

Research Paper

Relationship Between Hardiness and Stress of COVID-19 Through the Mediating Role of Mindfulness in Iranian Students



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Citation Nooripour, R., Hosseinian, S., Farmani, F., Abtahi Foroshani, N., Ghanbari, N., Farkhojasteh, V. S., et al. (2022). Relationship Between Hardiness and Stress of COVID-19 Through the Mediating Role of Mindfulness in Iranian Students. *Journal of Practice in Clinical Psychology*, 10(3), 193-202. <https://doi.org/10.32598/jpcp.10.3.288.7>

doi <https://doi.org/10.32598/jpcp.10.3.288.7>

**Article info:**

Received: 22 Jan 2022

Accepted: 19 Jun 2022

Available Online: 01 Jul 2022

Keywords:

Mindfulness, Stress of COVID-19, Hardiness, Students, Iran

ABSTRACT

Objective: Some stressors, such as COVID-19, can cause anxiety and health concerns. The present study aimed to investigate the relationship between hardiness and stress of COVID-19 by mediating the role of mindfulness in Iranian students.

Methods: We conducted cross-sectional research for this study. Data were gathered from the student populations of 2020-2021, which comprised the statistical population. A convenience sampling method was used to select the participants based on the information obtained from online self-report tools. Students from Iranian universities were asked to participate in an online survey using Internet advertisements, e-mails, forums, social networks, and short message services. Participants were 414 university students. All respondents completed the mindful attention awareness scale, the COVID-19 stress scale, and the personal views survey. We carried out an analysis of the data based on independent t-tests, Pearson correlations, as well as regression tests.

Results: It was found that there was a significant correlation between all variables and COVID-19 stress levels. It is worth noting that most of these correlations were in a moderate range. Structural equation modeling showed the overall effects of hardiness on the stress of COVID-19 ($\beta=-0.536$, $P=0.001$), the indirect effects ($\beta=-0.177$, $P=0.002$), and the direct effects of hardiness on the stress of COVID-19 ($\beta=-0.365$, $P=0.009$) were significant.

Conclusion: Considering these findings, we have clarified the role of mindfulness in affecting the hardiness and stress of COVID-19 among Iranian students. This study recommends implementing virtual and electronic mindfulness training workshops to reduce the stress associated with COVID-19 and increase psychological hardiness using these tools.

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Highlights

- The overall effects of hardiness on stress from COVID-19, indirect effects, and direct effects of hardiness on stress of COVID-19 were significant.
- Correlation between hardiness and mindfulness and Stress of COVID-19 were significant.
- It is worth noting that most of these correlations were in a moderate range.
- This study also revealed that mindfulness was negatively correlated with stress.
- The lower the hardiness, the greater the evaluation of the negative aspects of coronavirus.

Plain Language Summary

Students who perceive the COVID-19 outbreak as threatening their lives may experience adverse reactions such as stress. According to the results of this study, students can strengthen their mindfulness and hardiness during a pandemic. During Coronavirus outbreaks, students who exhibit high levels of mindfulness can focus solely on their own needs and those around them and respond with inner peace. In this regard, it is recommended to implement virtual or electronic mindfulness training workshops to reduce stress caused by COVID-19 and increase psychological hardiness to minimize the effects of stress. Thus, training programs such as mindfulness to promote mental health may help reduce the stress of COVID-19 in university students.

1. Introduction

C COVID-19 is an infectious respiratory disease caused by a virus closely related to the SARS coronavirus. The widespread prevalence of pandemics has increased the stress of COVID-19 among people (Zerbo et al., 2022). The coronavirus epidemic is also widespread in Iran and threatens people's physical and mental health. Stress is a common symptom in people during a coronavirus epidemic, which negatively affects health and quality of life by weakening the immune system. Huang et al. (2020) showed that coronavirus increases negative emotions such as anxiety and stress.

Stress is a psychological condition that almost all people experience throughout their lives. However, it is a mental disorder that is out of balance (Nooripour, et al., 2021). Stress refers to vague, excessive, and uncontrollable anxiety associated with physical symptoms without the presence of specific objects, stimuli, and situations. The stress of COVID-19 means tension due to infection with coronavirus, often due to anonymity and cognitive ambiguity (Nooripour, et al., 2021).

Duan, et al., (2020) claimed that psychological problems such as anxiety and stress increased significantly during the COVID virus outbreak. Some stressors like COVID-19 can cause stress and health problems. Stress-related factors in-

clude health concerns and psychological hardiness. It is possible to consider a person's hardiness as one of the variables that can mitigate the negative effects of stress. Hardiness is a personality style that helps individuals cope with stressful circumstances, withstand them, and actively engage in transformational coping (Maddi, 2004) each decision involves choosing a future, unfamiliar path, or repeating a past, familiar path. Although choosing the future is most consistent with continuing to elaborate life's meaning, it also brings ontological anxiety, as expressed in fear of uncertainty and possible failure. Consequently, existentialists believe that to choose the future regularly requires courage. Without courage, one may choose the past regularly, which stagnates the quest for meaning. Hardiness, comprised of the attitudes of commitment (vs. alienation). Hardiness can mitigate the negative effects of stress and protect against illness by dampening the negative effects of stress (Maddi et al., 2006).

Reknes, Harris, and Einarsen (2018) showed that stress had a significantly negative relationship with hardiness. Bartone and Bowles (2020) reported that stress and physical symptoms had a significant negative association with hardiness, supported by another study. The correlation between psychological hardiness and mental health is statistically significant; furthermore, studies show that psychological hardiness can reduce the negative symptoms associated with stress and improve mental health in general (Abdollahi, et al., 2017).

Mindfulness has been identified as one of the most important factors affecting people's mental health during the COVID-19 outbreaks (Belen, 2022). Mindfulness lets people face instantaneous situations immediately and without bias by consciously arising from focused attention (Malboeuf-Hurtubise et al., 2021). During the coronavirus epidemic, mindfulness helped people be aware of conditions and respond more effectively to stresses (Vos, et al., 2021). In this context, Saricali, et al., (2022) showed that people with low mindfulness and humor experienced more frustration and stress during COVID-19. In another study, Conversano et al. (2020) showed that mindfulness was found to reduce the severity of stress and tension symptoms of the coronavirus epidemic.

Due to the spread of coronavirus in many countries, including Iran, and the stress caused by the disease, the immune system is weakened, and coronavirus causes much stress due to its unknown nature. Therefore, COVID-19 stress can be reduced by identifying and utilizing related factors. By examining the mediating role of mindfulness in Iranian students, this study examined the relationship between hardiness and stress of COVID-19.

2. Participants and Methods

Study design

The research has been designed as a cross-sectional study to collect data. The STROBE (Strengthening The Reporting of Observational Studies in Epidemiology) checklist for cross-sectional studies was followed as a means of improving the methodological rigor of the study. It is worth noting that in 2020-2021, the statistical population consisted of university students. Using online self-report tools, convenience sampling was used to select participants based on their responses to the online questionnaire. The Iranian university students were invited to participate in an online survey using advertisements on the Internet, e-mails, forums, and social networking sites to participate in the survey. Participants in this program should read, write, and understand Farsi, and they live in Iran. They participated voluntarily in the program. As the test was self-administered, the participants could review their responses before taking it; therefore, they could confirm that the answers they provided were accurate before taking it.

Study participants

It was necessary to enroll in a university and have student status to be eligible for the program. Among the exclusion criteria is a lack of cooperation and dissatisfaction on the part of students participating in the research. This condition is caused by major stressful events like the death of a loved one, incurable diseases for themselves or their families, mental illness, or taking psychotic medication. To invite students from Iranian universities, we used email and social media platforms (such as Internet advertisements, e-mails, forums, and social media sites) as communication channels. Four hundred and fourteen (N=414) students answered the questions; 132 males (31.88%), 233 females (56.28%), and 49 students (11.83%) did not answer the questions. Participants' age ranged from 18 to 40 years, with a mean of 23.19 and a standard deviation of 4.15 years (Figure 1).

Regarding marital status, 75.3% of the participants were single, and 24.7% were married. In addition, 380 participants (91.78%) had a person with COVID-19 around them, and 34 (8.8%) did not have someone with COVID-19 around them. To begin with, the researchers conducted a discussion with the research units and participants regarding the purpose of the study. They were assured that the study would be conducted confidentially in accordance with the ethical requirements of the study. The participants were not required to write their names in the study, and their participation in the study was completely voluntary.

Study measures

Demographics

This study analyzed participants' sociodemographic characteristics, including their education level, gender, and age.

Mindful attention awareness scale (MAAS)

The mindful attention awareness scale (MAAS) consists of 15 items scored on a 6-point Likert scale ranging from 1 (almost always) to 6 (almost never) (Brown & Ryan, 2003). There is a range of total scores from 15 to 90, with higher scores indicating higher levels of mindfulness. In the survey, respondents are asked to read every item and report their daily life experiences. As for the Cronbach alpha, it was reported to be 0.90 in Iran (Ghorbani, Watson, & Weathington, 2009). We used the Farsi version, which has excellent internal consistency (Cronbach alpha=0.76).

COVID-19 stress scale (CSS)

COVID-19 stress scale (CSS) is a 7-item scale developed by Nooripour et al. in 2022. This scale is on a 5-point Likert-type scale (strongly agree=5, agree=4, neither agree nor disagree=3, disagree=2, and strongly disagree=1). The minimum score for each item is one, and the maximum score is five. Using the item scores (ranging from 7 to 35), a total score has been calculated, and a higher score indicates greater stress associated with COVID-19 and vice versa. Based on the findings of Nooripour et al. (2022), the internal consistency ($\alpha=0.84$) was appropriate. Moreover, they conducted a confirmatory factor analysis (CFA) that resulted in statistically significant factor loadings for all the items, and the results were deemed acceptable. As a result of the CFA analysis, it was found that the single-factor structure provided a good fit to the data: $\chi^2=27.52$ ($P=0.01$), the standardized root mean square residual =0.022, the comparative fit index=1.0, the normed fit index=0.99, the incremental fit index=1.0, the ratio frequency interference=0.99, the goodness of fit index=0.96, and the root mean square error of approximation=0.050. As a result, the scale has excellent reliability (Cronbach alpha of over 0.79 in the present study).

Personal views survey

There are 18 items in the personal views survey that are used to measure the three components of hardiness: commitment, control, and challenge (Maddi et al., 2006). Using a 4-point Likert scale, 0 means the statement is not true at all; 1 means it is somewhat true; 2 means it is true; 3 means it is very true. In a previous study (Maddi et al., 2006), an acceptable internal consistency score (α) was reported as 0.70 for commitment, 0.84 for control, 0.71 for the challenge, and 0.88 for total hardiness. Based on the results of the present study, the Cronbach alpha values for the components of commitment, control, and challenge were 0.69, 0.71, and 0.81, respectively.

Statistical analyses

To investigate any differences or similarities between those scales for women and men, we performed t test and calculated correlations based on the different scales. To investigate whether mindfulness can act as a mediator in the relationship between hardiness and stress in COVID-19, a bootstrapping procedure was employed to determine whether mindfulness can act as a mediator in the relationship between hardiness and stress in COVID-19. The indirect effects of mindfulness on COVID-19 stress are being tested using a bootstrap resampling method, which uses a 2000 bootstrap sample size, and the potential mediating variables have been used to examine the indirect effects of mindfulness. For the indirect effects, based on the output of the model, a 95% confidence interval was provided. This accounts for all other variables that may have influenced the indirect effects. Consequently, it can be concluded that the independent variable (hardiness) has a mediated effect on the dependent variable (stress of COVID-19) via the proposed mediators (mindfulness).

3. Results

Table 1 presents the correlation between the variables included in the study, which can be used to draw several conclusions. There was a significant correlation between all the variables and the stress level of COVID-19. A moderate correlation was found between the stress of COVID-19 and hardiness, mindfulness, and hardiness. More importantly, there was a significant relationship between hardiness and mindfulness ($r=-0.617$, $P>0.001$) and a significant relationship between hardiness and hardiness ($r=-0.417$, $P>0.001$).

Mediating role of mindfulness

The results of the mediation analyses are shown in Table 2. The overall effects of hardiness on stress from COVID-19 ($\beta=-0.536$, $P=0.001$), indirect effects ($\beta=-0.177$, $P=0.002$), and direct effects of hardiness on stress of COVID-19 ($\beta=-0.365$, $P=0.009$) were significant.

Table 1. Matrix correlations among all variables

Variables	Mean±SD	COVID-19 Stress	Hardiness	Mindfulness
Stress of COVID-19	11.83±4.90	1		
Hardiness	25.19±5.85	-0.537**	1	
Mindfulness	58.98±9.67	-0.386**	0.417**	1

** $P<0.01$

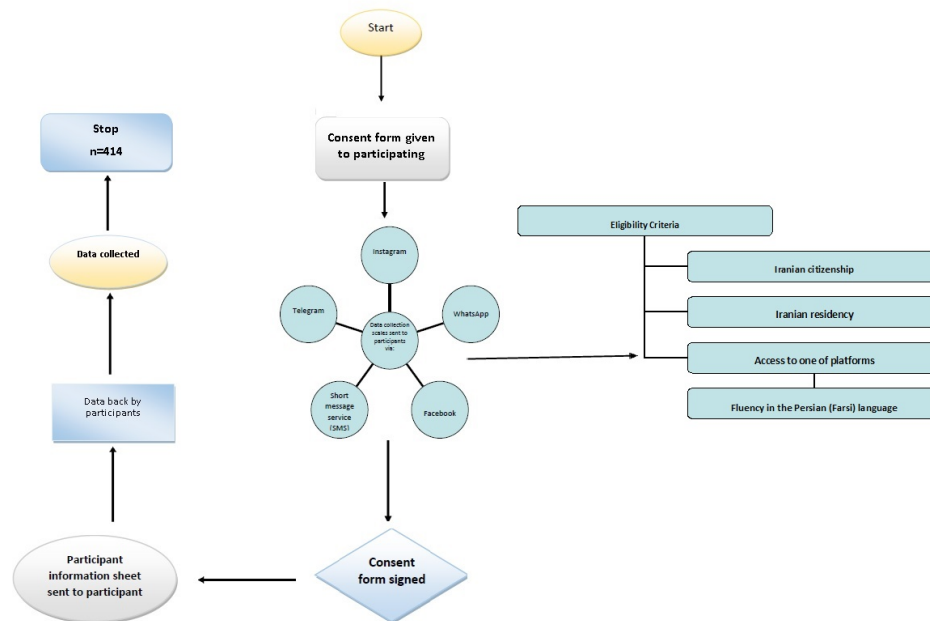


Figure 1. Sampling procedure

The standardized estimate between hardiness and mindfulness was 0.22, hardiness with COVID-19 stress was -0.18, and the standardized estimate for mindfulness with COVID-19 stress was -0.39. The Independent t test for comparison between male and female participants showed that there was no significant difference between males (11.45 ± 4.75) and females (12.17 ± 5.012) ($t_{398} = 1.48, P = 0.138$) in COVID-19 Stress (Figure 2). Also, there was not a significant difference between single (12.36 ± 5.02) and married participants (11.57 ± 4.82) ($t_{398} = 1.52, P = 0.129$) (Figure 2).

4. Discussion

This study aimed to examine the relationship between hardiness and stress from COVID-19 through the mediating role of mindfulness among university students. We found that mindfulness played a mediating role in the relationship between stress from COVID-19 and hardiness in Iranian students.

As a result, we found a significant negative correlation between hardiness and stress in COVID-19. The findings of this study are in line with those of previous stud-

ies (Barzilay et al., 2020; Yildirim & Arslan, 2020). In coping with stressful life events, a high hardiness level can provide people with excellent odds to cope with them. It is also believed that hardiness is beneficial in reducing epidemic stress as it allows people to control their anxiety and their irrational thoughts by having the ability to control them (Vagni, et al., 2020).

Hardiness plays an important role in responding to the threat posed by COVID-19 (Scarinci et al., 2021), as well as adapting to the stressful conditions associated with COVID-19. It has been observed in previous studies that the lower the hardiness, the greater the negative perception of coronaviruses (Harper, et al., 2021), and the lower the hardiness, the greater the evaluation of the negative aspects of coronavirus (Dymecka, et al., 2021). Hardiness makes people confident that they can protect themselves from infection during an epidemic or cope if they become infected; therefore, hardiness helps people cope better with the stress of coronavirus (Maddi, 2004) each decision involves choosing a future, unfamiliar path, or repeating a past, familiar path. Although choosing the future is most consistent with continuing to elaborate life's meaning, it also brings ontological anxiety, as expressed

Table 2. Results of the bootstrapping analyses testing mindfulness as mediators between hardiness and COVID-19 stress

Variable	Total Effect	Indirect Effect	Direct Effect	
Hardiness	-0.536**	-0.177 (0.002)	-0.365 (0.009)	Partial Mediation

** P<0.01

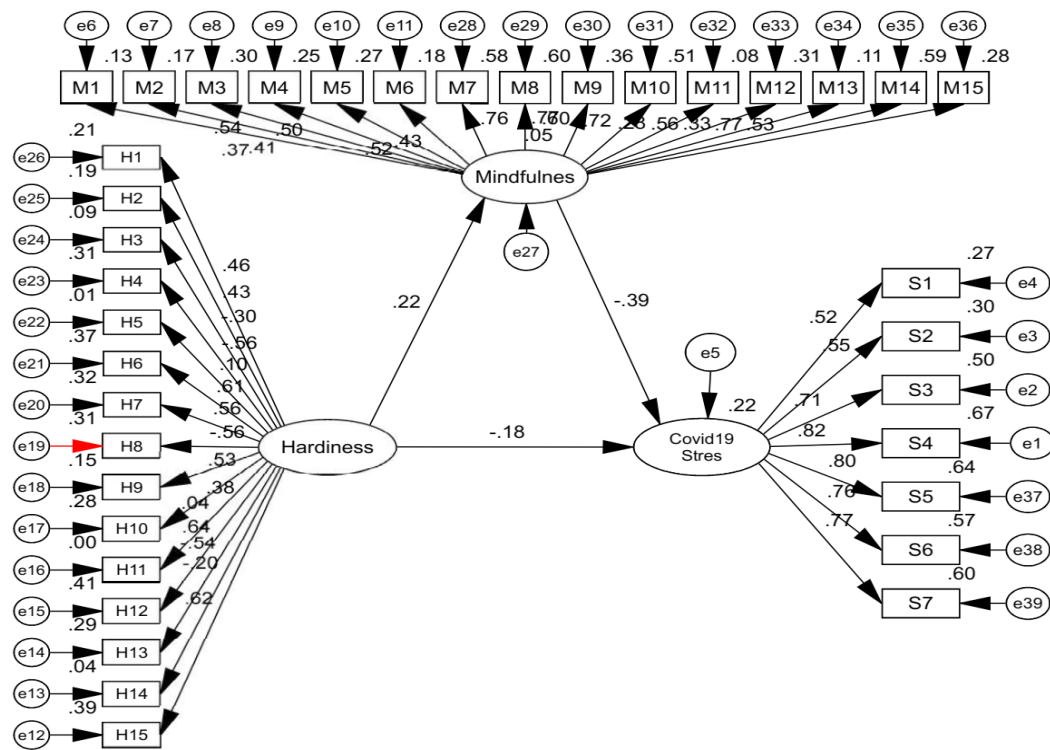


Figure 2. Mediating role of mindfulness between hardiness and stress of COVID-19

in fear of uncertainty and possible failure. Consequently, existentialists believe that to choose the future regularly requires courage. Without courage, one may choose the past regularly, which stagnates the quest for meaning. Hardiness, comprised of the attitudes of commitment (vs. alienation. Hardiness also makes people less likely to experience the negative consequences of an epidemic in the form of stress and anxiety and to evaluate their lives satisfactorily despite challenging situations because people with hardiness adapt more quickly in the face of difficult situations in epidemics.

Moreover, this study also revealed that mindfulness was negatively correlated with stress. This result is consistent with the investigations of Antonova, et al., (2021) and Conversano et al. (2020). Also, the relationship between stress of COVID-19 and mindfulness can be explained by the fact that mindfulness pays attention to the development of three qualities: refraining from judgment, intentional awareness, and focusing on the present moment (Yalçın, et al., 2022). Therefore, it processes all aspects of direct experience, including cognitive, physiological, or behavioral activities, thus increasing a person's awareness of their daily activities. Mindfulness leads to an instantaneous understanding of thoughts, feelings, and physical states, freeing the person from daily issues and an automatic mind focused on the past and future. Mindfulness increases physical control and

body awareness, improving biological mechanisms and self-care (Hartstone & Medvedev, 2021).

High levels of mindfulness during coronavirus outbreaks help students focus only on what is happening to themselves and those around them and face the situation with inner peace (Benfer, et al., 2019). Mindfulness increases awareness of the body and emotions, which is of utmost importance in critical situations, such as the COVID-19 pandemic, to balance and reduce stress (Behan, 2020). Crisis such as the COVID-19 epidemic has proven highly volatile despite their challenges. Mindfulness provides an excellent way to cope with these constant changes, helping us sit alongside COVID-19 anxiety and pay attention to the fact that this stage of life will also pass (Sun et al., 2021). There was a correlation between mindfulness and other forms of psychological hardiness in this study, which is consistent with the results of previous studies (Czerwinski, et al., 2021; Kowalski & Schermer, 2019). When people face difficult and stressful emotional and physical situations, they become more mindful by not evaluating the experiences. This awareness and a decentered view of challenging situations can lead to hardiness development (Bajaj & Pande, 2016).

Any study is subject to limitations in its conduct. In this study, using self-report instruments, variables such as hardiness, stress related to COVID-19, and mindfulness

were assessed. Considering that these instruments have been designed to measure a few variables, they cannot provide insight into other relevant constructs. Furthermore, no qualitative data was collected from the participants, so the quantitative responses could not be validated without qualitative data. During the COVID-19 pandemic, many study participants were enrolled in full-time online courses. As a result, we could not provide perspectives on “stress” before and after the pandemic in terms of its impact. Further, the study is also limited by its statistical nature, which does not prove causality from the results of the study. The causal relationships in psychological theory are plausible insofar as they are consistent with the causal relationships in the case studies.

The purpose of this study was to conduct an exploratory and descriptive study to conduct a large-scale study in the future that involves many students. Considering the limitations of random sampling, it is suggested to review the results of the study on COVID-19 stress prediction based on gender, to use structured or semi-structured interviews to collect data, especially on COVID-19 stress, and to explore other age groups to answer questions such as: Is there a difference between the results of predicting stress at COVID-19 for men and women? Is it possible that the results of the present study may change when the study is performed on another group of individuals? Because of the novelty of COVID-19’s stress profile, it is necessary to conduct further research to answer these and other questions. There is a need to conduct longitudinal rather than cross-sectional studies in future research. This study was conducted on normal humans, suggesting that investigators study other statistical populations.

As a result of this study, it is suggested to implement virtual or electronic mindfulness training workshops to reduce stress caused by COVID-19 and increase psychological hardiness to reduce the effects of stress. In this regard, training programs such as mindfulness to promote mental health may be helpful in reducing the stress of COVID-19 in university students.

5. Conclusion

Any study is subject to limitations in its conduct. This study assessed hardiness, stress related to COVID-19, and mindfulness using self-report instruments. Considering that these instruments have been designed to measure a few variables, they cannot provide insight into other relevant constructs. Furthermore, no qualitative data was collected from the participants, so the quantitative responses could not be validated without qualitative data. During the COVID-19 pandemic, many study

participants were enrolled in full-time online courses. As a result, we could not provide perspectives on “stress” before and after the pandemic in terms of its impact. Further, the study is also limited by its statistical nature, which does not prove causality from the investigation results. The causal relationships in psychological theory are plausible insofar as they are consistent with the causal relationships in the case studies.

Considering the limitations of random sampling, it is suggested to review the results of the survey on COVID-19 stress prediction based on gender, to use structured or semi-structured interviews to collect data, especially on COVID-19 stress, and to explore other age groups to answer questions such as: Is there a difference between the results of predicting stress at COVID-19 for men and women? Is it possible that the results of the present study may change when the investigation is performed on another group of individuals? Because of the novelty of COVID-19’s stress profile, it is necessary to conduct further research to answer these and other questions. There is a need to conduct longitudinal rather than cross-sectional studies in future research. This study was conducted on normal humans, suggesting that investigators study other statistical populations.

As a result of this study, it is recommended to implement virtual or electronic mindfulness training workshops to reduce stress caused by COVID-19 and increase psychological hardiness to minimize the effects of stress. In this regard, training programs such as mindfulness to promote mental health may help reduce the stress of COVID-19 in university students.

Ethical Considerations

Compliance with ethical guidelines

The ethical standards for all research involving human subjects were set by the National Research Committee, the 1964 Declaration of Helsinki, its revised version, or equivalent ethical standards that governed similar research. All participants were required to sign an informed consent form upon returning the survey, and the scales were completed anonymously by each participant.

Funding

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

Acknowledgments

There is no doubt that the results of this research could not have been achieved without the participants' voluntary participation. The study would not have been possible without the patience and willingness of the study participants.

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