Empathy and psychological concerns among medical students in Brazil during the COVID-19 pandemic

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Abstract

Objective: Being in direct contact with COVID-19 patients for long periods of time increases the risk of infection among frontline workers. The purpose of this study was to identify levels of empathy and psychological concern among medical students during the COVID-19 pandemic.
Methods: An online cross-sectional study was conducted among medical interns divided into two groups; those who worked in the frontline (n = 87) and non-frontline (n = 63) during the COVID pandemic. The students completed a questionnaire assessing sociodemographic characteristics as well as the Interpersonal Reactivity Index, Maslach Burnout Inventory, Perceived Stress Scale and Patient Health Questionnaire.
Results: The majority of study respondents were women (70.7%) and mean age was 25.45 ± 3.93 years. In the unadjusted analysis, those who worked with COVID-19 patients had higher levels of empathy, stress, burnout syndrome and depressive symptoms. In the logistic regression analysis, students who worked on the frontline during the

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COVID-19 pandemic had higher levels of empathy (OR: 1.27; 95% CI: 1.16-1.14), stress (OR: 1.21; 95% CI: 1.05-1.39) and burnout syndrome (OR: 1.19; 95% CI: 1.10-1.30). **Conclusion:** Medical students in the internship period who worked on the frontline during the COVID-19 pandemic had more psychological concerns and higher levels of empathy compared to those who did not work on the frontline.

Introduction

Empathy is a social ability with different definitions, as it is multi-faceted covering different aspects related to behavioral and cognitive processes.[1-4] However, Davis[1,2] defines empathy within the constructs of affective and cognitive components. Affective empathy refers to the emotional experience and feeling towards another person, whereas cognitive empathy is related to the understanding of the feelings and emotions of another person while differentiating them from one's own emotions.

Empathic ability has been the focus of studies among health disciplines, especially investigations involving healthcare providers and medical students.[5-8] The socio-demographic characteristics of students and healthcare providers (e.g., the female sex, an older age, higher educational level, etc.) were seen as contributors to increased empathy.[9] Moreover, higher levels of empathy can have positive consequences for both the empathizer and person to whom empathy is directed.[6,10]

For healthcare providers, empathy increases wellbeing and diminishes medical-legal risks.[6,11] The development of empathy during their training has led to students becoming competent healthcare providers and to have greater achievements in their careers.[10] For patients, this ability can enable an improvement in quality of life, greater adherence to therapy, improvements in clinical outcomes and a reduction in complaints of negligence.[10]

Besides the positive factors mentioned above, negative aspects are also identified in individuals who provide care.[12,13] Studies have demonstrated that higher levels of empathy are associated with psychological concerns (i.e., anxiety, depression, burnout syndrome and stress) in healthcare providers and medical students.[11-14] Besides higher levels of empathy, a high workload, excess of activities, insufficient social support to students, uncertainty regarding the future and a lack of time for oneself contribute to the occurrence of psychological concerns among medical students.[15]

The COVID-19 pandemic was seen to be the most recent contributor of psychological distress and psychosocial issues. Studies identified that the prevalence of psychological concerns among individuals who work in the health field increased significantly during the pandemic for COVID-19.[16-18] Likewise, an increase in

psychological concerns and levels of empathy was found among medical students during the pandemic.[5,19]

Studies evaluating psychological concerns and empathy among medical students were found to be higher towards the end of the internship period under normal circumstance (i.e., no pandemic).[7,8,20] However, studies that assessed levels of empathy and psychological concerns among medical students within their internship period during the COVID-19 pandemic were very limited. Understanding the importance of empathy and the mental health of these students in atypical situations, such as the COVID-19 pandemic, could reveal the importance of the care needed to ensure the quality of the emotional aspects and wellbeing of these individuals as well as care recipients (i.e., patients) in other similar situations such as public health emergencies. Undergraduate medical degree in Brazil has a six-year duration and the internship encompasses the last 2 years of medical training in different medical specialties (e.g., psychiatry outpatient clinic, geriatrics, neurology, cardiology and others). Therefore, the aim of the present study is to analyze levels of empathy and psychological concerns among medical students during the COVID-19 pandemic. The hypothesis was that higher levels of empathy, stress, depressive symptoms and burnout syndrome would be found in medical students who worked on the frontline in the treatment of COVID-19.

Methods

Design, participants and ethical considerations

A quantitative cross-sectional study was conducted at a private higher education institution in the city of Araguari, Brazil, between July and December 2021. A total of 280 students were eligible to participate in this study, however, 140 students showed no interest in participating in the research. Thus, one hundred 50 students (54%) in the internship period (last 2 years of the medical school) participated and were divided into two groups: those who worked on the frontline of treatment for COVID-19 (n = 87) and those who did not work on the frontline (n = 63). These students worked in different sectors, such as intensive care units, urgent care units, primary care units, emergency rooms, etc. However, the distribution of the students was based on a single question (i.e., Did you work in health care units specifically designed for the treatment of patients diagnosed with COVID-19?). Those who answered "yes" were designated to the group on the frontline of treatment for COVID-19 and those who answered "no" were allocated to the other group. We defined front line workers as students who worked directly with patients diagnosed with COVID-19 in hospital wards designated for the care of this disease (i.e., COVID-19) and/or field hospitals for the treatment of COVID-19. All medical students undergoing internship course were included in the study. Students younger than 18 years of age were excluded.

This study received approval from the Human Research Ethics Committee of *IMEPAC Centro Universitário* (certificate number: 4.817.519). All volunteers who

agreed to participate provided informed consent (i.e., consent form) prior to completing the data collection instruments described below.

Measures

Empathy. The Interpersonal Reactivity Index (IRI) was used to assess the level of empathy and the two main domains of this construct (affective and cognitive).[2] The IRI comprises 21 items – 14 addressing the affective domain (items 1, 3, 4, 6, 7, 9, 10, 12, 13, 14, 15, 17, 18 and 20) and seven addressing the cognitive domain (items 2, 5, 8, 11, 16, 19 and 21). The items are scored on a Likert scale ranging from 1 ("does not describe me very well") to 5 ("describes me very well"). The total ranges from 21 to 105 points, with higher scores denoting a higher level of empathy. In the present study, we used the version translated into Portuguese and adapted to the Brazilian context, which has adequate internal reliability (Cronbach's α = .75).[21]

Burnout syndrome. The Maslach Burnout Inventory - Human Services Survey (MBI-HSS) was used to assess the presence of burnout syndrome.[22] The inventory is composed of 22 items scored on a Likert scale ranging from 1 (never) to 5 (daily). The total ranges from 22 to 110 points, with higher scores denoting a greater level of burnout. The translated version validated for the Brazilian population was used in the present study (Cronbach's α = .87).[23]

Stress. The Perceived Stress Scale (PSS-14) was developed to identify stress.[24] This scale has 14 items scored on a Likert scale ranging from 0 (never) to 4 (always). Seven items address positive aspects (4, 5, 6, 7, 9, 10 and 13), the scores of which are inverted, and seven address negative aspects (1, 2, 3, 8, 11, 12, 14). The total is calculated by the sum of the 14 items and ranges from 0 to 56 points, with higher scores denoting a higher level of perceived stress. Luft et al.[25] translated and validated the PSS-14 for the Brazilian context (Cronbach's α = .82).

Depressive symptoms. The Patient Health Questionnaire (PHQ-9) is used to screen for depressive symptoms following the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5).[26] This scale has items scored on a Likert scale ranging from 0 (not at all) to 3 (almost every day). The total ranges from 0 to 27 points, with higher scores denoting a greater presence of depressive symptoms. The version translated into Portuguese and validated for the Brazilian population was used in the present study (Cronbach's α = .83).[27]

Procedures

An online study was conducted using the Google Forms platform. The students were recruited through social media (e.g., website, Instagram and Facebook of the main authors' higher education institution). The "snowball" method was used, in which

participants were invited spontaneously as indicated other students. Those who agreed to participate voluntarily answered a questionnaire created by the researchers addressing sociodemographic characteristics (sex, age, marital status, etc.) as well as the data collection instruments described above (IRI, MBI-HSS, PSS-14, and PHQ-9).

Statistical analysis

The SPSS (version 23.0) was used for statistical analyses. Relative frequency (%), mean and standard deviation values were used for the description of the characteristics of the sample. The Kolmogorov-Smirnov ($P < .05$) test was used to determine the normality of the continuous variables (age, schooling and clinical variables). As the variables were non-parametric, the Mann-Whitney U test was used for the comparison of the two groups (students on the frontline of COVID-19 vs. those not on the frontline). The chi-squared (χ^2) test was used for the comparison of categorical variables (sex, race/skin color, marital status and religion). Binary logistic regression analysis was employed to identify factors associated with students during the COVID-19 pandemic. Clinical variables with a significant difference between groups were incorporated into the model. A separate result revealed that multicollinearity did not occur among the variables in the final model (variance inflation factor < 2). The level of significance was set at 5% ($P \leq .05$) for all analyses.

Results

The sociodemographic and clinical characteristics of the overall sample are presented in Table 1. Female students predominated (70.7%) and mean age was 25.45 ± 3.93 years. Students who worked on the frontline of COVID-19 had higher levels of empathy, stress, burnout syndrome and depressive symptoms. Students on the frontline of treatment for COVID-19 had higher levels of empathy (OR: 1.27;95% CI: 1.16-1.14), stress (OR: 1.21; 95% CI: 1.05-1.39) and burnout syndrome (OR: 1.19; 95% CI: 1.10-1.30). Depressive symptoms (OR: 1.10; 95% CI: 1.04-1.17) were only associated with this group in the unadjusted analysis (Table 2).

Discussion

In this study, we hypothesized that clinical variables (i.e., empathy, stress, depressive symptoms and burnout syndrome) would be associated with working as a frontline staff treating COVID-19. This hypothesis was partially confirmed, as medical students in the internship period who worked on the frontline during the COVID-19 pandemic had higher levels of empathy, stress and burnout syndrome compared to those who did not work on the frontline.

Students who worked on the frontline of the COVID-19 pandemic had higher levels of empathy. Similar results were found in previous studies conducted during the COVID-19 pandemic.[7,8,10,20] This may be explained by the affective domain of empathy, which consists of the capacity to put oneself in the place of others as well as to experience the same

Table 1. Sociodemographic and clinical characteristics of medical students in internship period during COVID-19 pandemic.

| Variables | Total (n = 150) | Worked on frontline of care during COVID-19 pandemic | | U/X^2 | P |
		Yes (n = 87)	No (n = 63)		
Sociodemographic variables Mean (SD) or % (n)					
Age	25.45 (±3.93)	24.94 (±2.38)	26.14 (±5.34)	2526.50	.41
Sex					
Female	70.7 (106)	75.9 (66)	63.5 (40)	2.70	.10
Male	29.3 (44)	24.1 (21)	36.5 (23)		
Race/skin color					
White	77.3 (116)	74.7 (65)	81.0 (51)	0.81	.37
Non-white	22.7 (34)	25.3 (22)	19.0 (12)		
Marital status					
Married	5.3 (8)	5.7 (5)	4.8 (3)	—	—
Not married	94.7 (142)	94.3 (82)	95.2 (60)		
Religion					
With religion	78.7 (118)	82.8 (72)	73.0 (46)	2.07	.15
Without religion	21.3 (32)	17.2 (15)	27.0 (17)		
Clinical variables Mean (SD)					
Empathy[a]	66.16 (±8.58)	70.66 (±5.73)	59.95 (±8.00)	761.50	.01**
Stress[b]	33.28 (±5.24)	35.22 (±4.02)	30.60 (±5.57)	1224.00	.01**
Burnout syndrome[c]	48.01 (±10.32)	52.85 (±7.66)	41.32 (±9.82)	941.00	.01**
Depressive symptoms[d]	10.39 (±5.98)	11.70 (±5.32)	8.57 (±6.39)	1882.50	.01**

**P < .01. SD: standard deviation. U: Mann-Whitney U test. χ^2: chi-squared test. Test not performed – more than 20% of cells with n < 5.
[a]Davis's Interpersonal Reactivity Index.
[b]Perceived Stress Scale.
[c]Maslach Burnout Inventory - Human Services Survey.
[d]Patient Health Questionnaire.

Table 2. Binary logistic regression analysis of students who worked on frontline during COVID-19 pandemic and those who did not work on frontline.

Variables	Unadjusted analysis[a] OR (95% CI)	P	Adjusted analysis[a] OR (95% CI)	P
Empathy	1.27 (1.18-1.37)	.01	1.27 (1.16-1.41)	.01
Stress	1.29 (1.17-1.42)	.01	1.21 (1.05-1.38)	.01
Burnout syndrome	1.18 (1.11-1.24)	.01	1.19 (1.10-1.30)	.01
Depressive symptoms	1.10 (1.04-1.17)	.01	0.99 (0.90-1.10)	.90

[a]Reference for analysis: students who worked on frontline identified as (1). Likelihood ratio value of model regression χ^2: 88.726. Sample size for the entire model: n = 150.

emotions and feelings (e.g., anxiety, depression, etc.) presented by the target individual (e.g., patient with COVID-19).[1,2] One study showed that students presented higher levels of empathy during the pandemic due to more frequent contact with patients.[28] As the present investigation involved students who worked directly with patients that presented different (especially negative) emotional states, this may explain our findings.

Another factor that could also explain the higher levels of empathy among the students who worked on the frontline of the COVID-19 pandemic is empathic concern, which is one of the subcomponents of affective empathy and regards the capacity of relieving one's own pain only after relieving the pain of another person.[1,2] One study identified higher levels of empathic concern among healthcare students compared to health professionals.[29] Empathic concern is commonly identified in individuals who provide health care[30] and higher levels of empathic concern are associated with greater pro-social behavior,[10] which may explain the higher levels of empathy among the students who worked on the frontline of the COVID-19 pandemic.

With regards to psychological concerns, an association was found between working in the frontline during the COVID-19 pandemic with stress and burnout. As mentioned above, the pandemic exerted an impact on the mental health of professionals who worked in the frontline,[16-18] which may explain the association found in the present investigation. Empathy may also explain this association, as a systematic review found an association between higher levels of empathy and psychological concerns (e.g., stress, burnout syndrome, depression and anxiety) among health care providers.[31]

Students who worked in the frontline may also have had higher levels of stress due to the work environment and pandemic scenario.[16] A meta-analysis demonstrated an increase in the prevalence of mental disorders among healthcare providers during the COVID-19 pandemic between the years 2020 and 2021, especially those who maintained more direct contact with patients.[18] Moreover, previous cross-sectional studies reported an increase in the workload among healthcare providers on the frontline who volunteered to be members of response teams during the COVID-19 outbreak.[16,32] Even without the context of the pandemic, medical students experience stress due to the need to adjust to the medical school environment, ethical issues, professional dilemmas, exposure for the first time to death and human suffering and personal life events.[15] Thus, the medical school environment is already stressful and working in the frontline during the COVID-19 pandemic was an important aggravating factor regarding the level of stress among the students.

Higher levels of burnout syndrome were also found among students who worked on the frontline of the COVID-19 pandemic. However, feelings of burnout were aggravated with the onset of the pandemic, especially among healthcare providers and students on the frontline of care for patients with COVID-19, whose workloads were increased and who had greater contact with suffering.[32] Such circumstances were demonstrated in a study in which physicians declared an increase in levels of burnout and emotional exhaustion during the pandemic and this situation was worse among healthcare providers who worked on the frontline.[18] Thus, the students in the present study who worked on the frontline may have felt emotionally over-burdened with the increase in responsibilities, which may have led to greater levels of burnout.

From the biological standpoint, there is evidence that empathy and psychological concerns are the result of both behavioral and physiological changes.[33] One study demonstrated that regions of the brain, such as the amygdala, hypothalamus, hippocampus and anterior region of the insula, are activated when an individual experiences empathy, especially the affective domain.[3] Thus, a possible explanation for this association would be the activation of such regions in these students.

No significant association was found between work in the frontline of the COVID-19 pandemic and depressive symptoms. However, previous studies found that healthcare providers who worked in the frontline had a greater occurrence of depressive symptoms.[18,34] A meta-analysis found that the overall prevalence of depression among healthcare providers during the pandemic was 24.8%.[35] Another systematic review involving frontline healthcare workers reported that the prevalence of depression was 24.3%.[36] The divergence between the studies cited and the present investigation may be related to the overlap of the instruments used, as the burnout syndrome (i.e., MBI-HSS) and depressive symptoms (i.e., PHQ-9) have items that assess similar situations.

The literature reports that public health emergencies, such as the Ebola virus and Zika virus, had negative impacts on the mental health of the population and health care providers,[37] which was not different with the COVID-19 pandemic. We found a lack of care given to medical students on the part of higher education institutions with regards to the maintenance of mental health and wellbeing. Thus, strategies should be taught and/or implemented to ensure the physical and mental wellbeing of these students, as the negative impacts could exert an influence on the quality of care provided to patients. One way to deal with psychological concerns is the use of 'mindfulness', which consists of intentionally paying attention to each moment with curiosity, openness and the acceptance of each experience without judgment.[38] Moreover, this mechanism is an effective intervention to enhance psychological wellbeing and for the treatment of stress, burnout and depression.[39] Thus, interventions for medical students are important to minimizing emotional concerns.

Study limitations

The present study has some limitations that should be considered. The cross-sectional design impedes the determination of causality. The sample was from a single higher education institution. The overlap of the instruments used, as the MBI-HSS and PHQ-9 have items that assess similar situations. The convenience nature of the sample needs to be mentioned here as well (since only about half of the students participated, i.e., 150 out of 280). Lastly, the online nature of the study may have been an obstacle to the participation of a larger number of students, as possible difficulty in terms of access to the internet may have led individuals to not complete the questionnaires.

Conclusion

In conclusion, the results showed that students who worked in the frontline had higher levels of empathy, stress and burnout. These findings underscore the importance of

support on the part of higher education institutions to assist medical students as well as the development of interventions that can assist in minimizing the impacts on mental health during unusual situations such as public health emergencies.

Author contributions

We confirm that all authors met the four ICMJE criteria for authorship. Wercelens VO and Bueno ML: Writing- Original draft preparation. Bueno JL, Abrahim RP, Ydy JGM: Data curation, Investigation. Montayre J and Zanetti HR: Analysed the quantitative data, Writing-Reviewing and Editing. Maximiano-Barreto MA: Conceptualization, Methodology, Writing-Reviewing and Editing, and Supervision.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data availability

Due to the nature of this research, the participants did not agree for their data to be shared publicly. Therefore, no supporting data is available.

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