Research, Society and Development, v. 11, n. 7, e1411729513, 2022
(CC BY 4.0) | ISSN 2525-3409 | DOI: http://dx.doi.org/10.33448/rsd-v11i7.29513

Stress, Spirituality, and Altruism of Brazilian Medical Students during the COVID-19 Pandemic: A Cross-sectional Analysis

Estresse, Espiritualidade e Altruísmo de Estudantes de Medicina Brasileiros durante a Pandemia de COVID-19: uma Análise Transversal

Estrés, Espiritualidad y Altruismo de Estudiantes de Medicina Brasileños durante la Pandemia de COVID-19: un Análisis Transversal

Received: 04/22/2022 | Reviewed: 04/30/2022 | Accept: 05/08/2022 | Published: 05/14/2022

David Nunes de Lima Junior
ORCID: https://orcid.org/0000-0003-0382-5924
Universidade Federal do Ceará, Brazil
E-mail: delimadavid.md@gmail.com
Ridson Guilherme Parente de Aguiar
ORCID: https://orcid.org/0000-0003-1493-5299
Centro Universitário Christus, Brazil
E-mail: ridsong@gmail.com
Bruna Sobreira Kubrusly
ORCID: https://orcid.org/0000-0003-3433-0692
Universidade Federal do Ceará, Brazil
E-mail: brunaskubrusly@gmail.com
Danielle S. Macedo
ORCID: https://orcid.org/0000-0001-8980-9970
Universidade Federal do Ceará, Brazil
E-mail: danielle.macedo@ufc.br
Marcos Kubrusly
ORCID: https://orcid.org/0000-0002-4414-8109
Centro Universitário Christus, Brazil
E-mail: mmkubrusly@gmail.com
Danilo Lopes Ferreira Lima
ORCID: https://orcid.org/0000-0002-9916-013X
Universidade de Fortaleza, Brazil
Centro Universitário Christus, Brazil
E-mail: lubbos@uol.com.br
Lia Lira Olivier Sanders
ORCID: https://orcid.org/0000-0002-3823-9821
Universidade Federal do Ceará, Brazil
Centro Universitário Christus, Brazil
E-mail: lia_sanders@hotmail.com

Abstract
Spirituality and altruism may be critical coping strategies to minimize emotional pain during period of crisis. Here we aim to investigate how spirituality and altruism are related and whether they influence medical students' levels of stress during the COVID-19 pandemic. Data were collected when most Brazilian states had already been promoting social isolation in response to the COVID-19 pandemic using self-reported measures: the Perceived Stress Scale 4, the Self-Spirituality Rating Scale, and Altruistic Attitudes Scale, in an online questionnaire. We found moderate levels of perceived stress, moderate to high levels spirituality, as well as high levels of altruistic attitudes. Reported stress was higher among participants with a previous diagnosis of mental disorder and women, while more altruistic individuals were less vulnerable to it. Most participants attributed their stress symptoms to the COVID-19 pandemic or to the social isolation and participants with higher level of stress were less able to study during the pandemic. Spirituality correlated positively with altruistic thoughts and emotions, but only participants who act altruistically reported lower levels of stress. Our results indicate that the mental health status before the COVID-19 pandemic is related to the actual level of stress and suggest that altruism may allow for collective coping of emotional burden during the health crisis.
Keywords: Psychological stress; Teaching; Altruism; Spirituality; COVID-19 pandemic.

Resumo
Espiritualidade e altruísmo podem ser importantes estratégias de enfrentamento para minimizar a dor emocional durante o período de crise. Aqui, pretende-se investigar como a espiritualidade e o altruísmo estão relacionados e se

influenciam os níveis de estresse dos estudantes de medicina durante a pandemia do COVID-19. Os dados foram coletados quando a maioria dos estados brasileiros já vinha promovendo o isolamento social em resposta à pandemia de COVID-19, por meio de escalas autorreferidas: Perceived Stress Scale 4, Self-Spirituality Rating Scale e Altruistic Attitudes Scale, em um questionário online. Encontrou-se níveis moderados de estresse percebido, níveis moderados a altos de espiritualidade, bem como altos níveis de atitudes altruístas. O estresse relatado foi maior entre os participantes com diagnóstico prévio de transtorno mental e em mulheres, enquanto os indivíduos mais altruístas foram menos vulneráveis a ele. A maioria dos participantes atribuiu seus sintomas de estresse à pandemia de COVID-19 ou ao isolamento social e os participantes com maior nível de estresse foram menos capazes de estudar durante a pandemia. A espiritualidade se correlacionou positivamente com pensamentos e emoções altruístas, mas apenas os participantes que agem de forma altruísta relataram níveis mais baixos de estresse. Os resultados indicam que o estado de saúde mental antes da pandemia de COVID-19 está relacionado ao nível atual real de estresse e sugerem que o altruísmo pode permitir o enfrentamento coletivo da carga emocional de estresse durante a crise de saúde.
Palavras-chave: Estresse psicológico; Ensino; Altruísmo; Espiritualidade; Pandemia COVID-19.

Resumen
La espiritualidad y el altruismo pueden ser estrategias de afrontamiento importantes para minimizar el dolor emocional durante un período de crisis. Aquí, pretendemos investigar cómo la espiritualidad y el altruismo se relacionan e influyen en los niveles de estrés de los estudiantes de medicina durante la pandemia de COVID-19. Los datos fueron recolectados cuando la mayoría de los estados brasileños ya estaban promoviendo el aislamiento social en respuesta a la pandemia de COVID-19, utilizando escalas autoinformadas: Perceived Stress Scale 4, Self-Spirituality Rating Scale y Altruistic Attitudes Scale, en un cuestionario en línea. Se encontraron niveles moderados de estrés percibido, niveles moderados a altos de espiritualidad, así como altos niveles de actitudes altruistas. El estrés informado fue mayor entre los participantes con un diagnóstico previo de trastorno mental y en las mujeres, mientras que las personas más altruistas fueron menos vulnerables a él. La mayoría de los participantes atribuyeron sus síntomas de estrés a la pandemia de COVID-19 o al aislamiento social, y los participantes con un mayor nivel de estrés tuvieron menos capacidad para estudiar durante la pandemia. La espiritualidad se correlacionó positivamente con los pensamientos y emociones altruistas, pero solo los participantes que actuaron de manera altruista informaron niveles más bajos de estrés. Los resultados indican que el estado de salud mental antes de la pandemia de COVID-19 está relacionado con el nivel de estrés real actual y sugieren que el altruismo puede permitir el afrontamiento colectivo de la carga emocional del estrés durante la crisis sanitaria.
Palabras clave: Estrés psicológico; Enseñanza; Altruismo; Espiritualidad; Pandemia de COVID-19.

1. Introduction

Outbreaks of infection have the potential to profoundly impact people at the individual and community level (Hall et al., 2008). The 2019 coronavirus disease (COVID-19) pandemic represents a considerable stress factor that required a series of dramatic containment measures for the survival of the whole community (Lancet, 2020; Wang et al., 2020a). There is preliminary evidence that altruistic behavior increases in reaction to stress, leading people to make more generous choices (Shelly & Narang, 2018; Sparrow et al., 2019). Altruistic decisions may be motivated by spiritual beliefs (Huber & MacDonald, 2011), which, in turn, have been shown to reduce stress (S Cohen & Wills 1985; Pollner 1989; Bormann et al. 2005; Michalsen et al. 2005).

Many students suffer adverse psychological consequences as the level of stress caused by the pandemic uprose (Ye et al., 2020). Recent studies found considerable fear of COVID-19 (Nguyen et al., 2020) and a high level of stress among medical students (Abdulghani et al., 2020a). The individual coping process is determinant to a stress reaction (Lazarus, 1993). While a disrupted or conflictual relationship with God is associated with depression and anxiety during the COVID-19 pandemic (Fekih-Romdhane & Cheour, 2021), a belief that life has an ultimate meaning negatively correlates with perceived stress and depressive symptoms (Mahamid & Bdier, 2021).

Spirituality shapes social behaviors (Zerbetto et al., 2017) and may buffer the deleterious effects of disasters (Aten et al., 2014). Going beyond ordinary experiences (MacDonald et al., 2015), spirituality involves community values that may provide a sense of fulfillment in life (Bensley, 1991) and strengthen personal growth (Jung, 1969). A recent study highlights that many medical students consider indulging in religious activity the most effective strategy to cope with the severe stress during this pandemic (Abdulghani et al., 2020b). The experience acquired in epidemics demonstrates that the attention to

mental health requires humanitarian and social help, which is intrinsically related to altruism (Pan American Health Organization, 2006). In common sense, altruism means generosity and benevolence. Psychology defines it as acting out of concern for the welfare of others (Fehr & Fischbacher, 2003; Filkowski et al., 2016).

Spirituality and altruism may be critical coping strategies to minimize the insecurity and the emotional pain during a crisis (J. P. B. Gonçalves et al., 2015; Post, 2005). Still, it is unknown how these factors interact in a critical collective stressful period. Therefore, the purpose of this study is to investigate how spirituality and altruism are related and whether they influence medical students' levels of stress during the Covid-19 pandemic. We hypothesized that participants with higher levels of spirituality and altruism would report a lower level of stress. We also investigated how previous mental health status and social isolation influence participants' stress levels during the COVID-19 pandemic. Following previous findings (Byrne et al., 2021), we hypothesized that individuals with psychiatric conditions would show higher stress levels during the pandemic.

2. Methodology

Participants and study design

We conducted this study during the last week of March and the first week of April 2020, when most Brazilian states had already promoted social isolation in response to the COVID-19 pandemic and the infection rate was rising steeply. We used social media groups of Brazilian medical schools to recruit participants. We invited medical students to answer an online questionnaire. They provided information about biological sex, age, marital status, number of residents in their home, medical school, state of the federation, city location (capital or countryside), year in medical school (medical school in Brazil is a six-year program). We asked if they or any family member were a suspected or confirmed case of COVID-19 and if they were in total or partial social isolation. We also asked if they were currently involved in patient care, how many weekly hours they were devoting to academic study during the pandemic, and if they had been monitored for the treatment of any mental disorders before the outbreak.

Instruments

After the questions described above, participants answered three self-reported measures: the Perceived Stress Scale 4 (PSS-4, (Sheldon Cohen 1988), the Self-Spirituality Rating Scale (SRSS(Galanter et al. 2007), and Altruistic Attitudes Scale (Escala de Atitudes Altruístas, (Loureiro and Lima 2013).

The PSS-4 is a four-item scale about the frequency of stress symptoms. The PSS scale offers a means to measure stress and the individuals' capacity to handle and manage those perceived difficulties (Ingram et al., 2016a). The scale focuses on general aspects rather than specific experiences and has been validated for Brazilian Portuguese (Faro, 2015). We chose the PSS because it is the most used self-report measure for evaluating psychological stress (Ruisoto et al., 2020a). It is one of the most widely used tools for measuring psychological stress in clinical and non-clinical settings. For this research, we used the PSS-4, a shortened version of the original PSS-14 (Andreou et al., 2011a). It presents good psychometric features, with the advantage that its brevity avoids fatigue on testing. Previous studies have explored the internal consistency (reliability) of the PSS-4 (Andreou et al., 2011b; Guo et al., 2021; Ingram et al., 2016b; Zandifar et al., 2020). It has an adequate Cronbach's alpha range of 0.42 to 0.83 (Ruisoto et al., 2020b), similar to the original study (Cohen & Williamson, 1988). (Warttig et al. 2013)) found good internal consistency (Cronbach's $\alpha = 0.77$) . Participants respond on a 5-point Likert-type scale (0 = never; 4 = very often), with the total score ranging from 0 to 16. A high score indicates a high perception of stress. The higher the PSS-4 score, the less the respondent perceives that they can cope with current stressors. To evaluate the acute effects of social isolation, we changed the question about the frequency of symptoms "in the last month" to "in the last week". After answering the PSS-4, participants indicated whether stress symptoms have started or intensified with the COVID-19 pandemic or the

social isolation.

The Self-Spirituality Rating Scale (SRSS) has also been validated for Brazilian Portuguese (A. M. de S. Gonçalves & Pillon, 2009a). It is composed of six questions about how participants care about and engage in spiritual practices. Participants indicate their answers to each of the six items on a 5-point Likert scale (from 1—I totally agree to 5—I totally disagree). Each item is recoded before computing the sum (i.e., the score of 5 becomes 1; 2 becomes 4; and so forth). The sum of the responses to the six items indicates the total score for spiritual orientation (between 6 and 30). We chose this instrument to assess a more intimate spiritual dimension. The SRSS measures to what extent the subject considers spiritual issues important (L. M. Gonçalves et al., 2018). It has a good internal consistency, coefficient of Chronbach's alpha ranging from 0.7028 to 0.8878 (Gonçalves & Pillon, 2009b).

The Altruistic Attitudes Scale (Escala de Atitudes Altruístas) was developed in Portuguese and validated in Portugal (Loureiro & Lima, 2013b). It comprises three 4-item sub-scales, focusing on three aspects of altruism: cognition, affect, and behavior. Respondents answer a 5-item Likert scale. The cognitive subscale investigates participants' agreement to altruistic thoughts (1- totally disagree to 5- completely agree); the affective subscale, the feelings of the respondent in doing some altruistic actions, ranging from a 1 (very bad) to 5 (very good) answer; the third subscale evaluates the frequency in which the participants do some altruistic behaviors, answering the items in a 1 (never) to 5 (frequently) scale. Therefore, the total score ranges from 12-60. Loureiro and Lima confirmed the validity and reliability of the Altruistic Attitudes Scale (Chronbach's alpha = 0.79).

Statistical analysis

We used the Statistical Package for the Social Sciences (SPSS), version 23, for the statistical analysis, considering $p < 0.05$ as a significant value. The data did not follow a normal distribution. Therefore, we report descriptive statistics as median (Mdn) and interquartile range (IQR). We used the chi-square test for assessing relationships between categorical variables. We used the Mann-Whitney test, the non-parametric alternative test to the independent sample t-test, to compare mean scores of participants of different categories (sex, > 5 people in the home, city location) on PSS-4, SRSS, and The Altruistic Attitude Scale. We used the Kruskal-Wallis test, the non-parametric equivalent of the one-way analysis of variance (ANOVA), for testing the scores difference between students of different regions of Brazil and years of medical education. The Kruskal-Wallis test tests whether three or more samples originate from the same distribution, extending the Mann–Whitney U test, which compares two groups.

For correlation analysis, we used Spearman's rank correlation, a non-parametric test to evaluate the degree of association between participants' scores on PSS-4, SRSS, and The Altruistic Attitude Scale.

Ethical considerations

All procedures performed in studies involving human participants followed the ethical standards from Brazil, following resolution No. 510 of April 2016 for conducting in the humanities and social sciences, with the standards of free and informed consent and with the 1964 Helsinki declaration, its later amendments or comparable ethical standards. As a COVID-19 related research protocol, this project has been reviewed and approved by the National Commission of Ethics in Research - CONEP (protocol number: 4014340). All adult subjects gave their informed consent to participate in the study.

Funding

No funding was received for this study.

Declaration of interest statement

The authors declare they have no conflicts of interest.

3. Results

A total of 1105 Brazilian medical students of all years of medical school took part in the study. Table 1 shows the sample characteristics. Most of the participants were female (64.2%), single (94.8%), and between 20 to 29 years old (73.3%). The majority live in capitals or metropolitan regions (79.6%), especially in the Northeast Region (72.5%), in households with more than three people (58.3%).

Most participants (96%) were not suspected or confirmed cases of COVID-19 nor had any family member diagnosed with the disease (94.8%). A 77.9% majority was confined entirely to their homes or leaving home only to obtain essential goods and services. Moreover, 95.3% of the students were not in direct contact with patients during the pandemic.

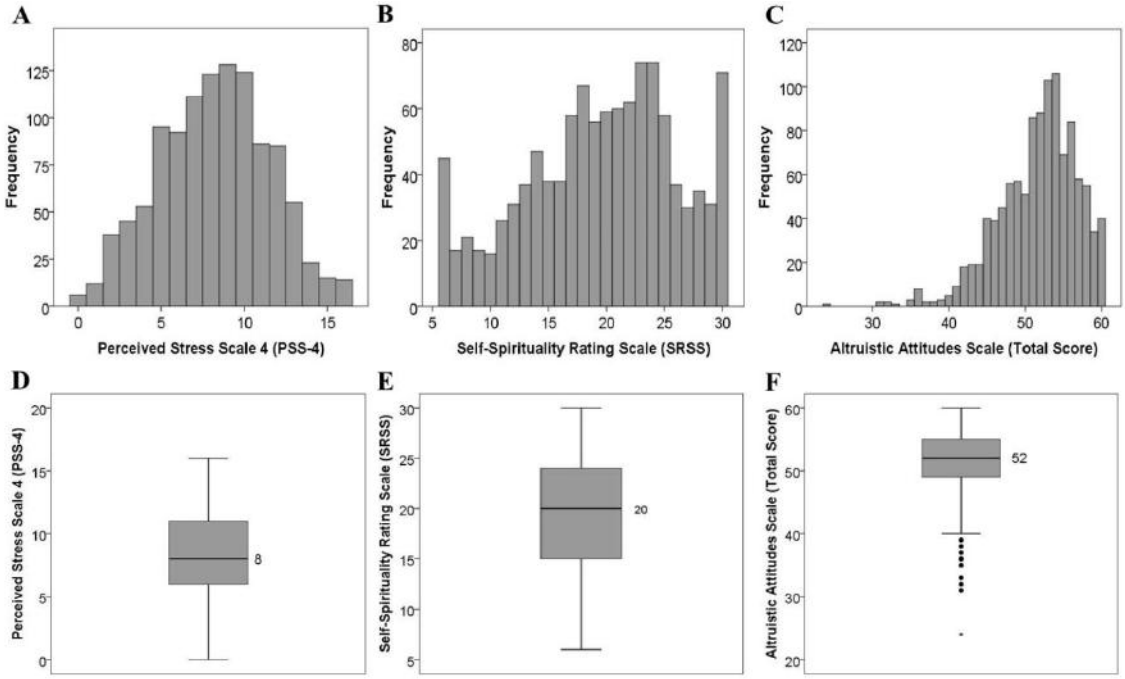
Table 1. Participant Demographics Characteristics.

Variable		n	%	Skewness	Kurtosis
Sex	Feminine Masculine	709 396	64.2 35.8	0.59 (± 0.07)	-1.65 (± 0.15)
Age Range	< 20 20 to 29 > 30	233 810 62	21.1 73.3 5.6	-0.31 (± 0.07)	0.52 (± 0.15)
Marital Status	Single Married Divorced	1047 56 2	94.8 5.1 0.2	4.35 (± 0.07)	19.09 (± 0.15)
Number of People in the Home	< 5 ≥ 5	461 644	41.7 58.3	-0.34 (± 0.7)	-1.89 (± 0.15)
Region of Brazil	Northeast Southeast Midwest South North	801 121 113 50 20	72.5 11.0 10.2 4.5 1.8	1.59 (± 0.07)	1.51 (± 0.15)
City Location	Capital/Metropolitan region Countryside	880 225	79.6 20.4	1.47 (± 0.07)	0.17 (± 0.15)
Year of Medical School	1 2 3 4 5 6	273 232 223 180 104 93	24.7 21.0 20.2 16.3 9.4 8.4	0.45 (± 0.07)	0.17 (± s0.15)
	Total	1105	100.0		

Source: Authors.

We found moderate levels of perceived stress in this population of medical students during the COVID-19 pandemic (Figure 1). Most participants (66.5%) declared that stress symptoms have started or intensified with the COVID-19 pandemic or the measures of social isolation; 14.1% did not see a relationship between their level of stress and the pandemic, while 19.4% denied any stress symptom.

Figure 1 Participants' Level of Stress, Spirituality, and Altruism.



Histograms showing the distribution of scores on each scale: Perceived Stress Scale 4 (A), Self-Spirituality Rating Scale (B), and Altruistic Attitudes Scale (C); the box plots in the bottom (D, E, F) indicate the respective medians. Source: Authors.

Before the beginning of the pandemic, 21.8% of participants received mental health treatment. Their stress level was significantly higher than that of participants without a previous diagnosis of mental illness ($p < 0.001$, Table 2). Women had a higher level of perceived stress ($p < 0.001$, Table 2), and there was a negative correlation between the number of hours of study per week (Mdn = 10, IQR = 5-24) and the level of stress ($\rho = -0.173$; $p < 0.001$).

Table 2 Association between Variables and Scale.

Variable		Perceived Stress Scale 4 (PSS-4)	Self-Spirituality Rating Scale (SRSS)	Altruistic Attitudes Scale (Total score)
Sex	Feminine Masculine	9 (7 - 11) 7 (5 - 10) **p < 0.001**[1] **r_{rb}** = 0.27	21 (16 - 25) 18 (14 - 23) **p < 0.001**[1] **r_{rb}** = 0.19	53 (49 - 56) 52 (47 - 55) **p < 0.001**[1] **r_{rb}** = 0.14
Age Range	< 20 20-29 > 30	8 (6 - 11) 8 (6 - 10) 8 (5 - 10) p = 0.683[2]	19 (15 - 24) 20 (15 - 24) 21 (17 - 25) p = 0.683[2]	51 (47 - 54) a 53 (49 - 56) b 53 (51 - 56) b **p < 0.001**[2] ε^2= 0.02
Marital Status	Single Married Divorced	8 (6 - 11) 8 (6 - 10) 8.5 (6 - 11) p = 0.978[2]	20 (15 - 24) 21 (18 - 25) 16.5 (15 - 18) p = 0.090[2]	52 (48 - 55) 53 (50,5 - 56) 53 (51 - 55) p = 0.290[2]
Number of People in the Home	< 5 ≥ 5	8 (6 - 10) 8 (6 - 11) p = 0.745[1]	20 (16 - 24) 20 (16 - 24) p = 0.745[1]	52 (49 - 56) 52 (48 - 55) p = 0.273[1]
Region of Brazil	Northeast Southeast Midwest South North	9 (6 - 11) 8 (6 - 10) 9.5 (6.5 – 11.5) 8 (5 - 10) 9 (6 - 10) p = 0.339[2]	20 (16.5 - 24) a 21 (16 - 25) a 19.5 (14 - 22) ab 15 (12 - 22) b 17 (11 - 22) b **p < 0.001**[2] ε^2= 0.03	52 (49 - 55) 52 (48 - 55) 51 (45.5 - 52,5) 53 (51 - 56) 53 (49 - 56) p = 0.244[2]
Participants from the 4 states with highest incidence of COVID-19	Yes No	8 (6 - 10) 9 (6 - 11) p = 0.239[1]	20 (15 - 25) 19.5 (14 - 23) **p = 0.009**[1] **r_{rb}** = 0.11	52 (48 - 55) 53 (49 - 56) p = 0.176[1]
City location	Capital/Metropolitan Region Countryside	8 (6 - 10) 9 (6 - 11) p = 0.154[1]	20 (15 - 24) 21 (16 - 24) p = 0.773[1]	52 (48 - 55) 53 (49 - 56) p = 0.286[1]
Year of Medical School	1-2 3-4 5-6	8 (6 - 11) 8 (6 - 10) 8 (6 - 11) p = 0.999[2]	20 (15 - 24) 20 (15 - 25) 20 (16 - 24) p = 0.999[2]	52 (48 - 55) 53 (49 - 56) 53 (49 - 56) p = 0.160[2]
Previous Diagnose of Mental Disorder	Yes No	10 (7 - 12) 8 (5 - 10) **p < 0.001**[1] **r_{rb}** = 0.29	16 (12 - 23) 16 (12 - 21) p = 0.185[1]	52 (49 - 55) 53 (48 - 56) p = 0.264[1]

Values indicated as Median (Interquartile range), level of significance. Letters a,b shows the result of multiple comparison test. Values identified by the same letter (a,b) indicate that the medians were not significantly different indicate the same medians. If two letters are listed (a,b), the median was not significantly different from medians identified by either a or b. 1 Mann-Whitney Test; 2 Kruskal-Wallis Test. The rank-biserial correlation coefficient (rrb) represents the effect size for non-parametric data when comparing in independent samples T-test. Epsilon squared (ε^2) is a measure of effect size for non-parametric ANOVA. Source: Authors.

The stress level was not higher among participants living in the four Brazilian states with the highest incidence states of COVID-19 (Table 2) compared to those of other states, which suggests that stress does not depend on the local stage of the pandemic. The level of stress did not differ depending on whether or not the participants (Mdn = 9, IQR = 5-11 vs. Mdn = 8, IQR = 6-10; Mann-Whitney, p = 0.49) or a relative of theirs (Mdn = 9, IQR = 6-11 vs. Mdn = 8, IQR = 6-10; Mann-Whitney, p = 0.21) was a suspected or confirmed case of COVID-19. The perceived stress of participants in total or partial social isolation

also did not differ from those that were not (Mdn = 8, IQR = 5-11 vs. Mdn = 8, IQR = 5-10; Mann-Whitney, p = 0.43). We found the same for students who were in direct contact with patients during the pandemic. Their level of stress did not differ from that of students who were not (Mdn = 9, IQR= 5-10 vs. Mdn = 8, IQR = 6-11, p = 0.64). Age, marital status, number of people living in their home, region of Brazil, city location, and year of medical school did not influence students' stress level ($p > 0.05$).

Participants had a moderate to a high level of spirituality and a high level of altruistic attitudes (Figure 1). Participants from the Northeast and Midwest of Brazil reported higher levels of spirituality than those from the South and Southeast of Brazil ($p < 0.001$, table 2). The spirituality of participants from the North of Brazil did not differ from the other groups of regions.

Women reported higher levels of spirituality and altruism than men ($p < 0.001$, Table 2). Participants aged 20 years and older showed higher levels of altruism than participants younger than 20 years ($p < 0.001$, table 2). Marital status, number of people in the home, living in a capital or the countryside, year of medical school had no relationship with the levels of spirituality and altruism (Table 2). Interestingly, self-reported spirituality was slightly higher among participants from the four states hardest hit by the virus (Table 2).

We found a significant correlation between spirituality and altruism ($\rho = 0.14$, $p < 0.001$, Table 3), especially the cognitive and affective dimensions of altruism ($p < 0.001$), indicating that participants with higher spirituality report more altruistic thoughts and feelings. Moreover, there was a significant negative correlation between the level of stress (PSS-4) and altruism ($\rho = -0.07$, $p = 0.025$), particularly the behavioral dimension of altruism ($p = 0.048$, Table 3).

Table 3 Correlations between Stress, Spirituality, and Altruism.

Scale	Perceived Stress Scale 4 (PSS-4)	Self-Spirituality Rating Scale (SRSS)
Self-Spirituality Rating Scale (SRSS)	$\rho = 0.03$, $p = 0.255$	-
Altruistic Attitudes Scale (total score)	$\rho = -0.07$, **$p = 0.025$**	$\rho = 0.14$, **$p < 0.001$**
Cognitive subscale	$\rho = -0.05$, $p = 0.106$	$\rho = 0.13$, **$p < 0.001$**
Affective subscale	$\rho = -0.05$, $p = 0.095$	$\rho = 0.16$, **$p < 0.001$**
Behavioral subscale	$\rho = -0.06$, **$p = 0.048$**	$\rho = 0.05$, $p = 0.107$

Spearman's rank correlation coefficient (Spearman's ρ) and significance level. Source: Authors.

4. Discussion

The COVID-19 pandemic is putting enormous stress on all of us. Altruistic behavior increases in reaction to stress (Shelly & Narang, 2018; Sparrow et al., 2019) and may be intrinsically motivated by spiritual beliefs (Huber & MacDonald, 2011). Still, it is unknown how spirituality and altruism interact in a critical collective stressful period. This study analyzed self-reported stress, spirituality, and altruism measures of 1105 Brazilian Medical students during the COVID-19 pandemic. We found moderate levels of perceived stress, moderate to high levels of spirituality, and high levels of altruistic attitudes. Participants with a previous diagnosis of mental disorder and women reported higher stress levels during the COVID-19 pandemic. There was a significant negative correlation between stress and altruism and a significant correlation between spirituality and altruism.

Being in social isolation or living in a state with a high incidence of COVID-19 did not influence the level of stress, at least at the early stage of the pandemic. The stress level was the same irrespective of being in direct contact with patients during the pandemic or being a suspected or confirmed case of COVID-19. In agreement with recent studies, medical students

were not at different stress levels if we compare groups by age range. We also did not find a difference in stress by groups of marital status and academic year, contrary to previous studies that reported higher stress among married students and those transitioning from pre-clinical and clinical years (Abdulghani et al., 2020b).

Moreover, the level of stress was also the same in the five regions of Brazil. This result suggests that the perceived stress related to the pandemic is a more general preoccupation than a local phenomenon. The only regional difference was in spirituality, which was strongest in the regions with higher religiosity, namely the Northeast and Midwest of Brazil (Moreira-Almeida et al., 2010). A recent study found that while medical students in Southern Brazil appreciate the value of spirituality in patient care, they are unfamiliar with spiritual and religious concerns in clinical practice (Esperandio et al., 2021).

Our results indicate that the mental health status before the COVID-19 pandemic influences the current stress level, higher in the group of people already monitored at a mental health service. People with mental illness seem to have more difficulty coping with the stress during the COVID-19 pandemic. A study during the COVID-19 pandemic showed that psychiatric patients were more anxious and had more negative feelings than healthy subjects (Serfaty et al., 2021). We found the same pattern reported in the general population in our investigation with medical students.

In our study, females had a higher level of stress when compared to males. Interestingly, a recent study also reported that female medical students had a higher prevalence of severe stress during the COVID-19 pandemic (Abdulghani et al., 2020b). Most epidemiological studies have demonstrated that women suffer more anxiety and depression than men (Kessler et al. 1994; Wittchen et al. 1992). Accordingly, stress is more strongly related to psychiatric symptoms in women (Sandanger et al., 2004).

A recently published Chinese study showed that female gender, student status, and poor self-rated health status were associated with a more significant psychological impact of the outbreak of COVID-19 and higher levels of stress, anxiety, and depression (Wang et al., 2020b). In our study, we found moderate levels of stress among Brazilian medical students during the pandemic. There was an inverse relationship between students' hours of study and stress level, indicating a possible scenario of the functional impact of stress during the COVID-19 pandemic. Previous research has shown that working engagement correlates negatively with perceived stress in medical students (Agarwal et al., 2020). Studying may have contributed to reducing the level of perceived stress of some students amidst the COVID-19 pandemic. Future investigations should explore this phenomenon.

We found high levels of self-reported altruistic attitudes (total sum) in medical students. The literature on the altruistic attitudes of medical students during the COVID-19 pandemic is scarce. A cross-sectional study of 274 medical students found a strong interest in volunteering in medical emergence services in case of natural disasters or infectious epidemics, altruism being the most substantial motivating factor (Gouda et al., 2020). Furthermore, a Polish study conducted during the COVID-19 pandemic showed that religious healthcare students were more likely to volunteer for altruistic reasons (Domaradzki & Walkowiak, 2021). Another study showed that altruistic behaviors are relatively infrequent among medical students, even though younger students tend to be more altruistic (Sanjai & Gopichandran, 2017). In contrast, our results show that year of medical school did not affect the level of altruism.

Among the diverse perspectives for understanding the altruistic attitude, Rosenberg and colleagues separate three components of altruism (Rosenberg et al., 1960). The cognitive component corresponds to what people think of an altruistic attitude; the affective component, to how they feel about altruism; the behavioral component, to their commitment to altruistic behavior. Looking at the cognitive, affective, and behavioral aspects of the Altruistic Attitudes Scale, we found that spirituality correlated positively with the cognitive and affective subscales, while stress correlated negatively with the behavioral subscale. This suggests that spirituality and the cognitive and affective aspects of altruism may have more in common than we know, but only altruistic behavior is inversely related to stress. More research on that is needed.

Altruism seems to mediate the relationship between spirituality and perceived stress. Renowned authors such as Freud and Skinner postulated a positive relationship between religiosity/spirituality and altruism. However, it has never been clear whether spiritual values translate into altruistic behaviors (Saroglou, 2013). Huber and MacDonald investigated the relationship between altruism and spirituality in university students. They found a direct positive relationship between spiritual experiences and altruism (Huber & MacDonald, 2011). Here we also observed a positive correlation between spirituality and altruism. Spirituality correlated positively with altruistic thoughts and emotions, but not with altruistic behavior, which suggests a more cognitive impact of spirituality on altruism, that not necessarily leads to altruistic behavior.

In the present study, women reported more spirituality than men, witch parallels with previous (Dillon et al., 2003; Maselko & Kubzansky, 2006). Medical students turn to religion and spirituality to deal with the stress of medical school, make clinical decisions, resolve unexplained events, and practice patient-centered care (Ray & Wyatt, 2018). Since spiritual, religious, and existential concerns gain relevance to students as they search for meaning and purpose in their lives (Avila 2010; Krägeloh et al. 2015).

5. Conclusion

Our results identified moderate levels of perceived stress, moderate to high levels of spirituality, and high levels of altruistic attitudes. There were no regional differences in the stress level, which did not depend on the local incidence of COVID-19 or participants' social isolation at that pandemic stage. Participants with a previous mental disorder diagnosis and women were more vulnerable to stress during the COVID-19 pandemic. We found a significant correlation between spirituality and altruism, especially between spirituality and altruistic thoughts and feelings. The correlation between stress and behavioral altruism suggest that altruism may allow for collective coping of emotional burden during a health crisis.

We propose that future research explore the possible casual influence of spirituality on altruism and altruism on perceived stress by tracking outcomes over a prolonged period.

References

Abdulghani, H. M., Sattar, K., Ahmad, T., & Akram, A. (2020a). Association of COVID-19 Pandemic with undergraduate Medical Students' Perceived Stress and Coping. *Psychology Research and Behavior Management*, *13*, 871–881. https://doi.org/10.2147/PRBM.S276938

Abdulghani, H. M., Sattar, K., Ahmad, T., & Akram, A. (2020b). Association of COVID-19 Pandemic with undergraduate Medical Students' Perceived Stress and Coping. *Psychology Research and Behavior Management*, *13*, 871–881. https://doi.org/10.2147/PRBM.S276938

Agarwal, G., Mosquera, M., Ring, M., & Victorson, D. (2020). Work engagement in medical students: An exploratory analysis of the relationship between engagement, burnout, perceived stress, lifestyle factors, and medical student attitudes. *Medical Teacher*, *42*(3), 299–305. https://doi.org/10.1080/0142159X.2019.1679746

Andreou, E., Alexopoulos, E. C., Lionis, C., Varvogli, L., Gnardellis, C., Chrousos, G. P., & Darviri, C. (2011a). Perceived Stress Scale: Reliability and Validity Study in Greece. *International Journal of Environmental Research and Public Health*, *8*(8), 3287–3298. https://doi.org/10.3390/ijerph8083287

Andreou, E., Alexopoulos, E. C., Lionis, C., Varvogli, L., Gnardellis, C., Chrousos, G. P., & Darviri, C. (2011b). Perceived Stress Scale: Reliability and Validity Study in Greece. *International Journal of Environmental Research and Public Health*, *8*(8), 3287–3298. https://doi.org/10.3390/ijerph8083287

Aten, J. D., O'Grady, K. A., Milstein, G., Boan, D., & Schruba, A. (2014). Spiritually oriented disaster psychology. *Spirituality in Clinical Practice*, *1*(1), 20–28. https://doi.org/10.1037/scp0000008

Avila, L. (2010). Avaliação da espiritualidade e religiosidade dos estudantes de medicina e implicações frente a sua formação médica. *Arquivo de Ciencias Da Saúde*, *v. 17*.

Bensley, R. J. (1991). Defining Spiritual Health: A Review of the Literature. *Journal of Health Education*, *22*(5), 287–290. https://doi.org/10.1080/10556699.1991.10614636

Bormann, J. E., Smith, T. L., Becker, S., Gershwin, M., Pada, L., Grudzinski, A. H., & Nurmi, E. A. (2005). Efficacy of frequent mantram repetition on stress, quality of life, and spiritual well-being in veterans: a pilot study. *Journal of Holistic Nursing: Official Journal of the American Holistic Nurses'Association*, *23*(4), 395–414. https://doi.org/10.1177/0898010105278929

Byrne, A., Barber, R., & Lim, C. H. (2021). Impact of the COVID-19 pandemic – a mental health service perspective. *Progress in Neurology and Psychiatry*, *25*(2), 27–33b. https://doi.org/https://doi.org/10.1002/pnp.708

Cohen, S. (1988). Perceived stress in a probability sample of the United States. In *The social psychology of health.* (pp. 31–67). Sage Publications, Inc.

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In: Spacapan S and Oskamp S (eds). *The Social Psychology of Health.*, 31–68.

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, *98*(2), 310–357.

Dillon, M., Wink, P., & Fay, K. (2003). Is Spirituality Detrimental to Generativity? *Journal for the Scientific Study of Religion*, *42*(3), 427–442. https://doi.org/10.1111/1468-5906.00192

Domaradzki, J., & Walkowiak, D. (2021). Does Religion Influence the Motivations of Future Healthcare Professionals to Volunteer During the COVID-19 Pandemic in Poland? An Exploratory Study. *Journal of Religion and Health*, *60*(3), 1507–1520. https://doi.org/10.1007/s10943-021-01231-8

Esperandio, M. R. G., de Souza, Y. Q., Nadalin, O., & Hefti, R. (2021). Spirituality in Clinical Practice: The Perspective of Brazilian Medical Students. *Journal of Religion and Health*, *60*(3), 2154–2169. https://doi.org/10.1007/s10943-020-01141-1

Faro, A. (2015). Confirmatory factor analysis of three versions of the perceived stress scale (PSS): A population-based study. *Psicologia: Reflexao e Critica*, *28*(1), 21–30. https://doi.org/10.1590/1678-7153.201528103

Fehr, E., & Fischbacher, U. (2003). The nature of human altruism. *Nature*, *425*(6960), 785–791. https://doi.org/10.1038/nature02043

Fekih-Romdhane, F., & Cheour, M. (2021). Psychological Distress Among a Tunisian Community Sample During the COVID-19 Pandemic: Correlations with Religious Coping. *Journal of Religion and Health*, *60*(3), 1446–1461. https://doi.org/10.1007/s10943-021-01230-9

Filkowski, M. M., Cochran, R. N., & Haas, B. W. (2016). Altruistic behavior: mapping responses in the brain. *Neuroscience and Neuroeconomics*, *5*, 65–75. https://doi.org/10.2147/NAN.S87718

Galanter, M., Dermatis, H., Bunt, G., Williams, C., Trujillo, M., & Steinke, P. (2007). Assessment of spirituality and its relevance to addiction treatment. *Journal of Substance Abuse Treatment*, *33*(3), 257–264. https://doi.org/10.1016/j.jsat.2006.06.014

Gonçalves, A. M. de S., & Pillon, S. C. (2009a). Adaptação transcultural e avaliação da consistência interna da versão em português da Spirituality Self Rating Scale (SSRS). *Archives of Clinical Psychiatry (São Paulo)*, *36*(1), 10–15. https://doi.org/10.1590/S0101-60832009000100002

Gonçalves, A. M. de S., & Pillon, S. C. (2009b). Adaptação transcultural e avaliação da consistência interna da versão em português da Spirituality Self Rating Scale (SSRS). *Archives of Clinical Psychiatry (São Paulo)*, *36*(1), 10–15. https://doi.org/10.1590/S0101-60832009000100002

Gonçalves, J. P. B., Lucchetti, G., Menezes, P. R., & Vallada, H. (2015). Religious and spiritual interventions in mental health care: a systematic review and meta-analysis of randomized controlled clinical trials. *Psychological Medicine*, *45*(14), 2937–2949. https://doi.org/10.1017/S0033291715001166

Gonçalves, L. M., Tsuge, M. L. T., Borghi, V. S., Miranda, F. P., Sales, A. P. de A., Lucchetti, A. L. G., & Lucchetti, G. (2018). Spirituality, Religiosity, Quality of Life and Mental Health Among Pantaneiros: A Study Involving a Vulnerable Population in Pantanal Wetlands, Brazil. *Journal of Religion and Health*, *57*(6), 2431–2443. https://doi.org/10.1007/s10943-018-0681-4

Gouda, P., Kirk, A., Sweeney, A.-M., & O'Donovan, D. (2020). Attitudes of Medical Students Toward Volunteering in Emergency Situations. *Disaster Medicine and Public Health Preparedness*, *14*(3), 308–311. https://doi.org/10.1017/dmp.2019.81

Guo, A. A., Crum, M. A., & Fowler, L. A. (2021). Assessing the Psychological Impacts of COVID-19 in Undergraduate Medical Students. *International Journal of Environmental Research and Public Health*, *18*(6). https://doi.org/10.3390/ijerph18062952

Hall, R. C. W., Hall, R. C. W., & Chapman, M. J. (2008). The 1995 Kikwit Ebola outbreak: lessons hospitals and physicians can apply to future viral epidemics. *General Hospital Psychiatry*, *30*(5), 446–452. https://doi.org/10.1016/j.genhosppsych.2008.05.003

Huber, J. T., & MacDonald, D. A. (2011). An Investigation of the Relations Between Altruism, Empathy, and Spirituality. *Journal of Humanistic Psychology*, *52*(2), 206–221. https://doi.org/10.1177/0022167811399442

Ingram, P. B. 4th, Clarke, E., & Lichtenberg, J. W. (2016a). Confirmatory Factor Analysis of the Perceived Stress Scale-4 in a Community Sample. *Stress and Health: Journal of the International Society for the Investigation of Stress*, *32*(2), 173–176. https://doi.org/10.1002/smi.2592

Ingram, P. B. 4th, Clarke, E., & Lichtenberg, J. W. (2016b). Confirmatory Factor Analysis of the Perceived Stress Scale-4 in a Community Sample. *Stress and Health: Journal of the International Society for the Investigation of Stress*, *32*(2), 173–176. https://doi.org/10.1002/smi.2592

Jung, C. G. (1969). *Psychology and religion: West and east (2nd ed.). The collected works of C. G. Jung, Vol.11*.

Kessler, R. C., McGonagle, K. A., Zhao, S., Nelson, C. B., Hughes, M., Eshleman, S., Wittchen, H. U., & Kendler, K. S. (1994). Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. Results from the National Comorbidity Survey. *Archives of General Psychiatry*, *51*(1), 8–19. https://doi.org/10.1001/archpsyc.1994.03950010008002

Krägeloh, C. U., Henning, M. A., Billington, R., & Hawken, S. J. (2015). The relationship between quality of life and spirituality, religiousness, and personal beliefs of medical students. *Academic Psychiatry: The Journal of the American Association of Directors of Psychiatric Residency Training and the Association for Academic Psychiatry*, *39*(1), 85–89. https://doi.org/10.1007/s40596-014-0158-z

Lancet, T. (2020). COVID-19: learning from experience. In *Lancet (London, England)* (Vol. 395, Issue 10229, p. 1011). https://doi.org/10.1016/S0140-6736(20)30686-3

Lazarus, R. S. (1993). From psychological stress to the emotions: a history of changing outlooks. *Annual Review of Psychology*, *44*, 1–21. https://doi.org/10.1146/annurev.ps.44.020193.000245

Loureiro, A., & Lima, M. L. (2013a). Escala de atitudes altruístas: Estudo de validação e fiabilidade. *Laboratório de Psicologia*, *7*(1), 73–83. https://doi.org/10.14417/lp.687

Loureiro, A., & Lima, M. L. (2013b). Escala de atitudes altruístas: Estudo de validação e fiabilidade. *Laboratório de Psicologia*, *7*(1), 73–83. https://doi.org/10.14417/lp.687

MacDonald, D. A., Friedman, H. L., Brewczynski, J., Holland, D., Salagame, K. K. K., Mohan, K. K., Gubrij, Z. O., & Cheong, H. W. (2015). Spirituality as a scientific construct: testing its universality across cultures and languages. *PloS One*, *10*(3), e0117701. https://doi.org/10.1371/journal.pone.0117701

Mahamid, F. A., & Bdier, D. (2021). The Association Between Positive Religious Coping, Perceived Stress, and Depressive Symptoms During the Spread of Coronavirus (COVID-19) Among a Sample of Adults in Palestine: Across Sectional Study. *Journal of Religion and Health*, *60*(1), 34–49. https://doi.org/10.1007/s10943-020-01121-5

Maselko, J., & Kubzansky, L. D. (2006). Gender differences in religious practices, spiritual experiences and health: results from the US General Social Survey. *Social Science & Medicine (1982)*, *62*(11), 2848–2860. https://doi.org/10.1016/j.socscimed.2005.11.008

Michalsen, A., Grossman, P., Acil, A., Langhorst, J., Lüdtke, R., Esch, T., Stefano, G. B., & Dobos, G. J. (2005). Rapid stress reduction and anxiolysis among distressed women as a consequence of a three-month intensive yoga program. *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research*, *11*(12), CR555-561.

Moreira-Almeida, A., Pinsky, I., Zaleski, M., & Laranjeira, R. (2010). Envolvimento religioso e fatores sociodemográficos: resultados de um levantamento nacional no Brasil. *Archives of Clinical Psychiatry (São Paulo)*, *37*(1), 12–15. https://doi.org/10.1590/S0101-60832010000100003

Nguyen, H. T., Do, B. N., Pham, K. M., Kim, G. B., Dam, H. T. B., Nguyen, T. T., Nguyen, T. T. P., Nguyen, Y. H., Sørensen, K., Pleasant, A., & Duong, T. Van. (2020). Fear of COVID-19 Scale-Associations of Its Scores with Health Literacy and Health-Related Behaviors among Medical Students. *International Journal of Environmental Research and Public Health*, *17*(11). https://doi.org/10.3390/ijerph17114164

Pan American Health Organization. (2006). Protecting Mental Health During Epidemics. In *Pan American Health Organization* (p. 20).

Pollner, M. (1989). Divine relations, social relations, and well-being. In *Journal of Health and Social Behavior* (Vol. 30, Issue 1, pp. 92–104). American Sociological Assn. https://doi.org/10.2307/2136915

Post, S. G. (2005). Altruism, happiness, and health: it's good to be good. *International Journal of Behavioral Medicine*, *12*(2), 66–77. https://doi.org/10.1207/s15327558ijbm1202_4

Ray, C., & Wyatt, T. R. (2018). Religion and Spirituality as a Cultural Asset in Medical Students. *Journal of Religion and Health*, *57*(3), 1062–1073. https://doi.org/10.1007/s10943-017-0553-3

Rosenberg, M. J., Hovland, C. I., McGuire, W. J., Abelson, R. P., & Brehm, J. W. (1960). Attitude organization and change: An analysis of consistency among attitude components. (Yales studies in attitude and communication.), Vol. III. In *Attitude organization and change: An analysis of consistency among attitude components. (Yales studies in attitude and communication.), Vol. III*. Yale Univer. Press.

Ruisoto, P., López-Guerra, V. M., Paladines, M. B., Vaca, S. L., & Cacho, R. (2020a). Psychometric properties of the three versions of the Perceived Stress Scale in Ecuador. *Physiology & Behavior*, *224*, 113045. https://doi.org/10.1016/j.physbeh.2020.113045

Ruisoto, P., López-Guerra, V. M., Paladines, M. B., Vaca, S. L., & Cacho, R. (2020b). Psychometric properties of the three versions of the Perceived Stress Scale in Ecuador. *Physiology & Behavior*, *224*, 113045. https://doi.org/10.1016/j.physbeh.2020.113045

Sandanger, I., Nygård, J. F., Sørensen, T., & Moum, T. (2004). Is women's mental health more susceptible than men's to the influence of surrounding stress? *Social Psychiatry and Psychiatric Epidemiology*, *39*(3), 177–184. https://doi.org/10.1007/s00127-004-0728-6

Sanjai, S., & Gopichandran, V. (2017). Selfless giving in medicine: a study of altruistic attitudes among medical students. *Indian Journal of Medical Ethics*, *3*(1), 28–34. https://doi.org/10.20529/IJME.2017.082

Saroglou, V. (2013). Religion, spirituality, and altruism. In *APA handbook of psychology, religion, and spirituality (Vol 1): Context, theory, and research.* (pp. 439–457). American Psychological Association. https://doi.org/10.1037/14045-024

Serfaty, D. R., Lugasi, T., & Strous, R. D. (2021). Anxiety Reactions and Coping Modalities with the COVID-19 Pandemic: A Cross-Sectional Study Comparing a Population of Religious Patients with Mental Illness and their Health Caregivers. *Journal of Religion and Health*, *60*(3), 1494–1506. https://doi.org/10.1007/s10943-021-01219-4

Shelly, & Narang, R. (2018). Effects of Gender and Stress on Altruism. *The International Journal of Indian Psychology*, *6*(2), 1–8. https://doi.org/10.25215/0602.037

Sparrow, E. P., Armstrong, B. A., Fiocco, A. J., & Spaniol, J. (2019). Acute stress and altruism in younger and older adults. *Psychoneuroendocrinology*, *100*, 10–17. https://doi.org/https://doi.org/10.1016/j.psyneuen.2018.09.025

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020a). Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. *International Journal of Environmental Research and Public Health*, *17*(5). https://doi.org/10.3390/ijerph17051729

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020b). Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. *International Journal of Environmental Research and Public Health*, *17*(5). https://doi.org/10.3390/ijerph17051729

Warttig, S. L., Forshaw, M. J., South, J., & White, A. K. (2013). New, normative, English-sample data for the Short Form Perceived Stress Scale (PSS-4). *Journal of Health Psychology*, *18*(12), 1617–1628. https://doi.org/10.1177/1359105313508346

Wittchen, H. U., Essau, C. A., von Zerssen, D., Krieg, J. C., & Zaudig, M. (1992). Lifetime and six-month prevalence of mental disorders in the Munich Follow-Up Study. *European Archives of Psychiatry and Clinical Neuroscience*, *241*(4), 247–258. https://doi.org/10.1007/bf02190261

Ye, B., Wu, D., Im, H., Liu, M., Wang, X., & Yang, Q. (2020). Stressors of COVID-19 and stress consequences: The mediating role of rumination and the moderating role of psychological support. *Children and Youth Services Review*, *118*, 105466. https://doi.org/10.1016/j.childyouth.2020.105466

Zandifar, A., Badrfam, R., Yazdani, S., Arzaghi, S. M., Rahimi, F., Ghasemi, S., Khamisabadi, S., Mohammadian Khonsari, N., & Qorbani, M. (2020). Prevalence and severity of depression, anxiety, stress and perceived stress in hospitalized patients with COVID-19. *Journal of Diabetes and Metabolic Disorders*, *19*(2), 1–8. https://doi.org/10.1007/s40200-020-00667-1

Zerbetto, S. R., Gonçalves, A. M. de S., Santile, N., Galera, S. A. F., Acorinte, A. C., & Giovannetti, G. (2017). Religiosity and spirituality: mechanisms of positive influence on the life and treatment of alcoholics. *Escola Anna Nery - Revista de Enfermagem*, *21*(1). https://doi.org/10.5935/1414-8145.20170005