Revista Brasileira de Psiquiatria. 2016;38:318–324
Associação Brasileira de Psiquiatria
doi:10.1590/1516-4446-2015-1882

ORIGINAL ARTICLE

Mental health in medical residents: relationship with personal, work-related, and sociodemographic variables

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Objective: To examine association of sociodemographic characteristics, personality traits, social skills, and work variables with anxiety, depression, and alcohol dependence in medical residents.
Methods: A total of 270 medical residents completed the following self-report instruments: sociodemographic and work questionnaire, Patient Health Questionnaire-4 (PHQ-4), Alcohol Use Disorders Identification Test-3 (AUDIT-3), Revised NEO-Five Factor Inventory (NEO-FFI-R), and Social Skills Inventory (SSI-Del-Prette). Data were analyzed using descriptive statistics and univariate and multivariate logistic regression analyses.
Results: Multivariate analysis showed an association of neuroticism (odds ratio [OR] 2.60, $p < 0.001$), social skills (OR 0.41, $p < 0.01$), and number of shifts (OR 1.91, $p = 0.03$) with anxiety or depression, and of male sex (OR 3.14, $p = 0.01$), surgical residency (OR 4.40, $p = 0.001$), extraversion (OR 1.80, $p < 0.01$), and number of shifts (OR 2.32, $p = 0.04$) with alcohol dependence.
Conclusion: The findings support a multidetermined nature of mental health problems in medical residents, in addition to providing data that may assist in the design of preventive measures to protect the mental health of this group.

Keywords: Mental health; anxiety; depression; alcoholism; internship and residency

Introduction

Medical residency has been recognized as a period of high stress during which residents in training face a series of extreme emotional situations, such as long work hours, sleep deprivation, lack of autonomy, and constant contact with human suffering.[1,2] A series of studies has shown high prevalence of mental health problems in medical residents in different cultural contexts, including Latin America,[3-6] as well as an increased incidence of these problems throughout the residency years.[2,7] Anxiety, depression, and problematic alcohol use are among the mental health issues experienced by medical residents. A recent systematic review and meta-analysis[6] including 54 studies from five continents identified an overall pooled prevalence of depression or depressive symptoms of 28.8% among medical residents, ranging from 20.9 to 43.2%, depending on the instrument used. Such rates are much higher than the prevalence of lifetime depression in the general population verified by a study evaluating more than 37,000 participants from 10 countries – showing prevalence rates ranging from 3 to 16.9%, or from 8 to 12% in most countries.[8]

In the general population, anxiety and depression have been associated with negative outcomes such as functional impairment, absenteeism, suicide, and engagement in risk behaviors, including substance abuse/dependence.[9,10] Alcohol dependence, one of the main causes of absenteeism in Brazil,[11] is related to social, family, financial, interpersonal, and occupational impairments.[12-14] The presence of these problems in medical residents has been associated with increased rate of self-reported errors, adoption of suboptimal practices in patient care, and thoughts of suicide or death.[2,4,15]

Sociodemographic and work characteristics, such as gender, age, work hours and number of shifts have been investigated as possible determinants of mental health in medical residents.[2,4,16] In addition, recent studies have shown that socially competent professionals tend to present better physical and mental health,[3,17] and studies developed specifically with medical residents and students have shown negative associations between social skills and problems related to stress,[18] burnout,[3] and mental health.[3] Since most of the activities of medical residents are performed together with other people (patients, supervisors, staff), social skills may favorably contribute to their professional practice.[3]

According to Del Prette & Del Prette,[17] social skills may be defined as classes of behaviors that are part of an individual's repertoire and contribute to socially competent performance. Included in these classes are behaviors involving communication, empathy, civility, work, assertiveness, and expression of positive feelings.[17] However, more studies are needed to better elucidate the role of social skills in relation to the mental health of medical residents.

In addition to social skill resources, personality characteristics may also be associated with mental health

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Submitted Dec 04 2015, accepted Jan 15 2016.

problems in medical residents.[2,19] A Five Factor Model (the Big Five) has been proposed for the assessment of personality based on five domains: openness, conscientiousness, extraversion, agreeableness, and neuroticism.[20-22] Such domains have been identified across different cultures and language communities and seem to be relatively stable across the lifespan.[22] Recent studies have found the Big Five Personality Traits to be associated with job satisfaction[23] and both academic[24,25] and workplace performance.[24] Furthermore, studies with medical students and residents have shown associations between the Big Five traits and academic performance, stress, and burnout.[26,27]

Considering the serious impacts of anxiety, depression, and alcohol dependence on medical residents, it is important to address the different domains that may be associated with these problems in this population. It seems important to address the relationships between mental health problems and work demands,[16] to identify personal resources that may assist residents in dealing with difficult work situations, and to evaluate the predictive role of personality traits in combination with social skills for mental health outcomes in medical residents.

The aim of this study was to evaluate the association of sociodemographic characteristics, personality traits, social skills, and work-related variables with indicators of anxiety, depression, and alcohol dependence in medical residents. Based on previous research,[2-5,16,19] the guiding hypothesis defined for the present study was that the combination of variables of a different nature (sociodemographic, personal and organizational) would have predictive value for mental health outcomes (anxiety, depression, and alcohol dependence) in residents.

Methods

Participants

After approval from the Institutional Ethics Committee of the Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo (protocol no. 535.883), this study was carried out by three investigators – two psychologists and a psychiatrist. A total of 400 medical residents of a tertiary care hospital in Brazil (Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto), of both genders and from different years and specialties, were directly contacted in their workplace by one of the investigators between June and December 2013. The inclusion criterion was being a resident for at least 6 months. Exclusion criteria were having completed residency training in a specialty other than the current one (except for the specialty required as a prerequisite for the current residency program) or being a foreigner living in Brazil for less than 2 years.

After explaining the aims of the study, all residents who agreed to participate (n=270) signed an informed consent form and completed a set of anonymous self-report instruments. The average response time to the set of instruments was 30 minutes. To avoid bias, the order in which the instruments were administered was alternated by the investigators.

Measures

Sociodemographic and work variables

All participants answered a questionnaire that included information regarding gender, age, work hours per week, number of shifts per month, and medical specialty.

Anxiety and depression

Anxiety and depression were evaluated using the Patient Health Questionnaire-4 (PHQ-4),[28] an abbreviated self-report questionnaire. The PHQ-4 contains four items, two for the assessment of anxiety derived from a seven-item scale (Generalized Anxiety Disorder 7-Item Scale [GAD-7]) and two for the evaluation of depression derived from a nine-item scale (Patient Health Questionnaire-9 [PHQ-9]). These four items have been shown to have high discriminative power in studies with the extended versions.[29,30] A score from zero to 3 points is attributed to each item, for a maximum score of 12 points, 6 for anxiety and 6 for depression. A score $\geqslant 3$ in the first two questions indicates anxiety and a score $\geqslant 3$ in the other two questions indicates depression.

The instrument has been shown to have good psychometric properties in validation studies with primary healthcare patients and with the general population.[28,31] In the Brazilian context, the validity and reliability of the two items related to depression were tested with a clinical sample, presenting a Cronbach's alpha of 0.64 and a receiver operating characteristic (ROC) curve area of 0.89 in the validity study performed through comparison with the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-IV).[32]

Alcohol dependence

Alcohol dependence were evaluated with the Alcohol Use Disorders Identification Test-3 (AUDIT-3), an abbreviated self-report questionnaire derived from the Alcohol Use Disorders Identification Test (AUDIT).[33] The AUDIT was developed by the World Health Organization and covers a spectrum of unhealthy alcohol use, including questions that assess the amount and frequency of alcohol intake, alcohol dependence, and problems related to alcohol consumption. The AUDIT-3 is the shortest version of the AUDIT and consists of the third question of the instrument. Studies have shown satisfactory psychometric properties for the AUDIT-3.[34] In the Brazilian context, the psychometric properties of the AUDIT-3 were tested with two clinical samples, and a ROC curve area of 0.93 was obtained for the cutoff of 3 in the validity study using the SCID-IV as a comparative diagnostic measure. A correlation coefficient of 0.91 was obtained between the AUDIT-3 and the 10-item AUDIT.[35]

Personality

In order to assess the Big-Five Personality Traits, the Revised NEO-Five Factor Inventory (NEO-FFI-R)[36] was used, which proposes an assessment of the extent of the five domains of personality: (i) openness, (ii) conscientiousness, (iii) extraversion, (iv) agreeableness, and

(v) neuroticism. The instrument was designed to identify personality characteristics that may favor or hinder the adaptive processes of the adult subject. Each subscale contains 12 items and is rated on a 5-point scale. According to the score obtained in each personality domain, individuals are categorized as very low, low, medium, high, or very high in the corresponding domain. With regard to the psychometric proprieties of the instrument for Brazilian samples, a study described by Flores-Mendoza has found adequate psychometric properties for the instrument.[37]

Social skills

To assess the social skills repertoire of medical residents, the Social Skills Inventory (SSI-DEL-PRETTE)[38] was used. This is a self-report instrument assessing the social skills that are usually required in various everyday interpersonal situations.

The instrument contains 38 items describing various social situations in a variety of contexts, with different interlocutors and requiring a variety of skills.[17] Each item is rated on a 5-point scale, ranging from never or rarely (for each 10 situations of this type, I react this way between zero and 2 times) to always or almost always (for each 10 situations of this type, I react this way 9 to 10 times). The responses to the SSI-Del-Prette can be evaluated as a total score or as specific factor scores. The interpretation of these scores is based on the position of the respondent regarding the percentile for the reference subgroup of the same gender.

A psychometric study of the SSI[39] showed a reliability of 0.90 ($p < 0.001$) and concurrent validity, evaluated through correlations with the Rathus Assertiveness Scale, of 0.79 ($p < 0.01$), demonstrating psychometric adequacy.

Statistical analyses

Initially, a descriptive analysis of demographic and residency program data was conducted to characterize the study sample regarding its profile. Univariate and multivariate logistic regression analyses were also performed to determine the potential predictive effect of the sociodemographic, personal, and work variables for different mental health outcomes (indicators of anxiety, depression, and alcohol dependence). All variables with statistical significance ($p \leqslant 0.05$) or a trend toward statistical significance ($p \leqslant 0.50$) in univariate analysis were included in multivariate analysis. The final multivariate predictive model for each mental health outcome included only variables with statistical significance ($p \leqslant 0.05$).

Results

Descriptive statistics

Demographic information and work-related as well as mental health aspects are described in Table 1. A similar number of females and males was observed, as well as low variation in mean age. Regarding work variables, a similar distribution of residents was observed according to specialty and number of shifts per month. Most residents reported working more than 70 hours per week. With respect to the mental health problems, high rates of anxiety, depression, and alcohol dependence were verified.

Table 1 Demographic, work, and mental health variables

Gender, female	126 (46.47)
Mean age (years), mean (SD)	28.10 (2.52)
Specialty	
Clinical	148 (54.81)
Surgical	122 (45.19)
Shifts per month	
$\leqslant$ 8 per month	131 (48.52)
$>$ 8 per month	139 (51.58)
Work hours per week	
$\leqslant$ 70	70 (25.93)
$>$ 70	200 (74.07)
Presence of mental health problems	
Anxiety and/or depression	113 (41.85)
Alcohol dependence	43 (15.93)

Data presented as n (%), unless otherwise specified.
SD = standard deviation.

Univariate logistic regression analyses

Table 2 presents the results of all univariate logistic regression analyses for the association of mental health outcomes assessed by the PHQ-4 and the AUDIT-3 and sociodemographic, work-related, and personal variables.

All variables with a p-value lower than 0.50 in the univariate analysis of anxiety and/or depression by the PHQ-4 – gender, age, work hours, number of shifts, social skills, openness, conscientiousness, extraversion, and neuroticism – were considered for inclusion in the multivariate logistic regression model. The final model, which consists solely of variables that presented statistical significance ($p \leqslant 0.05$), is described in Table 3.

Table 4 presents the final model for association of alcohol dependence as assessed by the AUDIT-3 and sociodemographic, work-related, and personal variables. Initially, all variables with a p-value lower than 0.50 in the univariate analysis, i.e., gender, age, specialty, work hours, number of shifts, social skills, openness, extraversion, agreeableness, and neuroticism, were included. The final model included only those variables that presented statistical significance ($p \leqslant 0.05$) in the multivariate analyses.

Discussion

This study verified an association between a set of variables (sociodemographic, personal, and work-related) and mental health outcomes (anxiety, depression, and alcohol dependence) in medical residents, which is consistent with findings from previous studies.[2,4,5,19] These data are relevant because they highlight the importance of

Table 2 Associations of sociodemographic, work-related, and personal variables with mental health outcomes (n=270)

		PHQ-4: anxiety and/or depression		AUDIT-3: alcohol dependence	
	n (%)	OR (95%CI)	p-value	OR (95%CI)	p-value
Sociodemographic variables					
Gender					
Female	126 (46.47)	1 [Reference]		1 [Reference]	
Male	144 (53.33)	0.64 (0.39-1.04)	0.07	4.74 (2.11-10.66)	<0.001
Age, years					
⩽ 28	170 (62.96)	1 [Reference]		1 [Reference]	
> 28	100 (37.04)	1.49 (0.91-2.46)	0.12	0.70 (0.35-1.41)	0.31
Work-related variables					
Specialty					
Clinical	148 (54.81)	1 [Reference]		1 [Reference]	
Surgical	122 (45.19)	0.94 (0.58-1.52)	0.79	7.04 (3.12-15.88)	<0.001
Work hours per week					
⩽ 70	70 (25.93)	1 [Reference]		1 [Reference]	
> 70	200 (74.07)	1.11 (0.64-1.93)	0.86	3.05 (1.15-8.09)	0.02
Number of shifts per month					
⩽ 8	131 (48.52)	1 [Reference]		1 [Reference]	
> 8	139 (51.58)	1.26 (0.78-2.05)	0.34	3.77 (1.77-8.01)	<0.001
Personal variables					
Social skills repertoire (SSI-Del-Prette)					
Satisfactory	102 (37.78)	1 [Reference]		1 [Reference]	
Unsatisfactory	168 (62.22)	0.262 (0.16-0.44)	<0.001	1.31 (0.657-2.62)	0.44
Big-Five Personality Traits (NEO-FFI-R)*					
Openness	-	0.859 (0.67-1.08)	0.19	1.148 (0.84-1.57)	0.39
Conscientiousness	-	0.74 (0.58-0.95)	0.02	1.03 (0.74-1.44)	0.85
Extraversion	-	0.63 (0.50-0.81)	<0.001	1.90 (1.33-2.72)	<0.001
Agreeableness	-	0.947 (0.73-1.24)	0.69	0.79 (0.55-1.13)	0.19
Neuroticism	-	2.77 (2.06-3.73)	<0.001	0.65 (0.47-0.90)	0.01

* Big-Five factors were coded according to the normative standards of the instrument, ranging from 1 as very low to 5 as very high.
95%CI = 95% confidence interval; AUDIT-3 = Alcohol Use Disorders Identification Test-3; NEO-FFI-R = Revised NEO-Five Factor Inventory; OR = odds ratio; PHQ-4 = Patient Health Questionnaire-4; SSI-Del-Prette = Social Skills Inventory.

Table 3 Multivariate model of indicators of mental health problems assessed by the PHQ-4

Variable	Overall number (%)	Number with anxiety and/or depression (%)	OR (95%CI)	p-value
Neuroticism*	-	-	2.60 (1.89-3.55)	<0.001
Satisfactory social skills repertoire	168 (62.22)	50 (29.76)	0.41 (0.23-0.74)	<0.01
> 8 shifts per month	139 (51.48)	62 (44.60)	1.91 (1.07-3.39)	0.03
Constant	-	-	0.04	<0.001

* Neuroticism was coded according to the normative standards of the instrument, ranging from 1 as very low to 5 as very high.
95%CI = 95% confidence interval; OR = odds ratio.

Table 4 Multivariate model of indicators of alcohol dependence assessed by the AUDIT-3

Variable	Overall number (%)	Number with alcohol dependence (%)	OR (95%CI)	p-value
Gender, male	144 (53.33)	35 (24.31)	3.14 (1.32-7.48)	0.01
Surgical specialty	122 (45.19)	35 (28.69)	4.40 (1.85-10.43)	0.001
Extraversion*	-	-	1.80 (1.20-2.68)	<0.01
> 8 shifts per month	139 (51.48)	33 (23.74)	2.32 (1.02-5.25)	0.04
Constant	-	-	0.02	<0.001

* Extraversion was coded according to the normative standards of the instrument, ranging from 1 as very low to 5 as very high.
95%CI = 95% confidence interval; OR = odds ratio.

considering multiple aspects when addressing the issue of mental health problems in this population.

Regarding the univariate analysis of associations between sociodemographic variables and indicators of mental health problems, a statistically significant difference was found only for the association with gender, with men presenting a higher risk for alcohol dependence (OR 4.74, $p < 0.001$) than women. This result is consistent with the results of a national survey with the general population, which verified higher prevalence rates of alcohol dependence in Brazilian men (10.5%) than in Brazilian women (3.6%).[14] Regarding the associations

between gender and anxiety, depression, or both (assessed by the PHQ-4), women presented only a trend for higher risk ($p = 0.07$). Despite the observed higher risk for both anxiety and depression in women in the general population, studies with medical residents have demonstrated divergent results.[2,16,19]

Univariate analysis of work-related variables and mental health problems in medical residents showed statistically significant associations between all work variables (specialty, work hours, and number of shifts) and alcohol dependence. Residents from surgical specialties were more likely to present alcohol dependence than residents from clinical specialties (OR 7.04, $p < 0.001$). A previous study with practicing surgeons from the United States showed that alcohol abuse and dependence are a significant problem in this population.[5] The results of the present study suggest that the same may be true for Brazilian medical residents. While 5.40% of residents from clinical specialties presented alcohol dependence, which is close to the prevalence of 6.80% verified in the Brazilian general population,[14] almost one third (28.69%) of the residents from surgical specialties presented an AUDIT-3 score consistent with alcohol dependence. These data underscore the need to address this problem, since alcohol dependence implies several impairments for professionals and patients alike.[5,12,13] In addition to specialty, working more than eight shifts per month and 70 hours per week were also significantly associated with alcohol dependence.

Regarding the univariate analysis assessing the associations between personal variables and PHQ-4 anxiety and/or depression in medical residents, statistically significant associations were verified between PHQ-4 findings and both social skills and personality variables. In line with previous studies,[3,17] residents with a satisfactory repertoire of social skills were at lower risk of presenting anxiety, depression, or both. Although more research is needed, these data highlight the relevance of the interpersonal dimension for the medical career. Since social skills can be learned, it should be possible to design educational programs to improve this domain and help medical residents to cope with the interpersonal demands of their work.

Neuroticism, extraversion, and conscientiousness were the personality variables that presented significant associations with indicators of mental health problems (anxiety, depression, and alcohol dependence) in the univariate analysis. Neuroticism has been well documented as a trait directly associated with indicators of both anxiety and depression, and studies have shown the opposite association of extraversion with these problems.[2,36,40] Regarding conscientiousness, considering the diversity of tasks in residency programs, this trait may assist residents in dealing with their training demands, as it involves more active processes of planning and organization.[22,36] Medical residents with higher levels of extraversion were more likely to present alcohol dependence, which may be related to the characteristic preference of these individuals for social stimulation and excitement-seeking.[22] Since the onset of alcohol dependence usually follows social drinking, and given that problematic use may arise as a response to periods of overwhelming anxiety,[41] the residency period and its stressful characteristics may favor the development of alcohol dependence in medical residents. Higher levels of neuroticism were associated with lower risk of alcohol dependence in the univariate analysis. This result is not consistent with the results of a previous study evaluating the relationships between the Big Five factors and alcohol-related problems in a sample of both undergraduate and graduate students from different courses.[42] Due to the scarcity of studies evaluating the relationships between alcohol dependence and personality in medical residents, more studies are needed to better elucidate these results.

The present results support our initial hypothesis, which stated that the combination of variables of a different nature (sociodemographic, personal and organizational) would have predictive value for mental health outcomes in residents. The first multivariate model, related PHQ-4 assessment, included social skills (as protection), neuroticism, and number of shifts (> 8/month) as significant predictive variables for anxiety, depression, or both. Regarding the second model, related to AUDIT-3 assessment, gender (male), extraversion, surgical specialty, and the number of shifts (> 8/month) were significant predictive variables of alcohol dependence. These data suggest that any attempt to address mental health issues in medical residents should cover both work-related and personal aspects. Work-related variables should be addressed considering that residency training is a recognized source of stress that may lead to mental health problems.[1,2,16,19] In addition, including personal interventions may be productive, as this may allow the development of personal resources that could contribute to medical residents coping with the diverse demands of the training.

The present study has several strengths, such as a large sample size and the inclusion of controlled variables. Nevertheless, important limitations should also be mentioned. Initially, the cross-sectional design prevents the establishment of causal relationships. Furthermore, the study was carried in a single medical center, which limits the applicability of these data to other resident populations. Another limitation is the possibility of bias resulting from the refusal of some residents to participate (predominantly claiming lack of time). The levels and characteristics of mental health problems in this subset cannot be determined. Finally, although all the instruments utilized in this study were validated measures, they do not allow a definitive diagnosis, with further evaluation required to confirm clinical anxiety, depression, and alcohol dependence.

As contributions, the findings support the multidetermined nature of mental health problems in medical residents. Variables from multiple spheres (sociodemographic, personal, and work-related) may act as risk or protective factors for anxiety, depression, and alcohol dependence in this population. Such data highlight some implications for both professional practice and further research. With regard to professional practice, systematic interventions addressing both the development of

interpersonal skills and the work conditions of residency programs (e.g., work hours and number of shifts) may be implemented in order to protect these professionals.

Further studies should assess more specific work conditions, such as relationships with coworkers and supervisors, bureaucracy, and autonomy. Since most studies on mental health among medical residents use self-report instruments, other types of assessment of mental health indicators as well as of personal and organizational conditions may contribute to better elucidate the relationships among these variables. Longitudinal trials and intervention studies addressing sociodemographic, organizational, and personal variables may also increase the knowledge about the mental health status of medical residents. The present results may contribute to the design of preventive measures to protect the mental health in this population.

Acknowledgements

This study received financial support from Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP; grant 2014/06972-7) and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES). SRL and JAC are recipients of Research Productivity awards from Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).

Disclosure

The authors report no conflicts of interest.

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