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Coping strategies among resident physicians in Brazil: an assessment on the role of psychological distress

Estratégias de enfrentamento entre médicos residentes no Brasil: uma avaliação sobre o papel do sofrimento psicológico

J Bras Psiquiatr. 2024;73(4):e20240024
<https://doi.org/10.1590/0047-2085-2024-0024>

ABSTRACT

Introduction: Residency is a unique period in medical professional training, characterized by an imbalance between technical training and care requirements. Evidences have been showing that the rates of problems related to Mental Health are significant in this population and deserve attention.

Methods: In this work, specific instruments (DASS-21 and Coping Strategies Inventory) were used to assess symptoms related to depression, anxiety and stress, as well as coping strategies, among residents enrolled in programs at Fundação Hospital do Estado de Minas Gerais between 2021 and 2023. **Results:** 116 residents completed the assessment. The prevalence of depression reached 51.3% of the sample; anxiety 36.7%; and stress 56.5%. The presence of depressive, anxious or stress symptoms was correlated with the perception of worse sleep quality. Residents with depressive symptoms tended to adopt certain coping styles (confrontation, avoidance, escape and avoidance and positive reappraisal) differently from those without depression, as well as residents with anxiety or stress-related symptoms showed coping styles significantly different from those without symptoms. (confrontation, avoidance, acceptance of responsibility and escape and avoidance). **Conclusions:** A high prevalence of psychiatric symptoms was observed among residents, which correlated with poor sleep quality and specific coping strategies. These data can contribute to a better understanding of the phenomenon of mental illness among residents and to the creation of risk screening strategies, interventions and mental health promotion in medical residency programs.

KEYWORDS

Depression, anxiety, stress, coping, medical residents.

RESUMO

Introdução: A Residência é um período singular na formação profissional médica, caracterizado por um desequilíbrio entre a capacitação técnica e as exigências assistenciais. Evidências têm demonstrado que os índices de problemas relacionados à Saúde Mental são significativos nesta população e merecem atenção. **Métodos:** Neste trabalho, foram utilizados instrumentos específicos (DASS-21 e Inventário de Estratégias de Coping) para avaliar sintomas relacionados a depressão, ansiedade e estresse, bem como estratégias de *coping*, entre residentes matriculados em programas da Fundação Hospitalar do Estado de Minas Gerais entre 2021 e 2023. **Resultados:** 116 médicos residentes completaram a avaliação. A prevalência de depressão atingiu 51,3% da amostra; ansiedade 36,7%; e estresse 56,5%. A presença de sintomas depressivos, ansiosos ou de estresse foi correlacionada com a percepção de pior qualidade do sono. Os residentes com sintomas depressivos tenderam a adotar determinados estilos de *coping* (confronto, evitação, fuga e esquiva e reavaliação positiva) de forma diferente daqueles sem depressão, assim como os residentes com sintomas de ansiedade ou estresse apresentaram estilos de *coping* significativamente diferentes daqueles sem sintomas (confronto, evitação, aceitação de responsabilidade e fuga e evitação). **Conclusões:** Observou-se alta prevalência de sintomas psiquiátricos entre os residentes, o que se correlacionou com má qualidade do sono e estilos específicos de *coping*. Esses dados podem contribuir para uma melhor compreensão do fenômeno do adoecimento mental entre os residentes e para a criação de estratégias de triagem de riscos, intervenções e promoção da Saúde Mental nos programas de residência médica.

PALAVRAS-CHAVE

Depressão, ansiedade, estresse, *coping*, médicos residentes.

Received: Aug/01/2024. Approved: Nov/25/2024.

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INTRODUCTION

Medical residency is a period in a physician's development during which skills in a specialty need to be acquired while simultaneously providing high-quality patient care. In daily practice, the resident is both a learner and a healthcare provider to patients¹. This period has been characterized as a 'temporary imbalance,' where residents' investment in professional growth and development may lead them to prioritize various aspects of their lives, including family, social relationships, physical and mental health, spirituality, and financial gains^{2,3}.

Stress arising from work can lead to so-called "burnout", presenting a set of symptoms, including exhaustion, depersonalization, and reduced sense of personal accomplishment⁴, which previous studies have shown to affect about 50 to 75% of residents^{5,6}. Stress can also reveal or exacerbate underlying tendencies towards mental illness. A meta-analysis of depression rates among residents showed a prevalence of 28.8%⁷. Rates of burnout and depression are significantly higher among residents and fellows than in the general population^{6,8}. Suicide is the first and second leading cause of mortality among male and female physicians, respectively, during residency^{9,10}.

In light of the increasing rates of suicide among medical students and physicians, there has recently been a focus on examining burnout and depression among healthcare providers, especially residents. Depression has been shown to have harmful psychological and physical effects on the individual, but more globally, it has been associated with low-quality patient care and increased medical errors^{11,12}. Estimates of the prevalence of depression or depressive symptoms in resident trainees range from 20.9% to 50.8%, with up to 8% of residents reporting feelings of suicidal ideation in the past year^{7,13,14}.

Cognitive and behavioral efforts used to handle specific demands that generally protect individuals from threatening aspects to their well-being were studied by Lazarus and Folkman in 1980, who coined the term "coping" for such strategies¹⁵. These coping strategies can be problem-focused, emphasizing the stress-causing factor and seeking to alter the relationship with it, or emotion-focused, turning to the emotional response and adaptation to the event¹⁶.

Understanding how medical residents deal with the challenges imposed during this period of their training helps to address the mental health issues affecting this group and identify strategies to support these professionals in better coping with these challenges.

This study aims to assess the levels of stress, anxiety, and depression among medical residents at the Hospital Foundation of the State of Minas Gerais (FHEMIG, acronym in Portuguese for Fundação Hospitalar do Estado de Minas Gerais), as well as investigate the strategies adopted by these

professionals to cope with work-related stress. The guiding hypothesis is that in the professional practice of medical residents, the presence of indicators of burnout, anxiety, and depression is frequent and may be negatively associated with maladaptive coping strategies and the occurrence of adverse outcomes in both work and personal life for these individuals¹⁷.

METHODS

The research was initiated after the project's approval by the Ethics Committee of the FHEMIG under number 058976/2021. It is an observational cross-sectional study with a non-probabilistic convenience sampling design. Medical residents between 18 and 60 years of age, enrolled in the network of healthcare units managed by FHEMIG between the years 2021 and 2023, participated in the research. The participants were invited to complete a self-administered online digital questionnaire, and they had around two years to join the research. When agreeing to participate in the study, they signed an informed consent form and were able to answer the questionnaire only once.

The medical specialties were categorized into three groups as previously described by Pasqualucci and collaborators¹⁵: surgical specialties (General Surgery, Surgical Subspecialties, Orthopedics, Neurosurgery, Obstetrics and Gynecology, Dermatology), non-clinical non-surgical specialties (Anesthesiology, Psychiatry, Emergency Medicine), and clinical specialties (Internal Medicine, Clinical Subspecialties, Neurology, Pediatrics, Pediatric Subspecialties, Infectious Diseases).

The measurement instruments used were a general questionnaire involving sociodemographic and clinical data; the Depression, Anxiety, and Stress Scale (DASS-21); and the Coping Strategies Inventory^{18,19}. The DASS-21 is a scale subdivided into three factors that assess the occurrence of depression, anxiety, and stress. Formiga et al studied the validity, reliability and factorial invariance of the DASS-21, when applied to Brazilian workers. According to the authors, this scale is characterized not only by its ability to evaluate three psychological constructs of mental health in a single measure, but also by contributing to the fact that anxiety, depression and stress do not occur in isolation but rather as systems interdependent in the evaluation of these variables. In this research, it was possible to identify both the factorial quality and its reliability, as well as its diagnostic sensitivity in workers²⁰. The cutoff points established in the literature for the DASS-21 are: depression (0-9, normal; 10-13, mild; 14-20, moderate; 21-27, severe; 28+, extremely severe), anxiety (0-7, normal; 8-9, mild; 10-14, moderate; 15-19, severe; 20+, extremely severe); and stress (0-14, normal; 15-18, mild; 19-25, moderate; 26-33, severe; 34+, extremely severe).¹⁹

To evaluate stress coping strategies, the Coping Strategies Inventory was used, which contains 66 items that encompass thoughts and actions people use to deal with internal or external demands of a specific stressful event¹⁸. Each item presented can be evaluated on a scale ranging from 0 ("I don't use this strategy") to 3 ("I use this strategy a lot"). Finally, the items are grouped into eight factors, which involve different general strategies: confrontation (scoring range: 0-18), distancing (scoring range 0-21), self-control (scoring range 0-15), social support (scoring range 0-18), acceptance of responsibility (scoring range 0-21), escape/avoidance (scoring range 0-6), problem-solving (scoring range 0-12), and positive reappraisal (scoring range 0-27)²¹. Both scales are validated in Brazilian Portuguese^{18,19}.

Descriptive statistics and measures of central tendency were used to determine frequencies of variables in the samples. Cross-tabulations using the Chi-square method were used to compare categorical variables. The Kolmogorov-Smirnov normality test was used to verify the distribution of variables. Continuous variables with normal distribution were compared using Student's t-test and continuous variables with non-normal distribution were compared using the Kruskal-Wallis test. Significance was established

at $p < 0.05$. Analyses were performed using SPSS 18.0 statistical software.

RESULTS

Sociodemographic and Professional Aspects

A total of 116 medical residents from the FHEMIG network participated, comprising 75 women and 41 men. The participants' ages ranged from 24 to 39 years, with a mean age of 28 years (SD: ± 2.82). The majority of the respondents (93.91%) reside in Belo Horizonte - MG and are single (77.39%).

Among the research participants, 23.88% are in surgical medical residency, 45.11% in clinical areas, and 31.28% in non-clinical non-surgical specialties¹⁵ (Table 1). 73.91% reported working between 40-60 hours per week during residency, and 72.17% need to supplement their income with jobs outside of medical residency. Participants' self-reported hours of sleep ranged from 4 hours to 8 hours and 30 minutes, with an average sleep time of 6 hours and 30 minutes. 58.26% consider the quality of their sleep to be poor.

Table 1. Medical Residency Specialties in the FHEMIG Network

	Specialties	Frequencies	Percentage
Surgical	General Surgery	2	1,77%
	Neurosurgery	2	1,77%
	Basic Surgery	1	0,88%
	Orthopedics and Traumatology	4	3,54%
	Gynecology and Obstetrics	16	14,16%
	Ultrasonography in Gynecology and Obstetrics	1	0,88%
	Dermatology	1	0,88%
Clinical	Pediatrics	15	13,27%
	Internal Medicine	30	26,55%
	Infectious Disease	1	0,88%
	Intensive Medicine	3	2,65%
	Pediatric Intensive Therapy	1	0,88%
	Pediatric Infectious Disease	1	0,88%
Non-clinical/Non-surgical	Psychiatry	23	20,35%
	Psychotherapy	2	1,77%
	Emergency Medicine	4	3,54%
	Child and Adolescent Psychiatry	1	0,88%
	Pediatric Emergency Medicine	1	0,88%
	Anesthesiology	4	3,54%

Clinical Characteristics

The clinical questionnaire, present in the first third of the interview, reveals that the prevalence of self-reported mental disorder diagnosed by a mental health professional among interviewees was 50.43% (Table 2). 27.58% received more than one psychiatric diagnosis during their lifetime. Under the terms of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5)²², 43 residents (37.06%) reported having anxiety disorders, 19 (16.37%) had a previous diagnosis of depressive disorder, 5 (4.31%) revealed having attention-deficit/hyperactivity disorder (ADHD), 3 physicians (2.58%) declared having bipolar disorder, 01 (0.86%) of the interviewees had previous symptoms of obsessive compulsive disorder, and 01 (0.86%) reported having bulimia. For the treatment of these conditions, 25.22% of the evaluated physicians undergo psychotherapy, and 38.26% use psychotropic medications. 51.30% report using psychoactive substances regularly, with 43.48% reporting alcohol consumption. None of them consider the use of these substances as a disorder (Table 3). The questionnaire did not include a question quantifying consumption in more detail.

DASS-21

Based on the responses from the DASS-21 questionnaire (Table 4), a higher prevalence of depressive symptoms was observed in female residents ($p = 0.009$). Working more

than 60 hours per week was associated with a higher level of anxiety ($p = 0.01$), and a poorer perception of sleep was correlated with all three outcomes evaluated by the scale: anxiety ($p = 0.033$), depression ($p = 0.003$), and stress ($p = 0.006$). There was no correlation found between indicators of stress, depression, and anxiety and the use of psychoactive substances.

Coping Strategies Inventory

Based on the results from the DASS-21, the coping strategies used by residents who had altered scores on the scale were examined using the Coping Strategies Inventory. The Kolmogorov-Smirnov normality test revealed that the variables self-control ($p=0.074$), social support ($p=0.83$), acceptance of responsibility ($p=0.106$), problem solving ($p=0.155$) and positive reappraisal ($p=0.283$) presented normal distribution and the variables confrontation

Table 2. Self-reported prevalence of mental disorders in medical residents

Mental Disorders	Frequency	Percentage
Anxiety Disorders	43	37,06%
Depressive Disorders	19	16,73%
Attention Deficit Hyperactivity Disorder	5	4,31%
Bipolar Disorder	3	2,58%
Obsessive-Compulsive Disorder	1	0,86%
Bulimia	1	0,86%

Table 3. Self-reported current use of psychoactive substances among medical residents

	(%)
Use of Psychoactive Substances	51,30
Alcohol	43,48
Cannabis	5,22
Tobacco	4,35
LSD	1,74
Ecstasy	1,74
Cocaine	0,87

Table 4. Results obtained from the application of the DASS-21

Depression	(%)
Yes	51,30
No	48,70
Degree of depression	
Normal	48,70
Mild	13,04
Moderate	17,39
Severe	11,30
Extremely severe	9,57
Anxiety	(%)
Yes	36,65
No	64,35
Degree of Anxiety	(%)
Normal	64,35
Mild	6,09
Moderate	14,78
Severe	6,96
Extremely severe	7,83
Stress	(%)
Yes	56,52
No	43,48
Degree of Stress	(%)
Normal	43,48
Mild	24,35
Moderate	15,65
Severe	9,57
Extremely severe	6,96

($p=0.014$), avoidance ($p=0.014$) and scape and avoidance ($p=0.01$) presented non-normal distribution. Therefore, the first group was evaluated using the Student's t-test and the second using the Kruskal-Wallis test (Table 5). The level of stress was significantly associated with coping strategies of confrontation, distancing, acceptance of responsibility, and escape and avoidance. Depressive symptoms were related to confrontation, distancing, escape and avoidance, and showed a negative relationship with positive reappraisal as coping strategies. Anxiety was associated with coping strategies of confrontation, distancing, acceptance of responsibility, and escape and avoidance.

DISCUSSION

This study brings new information to the national literature on mental health among resident physicians, including the assessment of the relationship with coping strategies. The analysis of the theoretical framework on the mental health of medical residents revealed that studies in this context have intensified since 2004, with a significant number of publications by Brazilian authors (38.10%) and North American authors (33.34%), focusing on main related issues such as sleep, stress, fatigue, and dealing with living and working conditions²³.

Table 5. Results obtained through the DASS-21 and the Coping Strategies Inventory

Coping Strategies (Mean+ SD)	Depression		
	Yes	No	p
Confrontation ^a	5,27 (3,25)	3,77 (2,21)	0,012*
Avoidance ^a	7,15 (3,41)	5,50 (2,78)	0,009*
Self-Control ^b	5,93 (2,08)	6,46 (2,50)	0,216
Social Support ^b	8,17 (3,76)	7,61 (3,59)	0,414
Acceptance of Responsibility ^b	10,15 (3,84)	8,84 (3,67)	0,063
Scape and Avoidance ^a	3,81 (1,81)	2,46 (1,95)	0,000*
Problem Solving ^b	5,02 (2,32)	5,84 (2,63)	0,077
Positive Reappraisal ^b	7,88 (4,19)	9,88 (4,76)	0,018*

Coping Strategies (Mean+ SD)	Anxiety		
	Yes	No	p
Confrontation ^a	5,78 (3,49)	3,85 (2,22)	0,003*
Avoidance ^a	7,46 (3,16)	5,73 (3,09)	0,005*
Self-Control ^b	6,61 (2,41)	5,96 (2,22)	0,147
Social Support ^b	7,98 (4,08)	7,85 (3,45)	0,863
Acceptance of Responsibility ^b	10,90 (3,51)	8,74 (3,75)	0,003*
Scape and Avoidance ^a	3,90 (1,88)	2,74 (1,94)	0,003*
Problem Solving ^b	5,27 (2,09)	5,50 (2,71)	0,610
Positive Reappraisal ^b	8,68 (4,29)	8,95 (4,75)	0,769

Coping Strategies (Mean+ SD)	Stress		
	Yes	No	p
Confrontation ^a	5,20 (3,18)	3,68 (2,18)	0,011*
Avoidance ^a	6,97 (3,18)	5,54 (3,10)	0,014*
Self-Control ^b	6,20 (2,39)	6,18 (2,19)	0,963
Social Support ^b	8,09 (3,84)	7,64 (3,47)	0,515
Acceptance of Responsibility ^b	10,45 (3,64)	8,30 (3,69)	0,005*
Scape and Avoidance ^a	3,71 (1,98)	2,44 (1,79)	0,001*
Problem Solving ^b	5,26 (2,22)	5,62 (2,82)	0,448
Positive Reappraisal ^b	8,52 (4,23)	9,28 (4,99)	0,381

Analysis carried out with: ^aKruskal-Wallis test; ^bStudent's t-test.

Our study presents demographic results similar to other studies conducted in Brazil. Despite encompassing different specialties without gender predominance, the sample is mostly composed of women (64.65%)^{23,24}. Other findings in line with the literature include the average age of 28 years and the predominance of single individuals (77.39%)²⁴.

Among the residents evaluated in this study, 50.43% reported having at least one mental disorder, a prevalence higher than that of the general population (23.1%)^{3,15,26}. For the treatment of these conditions, only 25.22% of the participants undergo psychotherapy, and 38.26% use psychotropic medications, indicating that some residents do not seek treatment for the disorders they claim to have. The rates of depression, anxiety, and stress indicated in the DASS-21 were higher than the self-declared data by the medical residents. Dealing with challenging health issues, the risk of patient death, supervisor pressure, and excessive working hours are some factors that contribute to the development of these disorders among residents, especially among the younger ones^{23,27,28,29}. Consistent with the general population and other studies with medical residents, the prevalence of depression was higher among women in this evaluation ($p = 0.009$)^{23,24,26}. Although none of the participants considered alcohol consumption as a mental disorder, 43.48% have the habit of consuming it. In Brazil, alcohol dependence among medical residents reaches 15.93%^{23,30}.

According to Tokarz et al., factors such as the transition period from student to medical doctor, professional responsibility, social isolation, fatigue, sleep deprivation, workload burden, fear of making mistakes, and other factors related to the residency training process are associated with psychological, psychopathological, and behavioral reactions, including depressive states with suicidal ideation, excessive alcohol consumption, drug addiction, and chronic anger, making medical residents a high-risk group for emotional disorders²⁵.

Another element observed in our study is the correlation between working hours per week exceeding 60 hours and higher levels of anxiety. Although the majority (73.91%) of the residents who responded to our survey stated that they work between 40-60 hours per week due to their residency, 72.17% need to work in other jobs to supplement their income, likely exceeding the 60 hours/week threshold. This data replicates results observed in other studies, such as the one conducted by Coimbra (2017)^{24,36}.

The literature demonstrates a positive correlation between clinical symptoms and the number of hours worked, showing that long working hours deteriorate health³¹. The high number of hours has been proven to have negative effects on patient care, the health, and safety of medical residents. Several authors have reported a correlation between workload and the development of

Burnout Syndrome³². According to Pereira-Lima, there is a direct correlation between the presence of stress, anxiety, and depression and the absence of social skills, also adversely affecting the doctor-patient relationship¹⁷.

Another factor that was related to all the disorders evaluated in this study was the self-perception of poor sleep, present in 58.26% of the evaluated residents. The main causes of this, according to Lourenção et al., are the poor working conditions and long working hours¹⁸. According to our research, the poorer perception of sleep is related to anxiety ($p=0.033$), stress ($p=0.006$), and depression ($p=0.003$).

There is a great difficulty for residents in handling stress and poor working conditions. Studies on coping strategies have shown that almost half of the residents have difficulties in dealing with emotional stress, which negatively affects the doctor-patient relationship and professional performance^{18,33}. Blandin et al. emphasize that residents with non-functional coping styles, such as distancing and escape and avoidance, are more susceptible to experiencing Burnout Syndrome. In our sample, we observed these coping styles more frequently in those with indications of depression, anxiety, and stress according to the DASS-21. It is noteworthy that the frequencies of depression (51.3%), anxiety (36.65%) and stress (56.52%) observed in our sample are comparable with other studies carried out in the country, such as, for example, in the recent study by Silva Júnior and collaborators, who, when carrying out a screening for depression, anxiety and burnout among resident doctors, found frequencies of 46.9%, 56.6% and 37.0%, respectively.³⁵ Exposure to various types of stress during training can produce harmful effects on residents, thus affecting the quality of patient care²³.

Lazarus (1984) describes Coping as "the cognitive and behavioral, dynamic and conscious process by which the individual commonly manages the stimuli originating from the subject-environment relationship that are stressful to them, with the aim of neutralizing, controlling, or eliminating the stressor and restoring their internal balance"²⁴. Based on this definition, unconscious and unintentional defense mechanisms (e.g., denial and regression) cannot be considered as coping strategies²⁴.

According to Coimbra (2017), defensive strategies can be emotion-focused or problem-focused, with distinct implications and outcomes. Problem-focused defense strategies are those in which the individual seeks to resolve the situation by evaluating the available courses of action and choosing the one they consider most suitable. On the other hand, emotion-focused strategies are processes of self-defense with high emotional burden, involving avoidance, evasion, and seeking distance from the stressor, attempting to change the meaning and the unpleasant sensations arising from the stressful situation. As they have the ability to mitigate environmental pressures, problem-focused

strategies are considered more adaptive. Notably, in the healthcare field, the adoption of emotion-focused strategies can lead to a decline in the quality of clinical care, due to the development of irritability, impatience, and avoidance of situations that involve contact with the stressor²⁴.

This point is of particular importance in a study investigating the mental health of medical residents, as avoidance, distancing, and escape and avoidance - the responses observed in our study among participants displaying indications of depression, anxiety, and stress - are emotion-focused coping mechanisms. These strategies may help us understand one of the main limiting factors of the current research: the low participation of medical residents in the study. It is assumed that residents with these approaches may have felt averse to engaging in the research²⁴.

FHEMIG is one of the main institutions for training medical residents in the country and the second most important in Minas Gerais. It annually qualifies professionals from different areas and provided our study with a diverse sample of trainees. Another relevant point of this research is the use of standardized and validated tools to assess the occurrence of psychopathological symptoms, as well as to investigate the coping strategies used by this population to deal with work-related situations. However, despite the service's medical residency program enrolling approximately 527 registered residents per year, only 116 (22.01%) agreed to respond to this survey, even with active search and attempts to simplify the questionnaire application (via the internet). Such difficulty is observed in other research studies conducted in different contexts, in both Brazilian and North American publications^{10,24}. Coimbra (2017) reports that response rates are often lower when addressing sensitive topics, indicating a sort of avoidance of the subject^{24,34}.

Another limiting factor of the research is the online/self-applicable format, which, while facilitating participant adherence, restricts the study since it is not conducted by a specialist, thus preventing the elaboration of a diagnosis. The cross-sectional nature and low adherence of medical residents to the research also limit the results presented here.

CONCLUSIONS

Medical education does not end with graduation, it continues throughout a physician's professional life. Residency is a crucial phase of on-the-job training that demands exclusive dedication, marked by excessive workload and responsibility, ultimately affecting the physical and mental health of the resident to a greater or lesser extent. Understanding the reality experienced by these medical professionals is essential as it allows for reflection and intervention, ensuring personal and professional development.

Our work can help shed light on the maladaptive strategies of resident physicians when dealing with the challenges of professional practice. Considering that coping strategies can be learned and adapted to various stressful situations, the identification and learning of more adaptive strategies that can help regain control when facing stressors. These adaptations are closely influenced by past stressors experienced by individuals, their life history and social group.

Studies have shown that implementing mental health assistance programs for residents, psychoeducation, training, and raising awareness among supervisors and preceptors lead to improvements in both the quality of professional training in handling training stress and personal quality of life, including better patient relationships. Thus, identifying the use of maladaptive coping strategies by medical residents can help identify potential issues and guide strategies for intervention and prevention of health problems.

Future work in this area should delve deeper into the investigation of the coping strategies used by resident doctors, also including the assessment of associated personality characteristics, the attitudes of supervising doctors in the face of residents' difficulties and the positioning of institutions regarding this issue.

CONTRIBUTIONS

GCL contributed to the conception of the work, preparation of the research project, bibliographic review, data collection, writing of the manuscript and statistical analyses. **VSSP** contributed to the conception of the work, general supervision of the project, writing of the manuscript, statistical analysis and review of the final text.

CONFLICTS OF INTEREST

The authors declare that they have no conflict of interest.

ACKNOWLEDGMENTS

Fundação Hospitalar do Estado de Minas Gerais (FHEMIG).

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