting traditionally starts featuring a session dedicated to equality, diversity, and inclusion. During the 2023 session, authors introduced the survey and provided access through a link uploaded to the iWIN website ([www.iwinideal.com](http://www.iwinideal.com)), allowing interested individuals to participate easily. Overall, these efforts aimed to broaden outreach and

ensure diverse participation in our research study. The iWIN survey is longer and more complex compared to most used in the field, therefore the message related to its importance was reinforced to secure participation and justify the need.

### **Time Frame**

The survey was conducted over a designated time frame, with recruitment open for nine-months from October 15<sup>th</sup>, 2023, to June 15<sup>th</sup>, 2024. The extended recruitment period was chosen to facilitate broad multinational dissemination through professional networks and meetings, and to maximize participation among ICU professionals, who often have limited availability due to demanding clinical schedules. One written follow-up reminder was sent after 6 months to a list of private email contacts (185 people) to encourage participation and ensure a robust response rate. The link to the survey was freely available on the iWIN website from October 2023.

### **Prevention of Multiple Participation**

To prevent multiple participation by the same individuals, unique identifiers were employed for the email distribution and on the system. Clear instructions were provided during the presentations to emphasize the importance of unique responses, further supporting the integrity of the data collected. Consent for participation was also requested before starting the survey. Through these methods of administration, we sought to ensure a comprehensive and diverse representation of perspectives in our findings.

### **Study Preparation**

Before conducting the survey, a thorough preparation process was undertaken to ensure its effectiveness and clarity. The authors held three preparatory calls leading up to the 2023 iWIN meeting in Italy ([www.iwinideal.com](http://www.iwinideal.com)), discussing objectives, target audience, and methodology. In June 2023, a hybrid meeting was convened to finalize survey details and involve key experts, which enriched the design process. Following the iWIN meetings, two additional calls addressed emerging questions and implementation strategies. Team members independently tested the survey and provided feedback, identifying ambiguities and allowing for adjustments prior to broader distribution. A special meeting focused on the Spanish translation, where a

native speaker translated the survey, followed by a second speaker reviewing for accuracy and clarity. Final proofreading ensured quality. The concluding meeting assessed the study results' relevance. This comprehensive preparation ensured a well-designed survey equipped to gather meaningful data and achieve its research objectives.

### **Ethical Considerations**

This survey follows the Helsinki declaration and Good Clinical Practice (GCP) principles<sup>10,11</sup>. The Institutional Review Board (IRB) “Comissão de Ética para a Investigação em Ciências Sociais e Humanas”, Universidade do Minho, Minho, Portugal, approved the study with reference number: CEICSH 055/2023. Informed consent was acquired from each participant before initiation of the questionnaire. Data were collected as anonymized and only the principal investigator (D.B.) accessed the database.

### **Statistical analyses**

No sample size calculation was performed considering the exploratory and descriptive nature of this survey. Data from the questionnaire were exported as a comma separated value report from an online software package and subsequently stored as an Excel file (Microsoft Corp®, Redmond, WA). Descriptive statistics was computed for all study variables. The results were presented as numbers and percentage for categorical variables, or medians (interquartile range) where not otherwise reported, as appropriate. Normality of data was tested using the Shapiro-Wilk test. Differences between groups (females vs. males) were assessed using a Mann-Whitney U test.  $P < 0.05$  was considered as statistically significant. Considering the small sample size, we did not perform multivariable modelling or adjust for potential confounders such as country, professional role, or contract type; therefore, observed gender differences should be interpreted as descriptive associations rather than causal inferences. JASP software (version 0.19.3) and R package were used for the statistical analysis.

## Results

### Characteristics of the Sample

A total of 158 healthcare professionals participated in the survey, with a predominance of female respondents (62%). Most participants were aged between 26–35 years (42%). The sample included a range of professional roles, with ICU consultants representing the largest group (30.4%), followed by trainees (20.3%), and other healthcare professionals including nurses and respiratory therapists. Most respondents were working in European countries (61.4%), although a substantial proportion were from extra-European regions (38.6%), supporting the multinational scope of the survey. In terms of ethnicity, over half of participants identified as White/Caucasian (55.1%), with a significant proportion identifying as Hispanic/Latin (38.0%). Most respondents worked in university hospitals (65.2%) and reported substantial clinical workload, with nearly 38% working more than 60 hours per week. Sociodemographic and health behavior profile of respondents are reported in Table 1 and SM Item S4.

### Measure of wellbeing according to the WHO-5 Well-Being Index

The overall median WHO-5 Well-Being Index score was 68 (IQR: 52–80), corresponding to 54.2% of the maximum possible score. Males reported a higher wellbeing than females [72 (IQR: 60–84) vs. 60 (IQR: 47–76),  $p=0.0051$ ]. Boxplots and frequency distribution for each domain of the WHO wellbeing scale are showed in Figure 2.

### Other measures of wellbeing

Overall satisfaction with the work setting was reported by 55% of respondents, with a median score of 32 points (IQR: 28–35). Self-realization was perceived by 50% of participants [median: 15 (IQR: 12–18)], while workload was perceived by 65% [median: 6.5 (IQR: 5.75–8)]. Work-related conflicts were reported by 44.4% of respondents [median: 5 (IQR: 3–7)], and nervousness was experienced by 55.6% [median: 6 (IQR: 6–8)]. The frequency distribution for each domain is shown in SM Item S5.

Perceived job fit and workload expectations among respondents are reported in Figure 3A. Median workload, as assessed by the NASA Task Load Index, was 86 (IQR: 69–97.25, range 0 to 100).

Job autonomy was rated with a median score of 44 (IQR: 32–53.25), and its frequency distribution is shown in SM Item S6. Response distributions for the subdomains of organizational justice—distributive and procedural justice—are presented in Figure 3B.

The median work meaningfulness score was 43.5 (IQR: 35–48; range 10–50). Subdomain medians were: positive meaning, 23 (IQR: 18–26); meaning making through work, 16 (IQR: 13–20); and greater good motivation, 5 (IQR: 3–5). The median Work-Related Stress (WRS) score was 39.5 (IQR: 27–52; range 0–80). The median Work–Family Conflict (WFC) score was 35 (IQR: 23–46; range 0–80).

The job insecurity scale had a median score of 8.5 (IQR: 8–12; range 4–20) points. A job transfer was considered by 41.1% of respondents, while 25.3% anticipated retirement. Additionally, 20.3% were contemplating a change in career or specialization, 6.3% expected contract termination, and 5.7% foresaw no changes in their employment status. Figure 4 shows the degree to which various factors were perceived as negative influences in the work environment.

Overall, 64.7% of participants strongly disagreed that they were excluded from workplace activities due to their gender, while 14.1% strongly agreed. Regarding sex-based stereotypes, 46.8% strongly disagreed and 16.5% strongly agreed that these had affected their experience. Additionally, 48.7% strongly disagreed that their gender was a limitation in the workplace. Views on institutional fairness and diversity management were more mixed. For instance, only 23.4% strongly agreed that managers promoted objectively regardless of race, sex, or age, while 55.1% strongly disagreed with the statement that they had been treated differently based on personal characteristics, see Table 2.

## Discussion

The main finding of our multinational survey is that overall wellbeing, as measured by the WHO-5 index, was generally positive, although males reported higher scores than females. Further, our survey revealed mixed perceptions of job autonomy, meaningfulness, organizational justice, workload, and diversity, highlighting key areas for intervention to improve the ICU work environment.

Strength of this study lies in its multinational sample, including participants from multiple countries and professional roles representing various professions and backgrounds. This diversity enhances the generalizability of the findings, allowing for a nuanced understanding of ICU work environments. The survey's comprehensive descriptive design, covering well-being, job satisfaction, workload, autonomy, and diversity perceptions, enables a general view of workplace dynamics<sup>34</sup>.

Males reported higher WHO-5 well-being scores than females. However, given the modest sample size and the absence of multivariable adjustment, this finding represents an unadjusted association and does not allow conclusions regarding causality or underlying determinants<sup>12</sup>. This disparity could be influenced by various domains. Future research should systematically measure these variables to gauge performance indicators and quality control<sup>13</sup>.

The predominance of female respondents may reflect broader trends in ICU staffing in some regions; however, it likely also mirrors the composition of the professional network through which the survey was distributed<sup>14</sup>. The majority were aged 26–35, a younger demographic that may shape perspectives on autonomy and job satisfaction. Physical inactivity levels were also notable, with only a minority reporting high activity levels—which could further impact their overall health in a demanding ICU environment. Job security emerged as a relevant concern (job insecurity score of 8.5), with a high proportion of respondents reporting temporary contracts. However, this finding should be interpreted with caution. The prevalence of temporary positions may partly reflect the inclusion of early-career professionals, such as residents or fellows, for whom fixed-term contracts are standard during training in many countries. Moreover, the implications of temporary employment may vary substantially across healthcare systems, where such contracts do not necessarily translate into long-term

job insecurity. Therefore, perceptions of job insecurity in our cohort may be influenced by career stage and local workforce dynamics, limiting the generalizability of this observation. In any case, the shared concerns about employment stability emphasize the importance of addressing job security to retain talent and maintain morale within the healthcare workforce<sup>15</sup>. A recent survey from the ESICM revealed that 72% of physicians are female and most nurses and physicians are young<sup>16</sup>. A notable percentage of clinicians left a previous job because of disagreements related to patient care, especially nurses who reported past effective job leave. Almost one-third of the respondents had thoughts about leaving their current job, and perceived inappropriateness of care was independently associated with higher intentional leave from a job<sup>16</sup>. The quality of relationships with colleagues and supervisors also impacts feelings of connectedness, while perceived job security may differ by gender, with males feeling more secure in their roles<sup>17</sup>. This disparity in perceived control over work responsibilities may contribute to the differences in self-realization and overall job satisfaction, as autonomy is closely linked to motivation and engagement in one's role.

Autonomy, job meaningfulness, and organizational justice showed room for improvement. Perceptions of meaningful work varied, pointing to potential gaps in mentorship, recognition, or professional growth opportunities. Many respondents agreed that managers do not always hire and promote physicians objectively, suggesting an area needing attention to enhance equity and transparency. While many respondents perceived fairness in hiring and evaluation, concerns about transparency in promotion practices were evident. These differences may result from disparities in access to career advancement, mentorship, and professional development, affecting how meaningful individuals find their work<sup>18</sup>. This may be due to males occupying roles traditionally viewed as impactful or authoritative. Organizational culture might also favor behaviors associated with male employees, leading to a perception that their contributions are more valued. Additionally, societal norms regarding gender roles can influence work perceptions. Feedback and recognition from peers can affect perceived meaningfulness. Females often face greater challenges in balancing work and family, potentially lowering their engagement and perceived significance<sup>19</sup>. To reduce the gender gap in medicine, a comprehensive approach is needed, as detailed in a review with 47

recommendations across seven themes<sup>19</sup>. Key strategies include addressing structural barriers to women's career advancement, improving access to senior positions, and increasing transparency around pay disparities. Policy changes should enforce equitable pay practices, while fostering a culture of inclusivity is essential. Additionally, reviewing performance payment criteria can help avoid disadvantaging women, and ongoing analysis of gender pay gaps is crucial for tracking progress. Together, these strategies can drive significant improvements in gender equity within the medical field<sup>20,21</sup>.

Work-life balance remains a concern, especially for those in complex household situations. The exploration of work-life balance revealed that a substantial portion of respondents live with multiple household members, which may influence their perceptions of work-life integration. Evidence indicates that work environments with higher WRS prioritize key characteristics such as rich communication, heedful interrelating, trust, respectful interaction, and mindfulness<sup>22</sup>. These elements foster a collaborative and supportive environment essential for effective teamwork and patient care. Conversely, low-scoring clinics lack these traits, which can lead to misunderstandings and lower satisfaction<sup>22</sup>. Interestingly, the WFC score suggests that other non-work factors may influence workplace satisfaction and engagement, but unfortunately, we were unable to explore them<sup>23</sup>.

Workload and job strain emerged as important issues. Most respondents reported working long hours, with many exceeding 60 hours per week. The high NASA TLX scores confirmed a perception of intense workload and the need for management strategies<sup>24</sup>. Despite this, a significant proportion disagreed with statements suggesting they worked more than required, reflecting a culture where overwork may be normalized. This reflects previous findings showing that over 70% of ICU workers reported perceived conflicts, mostly perceived as severe and significantly associated with job strain<sup>25</sup>. This is particularly relevant given that previous studies with smaller sample sizes indicated significant burnout and wellbeing challenges among ICU workers<sup>26</sup>. High perceived workloads and frequent reports of inter-staff conflict are consistent with earlier research suggesting that ICU staff often operate under significant stress. Previous literature suggests that anxiety symptoms are closely associated with diminished wellbeing among healthcare professionals. Many front-

line workers (70.8% doctors, 26.2% nurses from 75 countries) reported heightened anxiety when they felt unprotected during the COVID-19 pandemic. Several factors significantly contribute to increased anxiety, including being female, working as a nurse directly within the pandemic, and being younger<sup>27</sup>.

Lastly, the exploration of diversity in the workplace indicates that most respondents do not feel excluded or discriminated against based on personal characteristics, like gender, race, or age, as previously reported by the literature<sup>28–30</sup>. Notably, in our survey, 4.5% of participants reported a disability, underscoring the importance of inclusive practices. Despite a majority feeling treated fairly regarding diversity, some respondents noted experiences of stereotypes and differential treatment, emphasizing the need for ongoing efforts to enhance equity and inclusivity in the workplace<sup>31</sup>. This highlights the need for continued attention to diversity and inclusion in healthcare settings. A workplace culture that fosters mentoring and sponsoring younger colleagues to favour their career advancements<sup>20,21</sup>.

## Limitations

This study has important limitations. The reliance on self-reported data may introduce bias, as respondents might provide socially desirable answers rather than their true feelings. Additionally, the cross-sectional design captures data at a single point in time, limiting the ability to assess changes in perceptions or experiences over time. The geographic scope may not fully represent all regions, affecting the generalizability of the findings. The sample was not geographically representative of the global ICU workforce, with a predominance of respondents from specific European countries and limited participation from other regions. This unbalanced distribution introduces a substantial risk of selection bias and limits the generalizability of the findings. In particular, the underrepresentation of regions such as Asia and Africa, as well as the predominance of respondents identifying as White/Caucasian or Latin, restricts the ability to draw robust conclusions regarding diversity, equity, and experiences of discrimination across different populations. However, this study was conceived as an initial exploratory step to test and refine a survey instrument intended for broader international use. Given the length and complexity of the questionnaire, it was considered essential to first assess its feasibility, clarity, and overall value within a more limited and accessible sample.

~~before pursuing wider global dissemination.~~ Future iterations should aim to expand participation across a more diverse and geographically representative cohort to enhance external validity and inclusiveness. Therefore, findings related to fairness, inclusion, and gender or demographic disparities should be interpreted with caution. Furthermore, the presence of non-response bias and potential overlap in roles among respondents could complicate the interpretation of specific results. The fact that part of the sample is from iWIN network may also mean that the responses can be somewhat biased by the level of awareness of professionals in this group. It represents a convenience sample drawn largely from a professional network with a particular interest in equity and inclusion, introducing substantial risk of selection bias. The predominance of female respondents likely reflects the network composition rather than the broader ICU workforce. In addition, the observed gender differences are based on unadjusted analyses and may be influenced by confounding factors such as country, professional role, employment status, and institutional context; therefore, these findings should be interpreted as descriptive associations rather than causal relationships. Indeed, although several potentially relevant subgroups were represented in the sample, including participants with disabilities and different professional roles, the study was not powered to support robust subgroup analyses. As such, we did not explore differences across these groups to avoid overinterpretation of small sample comparisons. Nevertheless, this preliminary phase allowed us to ascertain that the survey yields valuable information, can be feasibly adapted across different languages, and has the potential to serve as a standardized tool within the network to benchmark and compare different hospitals and ICU settings. Future studies with larger and more representative samples should therefore not only address these limitations but also leverage this instrument to explore how factors such as disability status, professional role, and other demographic characteristics influence well-being and perceptions of fairness in ICU settings. Recruitment was not population-based, and the survey was not validated as a composite instrument in this setting. We did not perform multivariable modelling or adjust for potential confounders such as country, professional role, employment status, or institutional context. The sample size limits subgroup analyses, and findings should be interpreted as exploratory and hypothesis-generating rather than definitive.

## Conclusions

This multinational survey highlights important aspects of wellbeing among ICU professionals, including gender differences in well-being as measured by the WHO-5 index, alongside broader concerns related to job insecurity, workload, and work-life balance. The widespread prevalence of temporary contracts and long working hours reflects systemic issues in the healthcare workforce, contributing to reduced job satisfaction and elevated stress. These findings suggest areas that may merit further structured investigation, including career development programs, enhanced contract security, and initiatives promoting work-life balance. Addressing these concerns is essential not only for staff well-being but also for the quality and safety of patient care.

ARTICLE IN PRESS

## Declarations

**Conflicts of Interest:** **Conflicts of interest:** DB lecturer for ESTOR, not related with this work. The other authors have no conflicts of interest to declare.

**Acknowledgments:** Paolo Pelosi for conception of this project.

**Fundings:** none

**Authors contribution:** DB conceptualized the study, coordinated the project, performed statistical analysis, and drafted the initial manuscript. DB, IA, AV, SDR, JCVS, SPG, BF, ISS, CB, MCMD, LM, OH, and FR contributed substantially to study conception and design, interpretation of results, and critical revision of the manuscript for important intellectual content. FR and DB supervised the study. All authors reviewed, edited, and approved the final manuscript.

**Ethic Approval:** The study was conducted in accordance with the Declaration of Helsinki and Good Clinical Practice principles. Ethical approval was obtained from the Comissão de Ética para a Investigação em Ciências Sociais e Humanas (CEICSH), Universidade do Minho, Braga, Portugal (reference number CEICSH 055/2023).

**Consent to Participate:** All participants provided informed consent electronically before initiating the survey.

**Use of Artificial Intelligence:** AI tools were used solely for grammar and language editing. The authors take full responsibility for the content of the manuscript.

**Clinical trial registration:** Not applicable. This study was an observational cross-sectional survey and did not involve a clinical trial.

## Abbreviations

ICU: Intensive Care Unit

WHO-5: World Health Organization Well-Being Index

WES: Work Environment Scale

WAMI: Work and Meaning Inventory

WRS: Work Relationships Scale

WFC: Work–Family Conflict

TLX: Task Load Index

JIS: Job Insecurity Scale

## References

- 1 Moreno-Jiménez JE, Demerouti E, Blanco-Donoso LM, Chico-Fernández M, Iglesias-Bouzas MI, Garrosa E. Passionate healthcare workers in demanding intensive care units: its relationship with daily exhaustion, secondary traumatic stress, empathy, and self-compassion. *Current Psychology* 2023; **42**: 29387–402.
- 2 Moss M, Good VS, Gozal D, Kleinpell R, Sessler CN. A Critical Care Societies Collaborative Statement: Burnout Syndrome in Critical Care Health-care Professionals. A Call for Action. *Am J Respir Crit Care Med* 2016; **194**: 106–13.
- 3 Papazian L, Hraiech S, Loundou A, Herridge MS, Boyer L. High-level burnout in physicians and nurses working in adult ICUs: a systematic review and meta-analysis. *Intensive Care Med* 2023; **49**: 387–400.
- 4 Venkatesh B, Mehta S, Angus DC, *et al.* Women in Intensive Care study: a preliminary assessment of international data on female representation in the ICU physician workforce, leadership and academic positions. *Crit Care* 2018; **22**: 211.
- 5 Nørøxe KB, Pedersen AF, Bro F, Vedsted P. Mental well-being and job satisfaction among general practitioners: a nationwide cross-sectional survey in Denmark. *BMC Fam Pract* 2018; **19**: 130.
- 6 Aruta JJBR, Almazan JU, Alamri MS, Adolfo CS, Gonzales F. Measuring mental well-being among frontline nurses during the COVID-19 crisis: Evidence from Saudi Arabia. *Current Psychology* 2022; : Online ahead of print.
- 7 Sharma A, Minh Duc NT, Luu Lam Thang T, *et al.* A Consensus-Based Checklist for Reporting of Survey Studies (CROSS). *J Gen Intern Med* 2021; **36**: 3179–87.
- 8 Topp CW, Østergaard SD, Søndergaard S, Bech P. The WHO-5 Well-Being Index: A Systematic Review of the Literature. *Psychother Psychosom* 2015; **84**: 167–76.
- 9 World Health Organization, Burton J. WHO Healthy Workplace. Framework and Model: Background and Supporting Literature and Practices. 2010.
- 10 Dixon JR. The International Conference on Harmonization Good Clinical Practice Guideline. *Quality Assurance* 1999; **6**: 65–74.
- 11 Committee for Human Medicinal Products. Guideline for good clinical practice E6(R2). European Medicines Agency Science Medicines Health. 2016; : 1–68.
- 12 Cole SP, Siddiqui S. Well-being in the Intensive Care Unit. *Anesthesiol Clin* 2022; **40**: 373–82.
- 13 Mealer M. Burnout Syndrome in the Intensive Care Unit. Future Directions for Research. *Ann Am Thorac Soc* 2016; **13**: 997–8.
- 14 Venkatesh B, Mehta S, Angus DC, *et al.* Women in Intensive Care study: a preliminary assessment of international data on female representation in the ICU physician workforce, leadership and academic positions. *Crit Care* 2018; **22**: 211.
- 15 Oweidat I, Abu Shosha G, Al-Harazneh R, *et al.* Nurses' perceptions of job security and performance: A comparative study between governmental and private hospitals. *PLoS One* 2025; **20**: e0318412.
- 16 Piers RD. Perceptions of Appropriateness of Care Among European and Israeli Intensive Care Unit Nurses and Physicians. *JAMA* 2011; **306**: 2694.
- 17 Loudoun R, Biggs A, Robertson A, Townsend K, Troth A. Supervisor-worker relationships and the work environment: Development and validation of a construction specific measure. *Saf Sci* 2024; **177**: 106587.
- 18 Charles-Leija H, Castro CG, Toledo M, Ballesteros-Valdés R. Meaningful Work, Happiness at Work, and Turnover Intentions. *Int J Environ Res Public Health* 2023; **20**: 3565.
- 19 Son Hing LS, Sakr N, Sorenson JB, Stamarski CS, Caniera K, Colaco C. Gender inequities in the workplace: A holistic review of organizational processes and practices. *Human Resource Management Review* 2023; **33**: 100968.

- 20 Rubulotta F. Advancing careers in critical care medicine: the power of sponsorship and mentorship. *Lancet Respir Med* 2024; **12**: 99–101.
- 21 Hamzaoui O, Boissier F, Salmon Gandonnière C, *et al*. Ten actions to achieve gender equity among intensivists: the French Society of Intensive Care (FICS) model. *Ann Intensive Care* 2022; **12**: 59.
- 22 Finley EP, Pugh JA, Lanham HJ, *et al*. Relationship Quality and Patient-Assessed Quality of Care in VA Primary Care Clinics: Development and Validation of the Work Relationships Scale. *The Annals of Family Medicine* 2013; **11**: 543–9.
- 23 Vincent J-L, Juffermans NP, Burns KEA, Ranieri VM, Pourzitaki C, Rubulotta F. Addressing gender imbalance in intensive care. *Crit Care* 2021; **25**: 147.
- 24 Luse KA. Managerial strategies for creating an effective work environment. *Radiol Technol* 2013; **84**: 383–97; quiz 398–401.
- 25 Azoulay É, Timsit J-F, Sprung CL, *et al*. Prevalence and Factors of Intensive Care Unit Conflicts. *Am J Respir Crit Care Med* 2009; **180**: 853–60.
- 26 Arrogante O, Aparicio-Zaldivar EG. Síndrome de burnout en los profesionales de cuidados intensivos: relaciones con la salud y el bienestar. *Enferm Intensiva* 2020; **31**: 60–70.
- 27 Cag Y, Erdem H, Gormez A, *et al*. Anxiety among front-line health-care workers supporting patients with COVID-19: A global survey. *Gen Hosp Psychiatry* 2021; **68**: 90–6.
- 28 Dymore-Brown L-A, Ahluwalia A, Dangoisse C, *et al*. An Update on Gender Disparity in Critical Care Conferences. *Crit Care Explor* 2024; **6**: e1075.
- 29 Chaudhry D, Chawla R, Mathur R, *et al*. ISCCM Position Statement for Improving Gender Balance in Critical Care Medicine. *Indian Journal of Critical Care Medicine* 2024; **28**: S288–96.
- 30 De Rosa S, Schaller SJ, Galarza L, *et al*. Barriers to female leadership in intensive care medicine: insights from an ESICM NEXT & Diversity Monitoring Group Survey. *Ann Intensive Care* 2024; **14**: 126.
- 31 Fiaz S, Muhammad Fahim S. The influence of high-quality workplace relational systems and mindfulness on employee work engagement at the time of crises. *Heliyon* 2023; **9**: e15523.

## Tables and Figures

Table 1. Sociodemographic and health behavior profile of respondents.

| Category                              | Details                                    | Number (%)  |
|---------------------------------------|--------------------------------------------|-------------|
| <b>Gender</b>                         | Male                                       | 59 (37.3%)  |
|                                       | Female                                     | 98 (62.0%)  |
|                                       | Other                                      | 1 (0.6%)    |
| <b>Age</b>                            | <25                                        | 38 (24.0%)  |
|                                       | 26–35                                      | 66 (41.8%)  |
|                                       | 36–45                                      | 51 (32.3%)  |
|                                       | 46–65                                      | 3 (1.9%)    |
|                                       | >65                                        | 0 (0.0%)    |
| <b>Hospital Type</b>                  | University                                 | 103 (65.2%) |
|                                       | Non-University                             | 32 (20.2%)  |
|                                       | Private Institution                        | 23 (14.6%)  |
| <b>Profession</b>                     | ICU Consultant                             | 48 (30.4%)  |
|                                       | Fellow/Resident/Doctoral student           | 32 (20.3%)  |
|                                       | Associate professor                        | 11 (7.0%)   |
|                                       | Head of dept. / Full professor             | 17 (10.8%)  |
|                                       | ICU Respiratory Therapist                  | 9 (5.7%)    |
|                                       | ICU Nurse / Advanced Clinical Practitioner | 14 (8.9%)   |
| <b>Years Experience in Healthcare</b> | Other                                      | 27 (17.1%)  |
|                                       | <5                                         | 20 (12.7%)  |
|                                       | 5–9 years                                  | 30 (19.0%)  |
|                                       | 10–20 years                                | 65 (41.1%)  |
| <b>Ethnicity</b>                      | >20 years                                  | 43 (27.2%)  |
|                                       | White / Caucasian                          | 87 (55.1%)  |
|                                       | Hispanic / Latin                           | 60 (38.0%)  |
|                                       | Black / Afro-American                      | 4 (2.5%)    |
| <b>Country of Work</b>                | Other                                      | 7 (4.4%)    |
|                                       | European                                   | 97 (61.4%)  |
| <b>Nationality</b>                    | Extra-European                             | 61 (38.6%)  |
|                                       | European                                   | 95 (60.1%)  |
| <b>Working Hours per Week</b>         | Extra-European                             | 63 (39.9%)  |
|                                       | 41–60 hours                                | 75 (47.5%)  |
|                                       | 61–70 hours                                | 34 (21.5%)  |
|                                       | >70 hours                                  | 26 (16.5%)  |
|                                       | <40 hours                                  | 22 (13.9%)  |
| <b>Household Composition</b>          | No response                                | 1 (0.6%)    |
|                                       | Lived with ≥3 people incl. children        | 76 (48.1%)  |
|                                       | Lived with another person                  | 51 (32.3%)  |
|                                       | Lived with partner                         | 25 (15.8%)  |
|                                       | Lived alone                                | 5 (3.2%)    |
| <b>Children in Household</b>          | Preferred not to answer                    | 1 (0.6%)    |
|                                       | Youngest children under 5 years of age     | Majority    |
| <b>Employment Type</b>                | Temporary position                         | 122 (76.9%) |
|                                       | Permanent contract                         | 34 (21.8%)  |
|                                       | Voluntary work                             | 2 (1.3%)    |
| <b>Physical Activity Level</b>        | Sedentary                                  | 19 (12.2%)  |

|                                   |                        |            |
|-----------------------------------|------------------------|------------|
|                                   | Minimal movement       | 48 (30.1%) |
|                                   | Moderately active      | 78 (49.4%) |
|                                   | Highly active          | 13 (8.3%)  |
| <b>Weekly Physical Exercise</b>   | None                   | 29 (18.6%) |
|                                   | One hour               | 34 (21.8%) |
|                                   | 2–3 hours              | 68 (42.9%) |
|                                   | >5 hours               | 27 (16.7%) |
| <b>Self-Rated Physical Health</b> | Unhealthy              | 10 (6.4%)  |
|                                   | Almost unhealthy       | 51 (32.1%) |
|                                   | Fit and healthy        | 92 (58.3%) |
|                                   | Top physical condition | 5 (3.2%)   |

**Table 2.** Domains highlighting diversity in the workplace.

| Domain                                                                                                                                                 | Strongly disagree | Disagree | Somewhat disagree | Somewhat agree | Agree | Strongly agree |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|-------------------|----------------|-------|----------------|
| I feel that I have been treated differently here because of my race, sex, religion, or age                                                             | 55.1%             | 9.5%     | 10.1%             | 8.9%           | 6.3%  | 8.9%           |
| My managers have a track record of hiring and promoting physicians objectively regardless of their race, sex, religion or age                          | 25.9%             | 9.5%     | 13.9%             | 8.9%           | 17.1% | 23.4%          |
| My managers here give feedback and evaluate physicians fairly, regardless of such factors as the faculty member's race, sex, age, or social background | 20.3%             | 7.6%     | 20.9%             | 12%            | 16.5% | 21.5%          |
| My managers here make promotion and tenure decisions fairly, regardless of such factors as the physician's race, sex, age, or social background        | 18.4%             | 11.4%    | 23.4%             | 12.7%          | 12.7% | 20.3%          |
| My managers interpret human resource policies (such as sabbaticals) fairly for all physicians                                                          | 20.9%             | 13.9%    | 19.6%             | 13.9%          | 10.1% | 20.3%          |
| My managers give assignments based on the skills and abilities of physicians                                                                           | 15.8%             | 10.1%    | 23.4%             | 19%            | 13.3% | 17.1%          |

## Figures' Legend

**Figure 1.** Eight domains impacting well-being at the workplace according to the Financial services culture board. More information can be found at the following link: <https://financialservicescultureboard.org.uk/wp-content/uploads/2019/03/BSB-wellbeing-paper.pdf>.

**Figure 2.** Frequency distribution for each domain of the WHO well-being scale. A) Boxplots showing the distribution of WHO-5 scores among male (n=59) and female (n=98) respondents. Males reported significantly higher well-being scores than females (median 72 vs. 60;  $p=0.0051$ , Mann–Whitney U test). The boxes represent interquartile ranges, with medians marked; whiskers indicate range; and B) Frequency of responses to its subdomains.

**Figure 3.** Perceived job fit and workload expectations among ICU professionals and organizational justice: distributive and procedural justice. A) *Perceived job fit and workload expectations among ICU professionals*. This panel displays respondents' perceptions regarding their alignment with job demands and their subjective workload expectations. Responses were distributed across a spectrum of perceived overwork, underwork, or fit between personal skills and job requirements, highlighting variation in workload strain within the ICU workforce. B) This panel presents response distributions for two subdomains of organizational justice among ICU professionals. Distributive justice refers to the perceived fairness of outcomes (e.g., pay, recognition), while procedural justice reflects the perceived fairness of processes used to determine those outcomes. The panel illustrates considerable variability in how professionals view institutional fairness in the ICU setting.

**Figure 4.** Perceived negative influences in the ICU work environment. This figure illustrates the proportion of ICU professionals identifying various factors as negative influences on their well-being, including both workplace-related and individual (personal) factors.







