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Factors associated with burnout among Family and Community Medicine and Nursing residents: secondary analysis of a multicentre study

Macarena Chacón-Docampo^{1,2} , Ángela Asensio-Martínez^{2,3,4*} , Sara Rodríguez-Pastoriza^{1,5} ,
David Liñares-Mariñas⁶ , María Victoria Martín-Miguel^{2,7,8} , Cruz Bartolomé-Moreno^{2,4,9} ,
Clara González-Formoso^{2,8} and Ana Clavería^{2,8}

Abstract

Introduction Healthcare workers, especially medical and nursing residents, are exposed to situations that can lead to burnout. The main factors are organizational. However, it is more feasible for professionals to act on personal factors. There is a growing interest in interventions to prevent and reduce burnout.

Objective To examine the association between organizational and personal characteristics and burnout in Family and Community Medicine and Nursing residents, using baseline data from a non-randomised comparative study.

Method This study is a secondary cross-sectional analysis of baseline data from a pragmatic non-randomised trial. We analysed sociodemographic, occupational, and psychological variables in relation to burnout. Medical and nursing residents enrolled in 2018–2021 at the teaching units of Vigo, Zaragoza, and Mallorca. Variables: Sociodemographic, professional, burnout, empathy, resilience, social support, sense of coherence, anxiety and depression, personality, locus of control. Descriptive statistics and bivariate analyses (chi-square and Mann–Whitney U) were performed, and Pearson correlations with 95% confidence intervals were estimated to assess associations between burnout and organizational/personal variables (R 4.1.3). Registered in Clinical Trials with ID: NCT04625582 (November 10, 2020)

Results A total of 147 residents were included at baseline (71% medicine, 29% nursing; 80% women; mean age 27.6 years). Mean burnout scores were 44.1 (SD 18.1) for personal burnout, 47.8 (SD 16.8) for work-related burnout, and 38.2 (SD 16.3) for patient-related burnout. Burnout correlated positively with weekly hours worked ($r = 0.32$, 95% CI 0.17–0.46), number of patients/day ($r = 0.41$, 95% CI 0.27–0.54) and monthly on-call shifts ($r = 0.29$, 95% CI 0.14–0.43), and with anxiety ($r = 0.47$, 95% CI 0.33–0.60) and depression ($r = 0.36$, 95% CI 0.21–0.50). Negative correlations were found with resilience ($r = -0.38$, 95% CI -0.52 to -0.23), social support ($r = -0.24$, 95% CI -0.39 to -0.08), and sense of coherence ($r = -0.52$, 95% CI -0.62 to -0.40) (all $p < 0.05$).

*Correspondence:
Ángela Asensio-Martínez
acasensi@unizar.es

Full list of author information is available at the end of the article



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Conclusions Burnout in Family and Community Medicine and Nursing residents is associated with both organizational factors (workload, on-call duties, patient volume) and personal resources (resilience, empathy, sense of coherence). These findings underscore the importance of addressing structural workload while simultaneously enhancing coping resources to prevent burnout during residency training.

Keywords Burnout, Medicine, Nursing, Residents, Protocol

Introduction

Burnout was first described by Freudenberg in 1974 [1]. However, it was not until 2022 that it was included in the International Classification of Diseases (ICD-11) as “occupational burnout syndrome” code QD85 [2]. Thus, the importance and recognition of psychosocial issues in the workplace has become clear.

The National Academy of Medicine highlights this problem, noting that burnout prevalence among health care workers is often greater than 50%, with harmful consequences for both the individual and society. The main factors influencing this syndrome are stressors external to the individual and related to work organization [3].

At first sight, the strategies to address this problem are those focused on workplace organization, but they would have to be implemented by the relevant political or managerial bodies. Therefore, person-centered skills are often the only tools available to address the problem [3] in clinical or teaching teams.

It is well known and supported by the existing literature that individual characteristics have been shown to be beneficial in addressing burnout-related problems and that they are predictors of illness or health from many other causes [4]. These individual characteristics include sociodemographic variables, personality, coping strategies, and social relationships [5].

Personality traits are related to how a person interprets his or her work. There are many studies that have found a relationship between personality and its potentiating or protective effect on burnout [5, 6]. Related to personality traits is locus of control, or where we believe we have control over our lives. An external locus of control is associated with an increase in burnout [5]. Another construct that determines how stressful situations derived from the environment are handled is the sense of coherence, the feeling of understanding what is happening, of understanding and controlling one's own thoughts and emotions. It increases a person's expectations and ability to assimilate and modify experiences and events, a factor that determines how a person manages stress and maintains healthy life habits [7]. The greater the sense of coherence, the greater the tendency toward health-promoting behaviors and better quality of life [8]. Resilience, defined as the ability to adapt positively to stress and adversity, is considered a protective factor against mental health problems [9]. Several studies suggest that higher

levels of resilience may reduce the risk of burnout [10]. And social support may act as a protective factor [11].

Becoming a medical or nursing resident is an added stress to what it means to be a healthcare professional. Specialized healthcare training programs are designed to help residents achieve specific goals. All of the daily care work, multiple shifts, delivery of work, facing an adverse work environment, complicated relationships with patients or family members, little or no family time means that residents are exposed to physical and mental stress that can lead to burnout. In addition to all of the above, the likelihood of making errors during work performance increases, and the quality of patient care also decreases, as compassion and interactions are reduced [12]– [13]. Therefore, in recent years, there has been increased interest in interventions to reduce professional burnout among residents [14].

The present manuscript reports a secondary cross-sectional analysis of baseline data from a non-randomised comparative study conducted among Family and Community Medicine and Nursing residents in Spain. This analysis was specifically designed to explore the association between burnout and both organizational factors (such as workload and on-call shifts) and personal resources (including empathy, resilience, personality traits, social support and sense of coherence). While the main trial evaluated the effectiveness of a training intervention, this secondary analysis provides novel insights by identifying factors associated with burnout prior to the intervention.

This approach is needed because few studies have simultaneously examined organizational and personal determinants of burnout in residents, and no previous Spanish research has addressed these factors together. Understanding these baseline associations is crucial for designing targeted preventive strategies. Accordingly, our research question was: Which organizational and personal factors are associated with burnout among Family and Community Medicine and Nursing residents at baseline?

Methods

Design

This is a secondary cross-sectional analysis of baseline data from a pragmatic non-randomised comparative study conducted in three Spanish teaching units (Vigo, Zaragoza, Mallorca). Figure 1 illustrates the study groups:

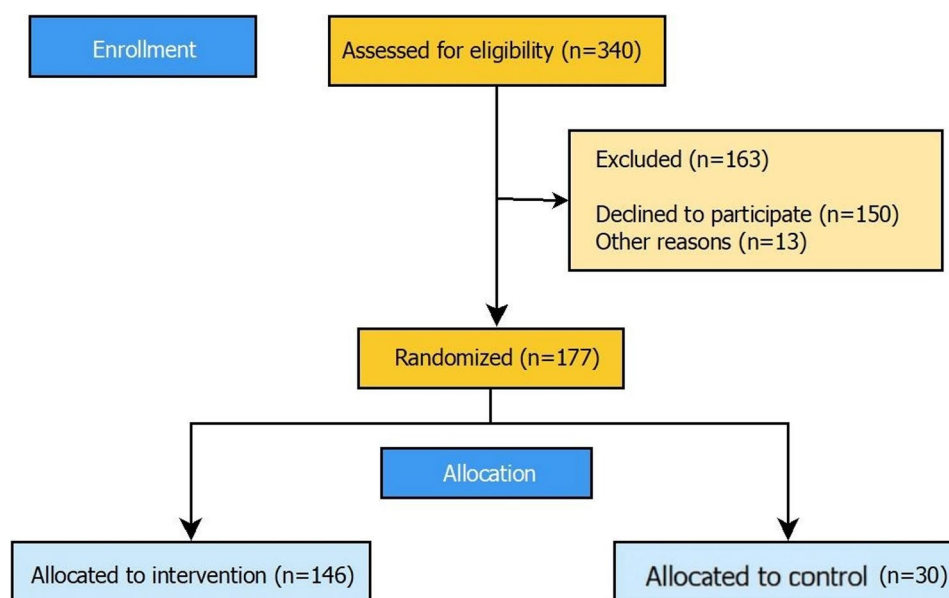


Fig. 1 Flow chart

face-to-face intervention (Vigo), online intervention (Zaragoza), and control group (Mallorca).

Registered in Clinical Trials with ID: NCT04625582 (November 10, 2020).

Research question

The aim of this secondary analysis was to explore the association between organizational and personal characteristics and burnout at baseline, before any intervention was implemented.

Population

Participants were Family and Community Medicine and Nursing residents enrolled in the 2018–2021 cohorts.

Ethics

This study was conducted in accordance with the International Council for Harmonisation guidelines on Good Clinical Practice (ICH-GCP) and the principles of the Declaration of Helsinki. The protocol was approved by the Ethics and Clinical Research Committee of Vigo (CEIC 2020/153).

Recruitment and enrollment

Residents were informed of the study by posters in the teaching units. The surveys were conducted telematically using the free software REDCap. In the first interface, participants viewed the informed consent form and were assigned a code to ensure anonymity. The second interface displayed the questionnaire, where they had to answer the questions.

Sample size

An attempt was made to recruit all residents of the participating teaching units ($N = 340$). The sample size calculated to observe changes in the three components of the Copenhagen Burnout Inventory (CBI), for $\alpha = 0.05$ and $\beta = 0.80$ [15], requires at least 74 residents in each intervention group and 148 in the control group. Calculations were performed with the free software OpenEpi, version 3. For this secondary analysis, all consenting residents ($n = 177$) were included; no separate sample-size calculation for correlation analysis was performed.

Study period

The study was conducted between November 2020 and June 2023.

Variables and instruments

Sociodemographic: age, sex, nationality, occupation, autonomous community of residence.

Work: average hours worked per week, average monthly shifts, number of patients per day in the primary care office.

Process indicators: training in motivational interviewing.

Psychological variables:

Burnout was measured using the Copenhagen Burnout Inventory (CBI). There are 19 questions divided into three scales designed to be used in different scenarios: personal burnout (PB), which can be used by anyone and refers to daily interpretations; work-related burnout (WB), which would be for anyone who has a paid job; and client-related burnout (CB), which is more focused on human relations work [16]. The questionnaire has been

validated in Spain and showed a Cronbach's alpha of 0.90 in the personal dimension, 0.83 in the work dimension and 0.82 in dealing with clients [17].

Empathy was assessed using the Interpersonal Reactivity Index (IRI). The IRI measures empathy along four independent dimensions: fantasy, perspective taking, empathic concern, and personal distress. Coefficients ranging from 0.68 to 0.8 [18] were obtained.

Resilience was measured with the abbreviated Connor-Davidson scale (10-item CD-RISC); this version measures resilience as a single dimension with 10 items. The Cronbach's coefficient was 0.85 [19].

Perceived social support was measured with the 3-item OSLO-3, which is widely used in Europe. It includes information about the primary support group, the interest and concern of others, and the ease of getting practical help [20].

Sense of Coherence was measured using the abbreviated Orientation to Life Questionnaire (OLQ-13). The scale has been validated in numerous languages and populations, with a Cronbach's alpha of 0.81 [21].

Baseline levels of anxiety and depression were measured using the Hospital Anxiety and Depression Scale (HADS) questionnaire, which is the most widely used brief self-report measure of emotional distress. It consists of 14 items and is composed of two subscales (HADA: anxiety and HADD: depression). A systematic review of

studies in Spanish samples was conducted, with scores above 0.80 and up to 0.86 [22].

Personality was assessed with the TIPI-SPA scale, one of the most widely used questionnaires that determines personality according to 5 main dimensions (E-Extraversion, A-Agreeableness, C-Conscientiousness, ES-Emotional Stability and O-Openness). Each personality dimension is measured by two items, one relating to the positive pole and the other to the negative pole. Its psychometric properties are adequate [23].

Self-perception of locus of control was measured by the non-validated question "I feel that what happens in my life is often determined by factors beyond my control" with 6 response options on a Likert-type scale.

Interventions

The topics covered in the intervention were divided into 4 modules, the objectives of which can be found in Appendix 1.

Residents from Vigo received a face-to-face intervention, those from Zaragoza an online intervention, while residents from Mallorca followed usual training (control). Detailed information on the interventions is available in the published protocol (ClinicalTrials.gov Identifier: NCT04625582).

Analysis

Descriptive statistics were calculated (mean, standard deviation, and percentages). Bivariate analyses were performed using chi-square and Mann-Whitney U tests. Pearson correlations with 95% confidence intervals were estimated to examine associations between burnout and organizational/personal variables. Analyses were conducted using R (version 4.1.3).

Results

Of the 340 residents from the various Teaching Units, a total of 177 residents participated. The 82% were female and 69.9% were medical residents (Table 1).

The mean and SD of the psychological variables are shown in table 2, together with their actual and possible ranges

Appendix 2 contains the descriptive analysis by autonomous community (Table 1, Table 2). According to gender, the independent variables responsibility (TIPI), importance of personal skills and burnout from working with patients showed significant differences (Appendix 1, Table 3).

Specialty was positively correlated with workload indicators: hours worked per week ($r=0.39$; 95% CI: 0.26–0.51; $p<0.001$), number of patients per day ($r=0.57$; 95% CI: 0.46–0.66; $p<0.001$), and on-call shifts ($r=0.37$; 95% CI: 0.24–0.49; $p<0.001$). A weaker but significant association was also found between specialty and burnout

Table 1 Descriptive analysis of the sociodemographic-labour variables

	Sociodemographic-labour	
	Mean (SD)/ number (%)	NA
Speciality	53 (30.1)	1
Nursing		
Medicine	123 (69.9)	
Age	27.7 (3.46)	8
Sex	141 (82.0)	5
Women		
Man	31 (18.0)	3
Nationality	167 (96.0)	
Spanish		
Foreign	7 (4.02)	1
Place of residency	71 (40.3)	
Galicia		
Aragón	75 (42.6)	
Balears	30 (17.0)	1
Courses of motivational interviewing	59 (33.5)	
Some		
None	117 (66.5)	
Months in health center	2.73 (1.75)	1
Work hours	49.3 (9.78)	3
Guards (monthly)	4.52 (1.35)	8
Patients in consult	30.5 (14.1)	7

#Data are mean (SD) or number (%). NA=data not available due to missing responses

Table 2 Descriptive analysis of the psychological aspects

	Psychological aspects#		Real range	Possible range	NA
	Mean (SD) / number (%)				
Burnout (CBI)					
Personal	44.8 (18.0)		0.00-95.83	0.00-100.00	
Work	47.3 (16.8)		0.00-95.83	0.00-100.00	3
Work with patients	37.9 (15.9)		0.00-95.83	0.00-100.00	
Empathy (IRI)					4
Fantasy	22.4 (5.59)		9.00-34.00	0.00-35.00	
Perspective	26.0 (4.09)		14.00-35.00	0.00-35.00	
Empathic concern	25.7 (3.17)		17.00-33.00	0.00-35.00	
Personal anguish	14.1 (4.21)		7.00-27.00	0.00-35.00	
Resilience (CD-risk)	26.6 (5.55)		12.00-39.00	0.00-40.00	4
Anxiety (HADS)					4
Less than or equal to 8	94 (54.3)				
Greater than 8	79 (45.7)				
Depression (HADS)					4
Less than or equal to 8	150 (86.7)				
Greater than 8	23 (13.3)				
Social support (OSLO)	10.6 (1.60)		4.00-13.00	3.00-14.00	4
Sense of coherence (SOC)	63.1 (11.5)		29.00-86.00	13.00-91.00	5
Personality (TIPI)					4
Extraversion	4.56 (1.18)		1.50-7.00	1.00-7.00	
Affability	4.51 (1.15)		1.50-7.00	1.00-7.00	
Responsability	4.07 (0.95)		1.50-7.00	1.00-7.00	
Emotional stability	4.22 (1.02)		1.50-7.00	1.00-7.00	
Opening	6.11 (0.74)		3.50-7.00	1.00-7.00	

#Data are expressed as minimum-maximum for the ranges. NA = data not available due to missing responses

from working with patients ($r=0.28$; 95% CI: 0.14–0.41; $p<0.001$). Sense of coherence (SOC) showed strong negative correlations with all burnout dimensions: personal burnout ($r=-0.52$; 95% CI: -0.62 to -0.40 ; $p<0.001$), work-related burnout ($r=-0.54$; 95% CI: -0.64 to -0.43 ; $p<0.001$), and patient-related burnout ($r=-0.47$; 95% CI: -0.58 to -0.35 ; $p<0.001$). SOC was also strongly negatively associated with anxiety ($r=-0.71$; 95% CI: -0.78 to -0.63 ; $p<0.001$) and depression ($r=-0.57$; 95% CI: -0.66 to -0.46 ; $p<0.001$). In contrast, SOC correlated positively with resilience ($r=0.54$; 95% CI: 0.43–0.64; $p<0.001$) and social support ($r=0.33$; 95% CI: 0.19–0.46; $p<0.001$). Together, these results indicate that both organizational workload and personal psychological resources are significantly associated with residents' burnout levels.

The remaining Pearson's correlation coefficients and significances are presented in Appendix 2, Table 4 and Table 5. The most relevant correlations are shown in Figs. 2 and 3.

Discussion

This secondary analysis of baseline data showed high levels of burnout among Family and Community Medicine and Nursing residents. Burnout was significantly associated with organizational workload (number of patients per day, weekly working hours, and on-call shifts) and

with personal and psychological variables such as sense of coherence, resilience, empathy, anxiety, and depression. These findings highlight the interplay of both systemic and individual factors in the development of burnout during residency.

Our results are consistent with previous studies reporting strong associations between work conditions and burnout, as well as protective roles of resilience, empathy, and sense of coherence [24–29].

Studies show levels similar to our results, in some cases even higher, as in the study by Majeed et al. [24]. It is of great importance to know which individual and/or organizational characteristics are responsible for producing higher or lower levels of burnout [5].

Burnout was positively and significantly correlated with several organizational aspects, such as hours worked per week, patients per day in the office, and on-call time per month. This reflects the importance of these organizational variables, which should be considered in training programs, as many residents take on more than is recommended for their training [3].

We found that it also correlated with most of the psychological variables examined, suggesting that there are many distinctive factors that may influence burnout. The results are consistent with other studies, Grigorescu et al. [25] showing how burnout is related to poor work

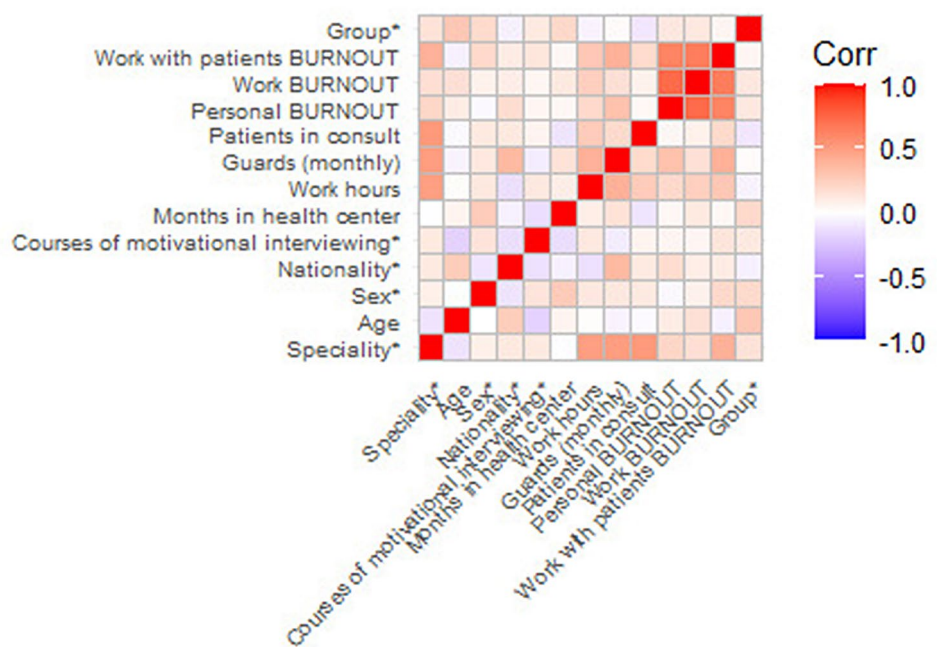


Fig. 2 Pearson correlations plot of the sociodemographic-labour variables and burnout

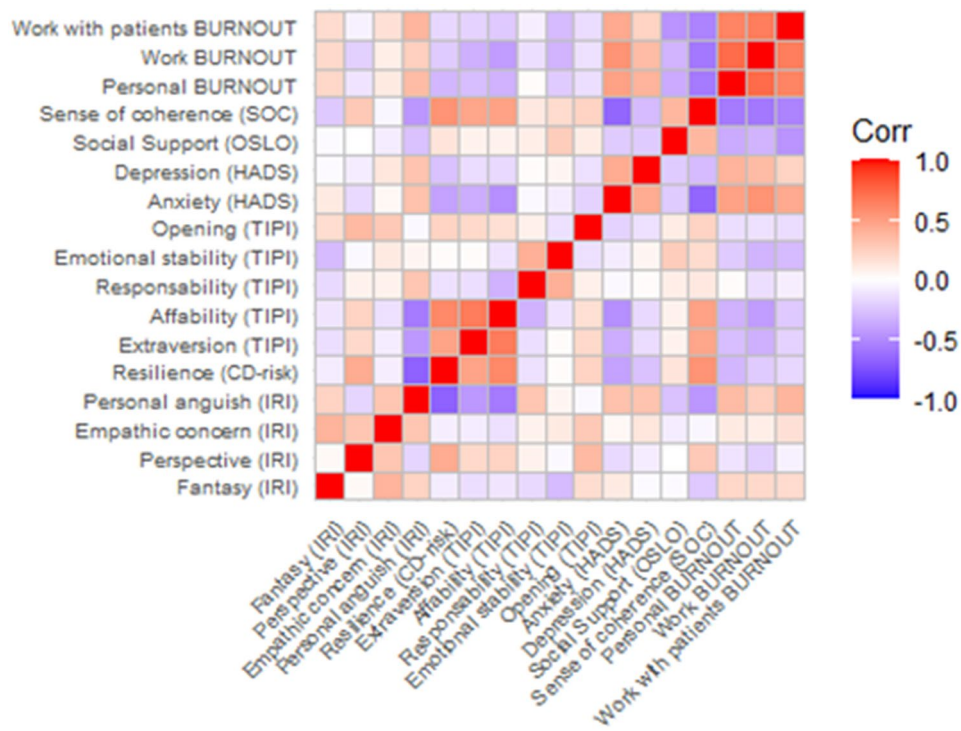


Fig. 3 Pearson correlations plot of the psychological aspects and burnout

conditions, and Zang et al. showing how social support, anxiety, and depression may have a mediating effect on the development of burnout [26].

Empathy, resilience and a sense of coherence act as protective factors in many cases, and the results obtained are in line with those of other authors, as can be seen in

the systematic review by Delgado et al. They report correlations between the components of empathy and burnout, with consistent results [27]. Resilience is negatively correlated with burnout, indicating a clear importance of this variable in preventing burnout. Regarding the sense of coherence, it may protect against difficult and stressful

situations, such as those experienced by residents during their training. Our results are similar to those described by Wu et al., where they reflect how it correlates negatively with the three subscales of CBI and anxiety, and positively with resilience [28]. In terms of personality, extraversion, agreeableness, and emotional stability correlate with burnout, as did Prins et al. in their work with German residents [29].

With the onset of the Covid-19 pandemic, the expected recruitment was not achieved. At that time, the demotivation of residents due to all the changes in their training caused them to focus their interest on other topics. The use of self-report scales, although highly valid, is prone to social bias. The locus of control was removed from the statistical analysis because it was measured with a single, non-validated question.

Our results have important practical implications, because by analyzing the variables that mediate burnout, they allow us to know where to work most urgently to prevent its progression. Residency is a time of multiple commitments in which specific skills must be developed to best care for patients. During this time, they experience sleep deprivation, heavy workloads, and unsatisfactory salaries, in addition to taking on many responsibilities in their workplaces. This combination of factors makes them vulnerable to the development of burnout [4].

Residents are a group with different characteristics from other types of health professionals, which reinforces the interest in conducting specific studies on them. They are the professionals of the future and need to be taken care of from the beginning of their working life. Burnout prevention strategies are necessary as a stable element in the management of teaching units and the health organizations that comprise them.

They could even be differentiated into primary prevention, which would apply to all residents, with training, information and necessary adaptations; secondary prevention, when the first symptoms of burnout have already appeared, to improve coping resources; and tertiary prevention, when burnout is already established and to try to repair the damage, as pointed out in their work Edú-Valsania et al. 2022 [7].

Limitations

This study has several limitations. First, its cross-sectional design precludes causal inference. Second, data were collected through self-report questionnaires, which may be subject to response bias. Third, the sample was limited to three Spanish teaching units, potentially reducing generalisability. Finally, the locus of control variable was excluded from the analysis as it was measured with a single, non-validated item.

Conclusions

This secondary analysis of baseline data shows that burnout among Family and Community Medicine and Nursing residents is highly prevalent and strongly associated with organizational workload factors such as number of patients per day, working hours, and on-call shifts. Burnout was also related to psychological resources, with lower resilience, weaker sense of coherence, and higher anxiety and depression associated with higher burnout levels.

These findings emphasise that both organizational conditions and individual coping resources are relevant targets for preventive strategies in residency programmes [17]. Tailored interventions that simultaneously reduce excessive workload and promote resilience, empathy, and sense of coherence may help mitigate burnout and protect residents' wellbeing [30].

Abbreviations

CB	Client-related burnout
CBI	Copenhagen Burnout Inventory
HADS	Hospital Anxiety and Depression Scale
ICD-11	International Classification of Diseases 11
IRI	Interpersonal Reactivity Index
PB	Personal burnout
REDCap	Research Electronic Data Capture
WB	Work-related burnout

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12912-025-03956-3>.

Supplementary Material 1

Supplementary Material 2

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Author contributions

MCD: Investigation (recruitment and data collection), Methodology, Formal analysis, Visualization, Writing-original draft, Writing-review & editing; SRP: Conceptualisation, Data curation, Methodology, Formal analysis, Writing-review & editing; AC: Conceptualisation, Data curation, Methodology, Formal analysis, Writing-review & editing; AAM: Conceptualisation, Data curation, Methodology, Formal analysis, Writing-review & editing. DLM, MVMM, CGF, CBM: Writing-review & editing. All authors read and approved the final manuscript.

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Data availability

The datasets are available from the corresponding author.

Declarations

Ethics approval and consent to participate

The protocol was approved by the Ethics and Clinical Research Committee of Vigo (CEIC 2020/153). All participants provided informed consent.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

¹Research Group in Care INVESTIC, Galicia Sur Health Research Institute (IIS Galicia Sur), SERGAS-UVigo, Vigo Pontevedra, Spain

²Network for Research on Chronicity, Primary Care and Health Promotion (Red de Investigación en Cronicidad, Atención Primaria y Promoción de la Salud/RICAPPS), Vigo, Galicia, Spain

³Department of Psychology and Sociology, Faculty of Social and Labor Sciences, University of Zaragoza, Zaragoza, Aragon, Spain

⁴Institute for Health Research Aragón (IIS Aragón), Zaragoza, Spain

⁵Department of Statistics and Operations Research, University of Vigo, Vigo, Galicia 36310, Spain

⁶Galician Agency for Health Technology Assessment, Avalia-t, Galician Agency for Health Knowledge Management (ACIS), Santiago de Compostela, Spain

⁷Multidisciplinary Teaching Unit of Family and Community Care, Vigo Health Area, Vigo, Galicia, Spain

⁸Saúde Group, Galicia Sur Health Research Institute (Instituto de Investigación Sanitaria Galicia Sur), SERGAS-UVIGO, Vigo, Spain

⁹Department of Family and Community Care Teaching - Sector I, Aragonese Healthcare Service, Zaragoza, Aragon, Spain

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