


Perceived Stress among Iranians during COVID-19 Pandemic; Stressors and Coping Mechanisms: A Mixed-methods Approach

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Stress perçu chez les Iraniens durant la pandémie de la COVID-19; stressors et mécanismes d'adaptation: Une approche de méthodes mixtes

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Abstract

Objective: New coronavirus (COVID-19) pandemic socioeconomically affected the world. In this study, we measured the perceived stress in response to the COVID-19 pandemic among Iranians to determine the groups at both extremes of the spectrum followed by identifying the stressors and coping mechanisms.

Methods: This study was a mixed-methods study. We distributed a web-based 10-item perceived stress scale (PSS-10), to measure perceived stress score (PSS), through social networks from March 12 to 23, 2020. Then, we interviewed 42 students, 31 homemakers, 27 healthcare providers, and 21 male participants to identify the sources of stress and coping mechanisms.

Results: Finally, 13,454 participants completed the questionnaires. The median and interquartile range (IQR) of the participants' PSS was 21 (15-25). Students, homemakers, and healthcare workers (HCWs) showed a higher median (IQR) of PSS compared to other groups (23 [18 to 27], 22 [16 to 26], and 19 [14 to 24], respectively). Male participants showed a lower

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median (IQR) PSS (17 [12 to 23]). Content analysis of 121 participants' answers showed that the most common stressors were school-related issues mentioned by students, family-related issues mentioned by homemakers, and COVID-19-related issues mentioned by healthcare providers. Male participants' coping mechanisms were mostly related to the perception of their abilities to cope with the current crisis.

Conclusion: Our participants clinically showed a moderate level of PSS. The main stressors among students, homemakers, and HCWs were related to their principal role in this period, and male participants' coping mechanisms were inspired by the self-image retrieved from the social perspectives.

Abrégé

Objectif : La nouvelle pandémie du coronavirus (COVID-19) a affecté le monde sur le plan socio-économique. Dans la présente étude, nous avons mesuré le stress perçu en réponse à la pandémie de la COVID-19 chez les Iraniens afin de déterminer les groupes aux deux extrémités du spectre et d'identifier ensuite les stressors et les mécanismes d'adaptation.

Méthodes : La présente étude utilisait des méthodes mixtes. Nous avons distribué en ligne une échelle de stress perçu en 10 items (ESP-10), pour mesurer le score de stress perçu (SSP) dans les réseaux sociaux du 12 au 23 mars 2020. Puis, nous avons mené des entrevues avec 42 élèves, 31 personnes au foyer, 27 travailleurs de la santé, et 21 participants masculins pour identifier les sources de stress et les mécanismes d'adaptation.

Résultats : Treize mille quatre cent cinquante-quatre participants ont répondu aux questionnaires. L'écart moyen et interquartile (EIQ) des SSP des participants était de 21 (15-25). Les étudiants, les personnes au foyer et les travailleurs de la santé (TDS) ont affiché un EIQ moyen plus élevé de SSP comparés aux autres groupes [23 (18-27), 22 (16-26), et 19 (14-24), respectivement]. Les participants masculins ont indiqué un (EIQ) SSP [17 (12-23)] moyen plus faible. L'analyse du contenu des réponses de 121 participants a révélé que les stressors les plus communs étaient des enjeux liés à l'école mentionnés par les étudiants, des questions familiales mentionnées par les personnes au foyer, et des questions liées à la COVID-19 mentionnées par les travailleurs de la santé. Les mécanismes d'adaptation des participants masculins étaient surtout liés à la perception de leurs capacités à faire face à la crise actuelle.

Conclusion : Nos participants ont indiqué cliniquement un niveau modéré de SSP. Les principaux stressors chez les étudiants, les personnes au foyer, et les TDS étaient liés à leur rôle principal dans cette période, et les mécanismes d'adaptation des participants masculins étaient inspirés de leur propre image renvoyée par les perspectives sociales.

Keywords

COVID-19, stress, psychological, adaptation, psychological, health personnel, qualitative research

Introduction

The new coronavirus disease (COVID-19), first reported by China in December 2019, was swiftly spread around the world to make a pandemic that is economically and socially afflicting.^{1,2} The early arrival of the pandemic with all the unknown was substantially tolling on the Iranian population and healthcare system.

In an outbreak of highly contagious diseases, quarantine, uncertainty, overload with an intermixture of fictitious and valid information, risk of death, and resulting economic crisis are contributing factors increasing stress.³⁻⁸ Stress was associated with higher consumption of alcohol and an increase in smoking, immune dysfunction, cardiovascular diseases, and other medical morbidities.⁹⁻¹⁴ Common resulting psychiatric disorders are post-traumatic stress disorder, depression, anxiety, and suicide.^{11,15-18} During a pandemic, healthcare workers (HCWs) are among the highest risk. They are highly stressed by overtime work, shortage of personal protective equipment (PPE) and training, long-term self-isolation, stigma, high exposure to patients' death, and risk of infection or death to self and family.^{10,19,20} While studies of the mental health impact of the pandemic are

emerging, the majority of such data is from China and European countries.

Stress is the first detectable reaction to any change, which activates a cascade of physical and mental reactions. Early screening of stress as the tip of the iceberg of psychosocial consequences helps us to predict the extent of possible psychological and behavioral sequels like suicide. Furthermore, determining correlates of a higher level of stress among a population provides the opportunity for planning to modulate the modifiable factors.^{21,22}

This is an exploratory study to measure the perceived stress in a large number of Iranian population, using social media, during the COVID-19 pandemic. Furthermore, this study identified self-reported causes of the stress and coping mechanisms among groups with significantly different levels of stress.

Method and Material

Cross-sectional Study

This cross-sectional qualitative study was approved by the review board of Iran University of Medical Sciences.

Web-based self-administered Farsi-language survey assessing stress over the past month was distributed via social networks including Instagram, Facebook, LinkedIn, Twitter, WhatsApp, and Telegram from March 12 to 23, 2020. We used a virtual sequential chain-referral sampling method. We recruited 250 initial subjects who were asked to answer and distribute the questionnaire. All were Iranian between 20 and 65 years of age from 31 various provinces (Figure 1S). Fifty percent of them were female. After 3 days, we seeded 100 new subjects who were mostly male, from the provinces and occupations with less participation rate. Finally, 13,454 participants completed the questionnaire.

This anonymous survey had 19 items falling into two sections: sociodemographic data and Cohen's 10-item perceived stress scale (PSS-10). Demographic questions covered age; gender; occupation; health status; location; practicing self-isolation; confirmed or suspected COVID-19 infection among the participants' family, friends, or colleagues; and COVID-19-related death among family, friends, or colleagues. The validity and reliability of the Farsi version of PSS-10 were previously shown.²³ Informed consent was signed at the beginning of the survey. The responses were automatically stored in a secure cloud-based database.

Statistical Analysis

A descriptive analysis was performed using the median and interquartile range (IQR) for the quantitative variables and frequencies and 95% confidence intervals (95% CI) for the categorical variables. A χ^2 test was used to compare categorical variables. Mann-Whitney U and Kruskal-Wallis tests were used to analyze the differences between quantitative variables across categorical factors. A multivariate binomial logistic regression model was used to identify the independent predictors of high levels of stress as defined by total perceived stress score (PSS) of ≥ 20 . The statistical analyses were performed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp.; Armonk, NY, USA). The alpha error was assumed as 5%.

Qualitative Study

A qualitative content analysis study was conducted to arrive at self-reported reasons for higher levels of stress among students, female homemakers, and healthcare professionals in addition to those for lower levels of stress among male participants. We recruited those four groups via an announcement on social networks. We selected participants with a convenience sampling method. We briefly explained our initial quantitative findings and rationale to the participants. After they gave informed consent, the facilitators interviewed participants one on one via end-to-end encrypted private text message or voice chat (Table 1S).

Thirty-six female and 6 male college students older than 18 were interviewed by the 2 interviewers. They were from 14 different programs. The facilitators asked them "What are

the sources of stress among students during COVID-19 pandemic?"

Furthermore, 31 female homemakers ages ranging from 32 to 65 years, from 9 different provinces of Iran, were interviewed by the 3 interviewers. The facilitators asked them "What are the sources of stress among homemakers during the COVID-19 pandemic?"

Twenty-three female and 4 male HCWs between ages 25 and 40 were interviewed by an interviewer. Eight nurses and 19 physicians from 7 different specialties, from 11 different provinces of Iran, answered the question. The facilitator asked them "What are the stressors for a HCW during the COVID-19 pandemic?"

Twenty-one male participants, between 22 and 66 years of age, were also interviewed by 3 interviewers. They were neither college students nor HWCs, from 6 different provinces of Iran, and they had different occupations, including employees, self-employed, and unemployed. The facilitators asked them "What are the reasons that male participants showed a lower level of stress compared to the total population and female participants during the COVID-19 pandemic?"

Data Analysis

The data analysis was performed manually in a Word document. One researcher coded the answers of each group. Then 2 other researchers separately cross-checked the first. The researchers used an inductive approach, an "open coding" method. The analysis was performed in three steps including reducing, clustering, and abstracting. In reducing, the units of analysis were identified by colour codes. Then, the codes with similar content were clustered together. Finally, clusters were abstracted into the themes and sub-themes. The manifest content was only analyzed. The frequencies of reduced expressions were counted. Finally, the extracted results were sent back to the participants to receive their feedback.

Results

Cross-sectional Study

Of the 27,378 survey link views, 13,454 forms were submitted (response rate, 49.1%). One questionnaire was excluded due to incomplete data. Those younger than 18 years old (137 respondents) were also excluded. A final number of 13,316 responses were included in the analysis. The age of the respondents ranged between 18 and 86 with a median (IQR) of 32 (27 to 37). The majorities of the patients were female (77.7%) and were living in Iran (97.4%; Table 2S).

In total, 2,204 respondents (16.6%) identified themselves as HCWs with 38.3% nurses and 28.1% physicians (Figure 2S). General practitioners (22.7%) constituted the majority of the physician survey respondents (Figure 3S). Most of the HCWs were practicing in an outpatient setting

Table 1. The Sources of Stress among Students.

Themes (Frequency)	Subthemes(Frequency)
School issues (f: 42)	<ol style="list-style-type: none"> 1. Inefficient virtual education (f: 17) <ol style="list-style-type: none"> a. Low-quality internet prevents attending online classes (f: 3) b. Technical problem with virtual education platforms of universities (f: 4) c. Lack of the mastery of the skills for distance teaching (f: 5) d. Cancelling of many sessions (f: 1) e. Cancellation of hands-on and laboratory courses which were essential for a better understanding of lectures and seminars (f: 4) 2. Fear of failing the final exam (f: 8) 3. Lack of update and support by the university (f: 13) <ol style="list-style-type: none"> a. Uncertainty about the time, content, and type of delivery of the final exam (f: 3) b. Uncertainty about the time of reopening (f: 7) c. Lack of support in case of unexpected problems of distance learning (f: 3) 4. Postponed graduation and dissertation (f: 3)
COVID-19 issues (f: 25)	<ol style="list-style-type: none"> 1. Fear of getting infected with SARS-COV2 (f: 5) 2. Fear of transmitting the infection to the family as an asymptomatic carrier (f: 6) 3. Fear of death due to COVID-19 infection (f: 4) 4. Lack of knowledge about COVID-19 (f: 4) 5. Uncertainty about the future of this pandemic (f: 4) 6. A high rate of infection and death based on COVID-19 statistics (f: 1) 7. Fear of COVID-19 stigma (f:1)
Social life issues (f: 14)	<ol style="list-style-type: none"> 1. Limitation in in-campus social activities (f: 2) <ol style="list-style-type: none"> a. Cancellation of the extracurricular group activities and learnings (f: 2) 2. Limitation in out-of-campus social activities (f: 5) <ol style="list-style-type: none"> a. Lack of access to professional sports equipment (f:2) b. Cancellation of the outdoor activities (f: 3) 3. Limitation of interpersonal relationships (f: 7) <ol style="list-style-type: none"> a. Limitation in daily socializing with peers (f: 5) b. Limitation in intimate relationships (f: 2)
Financial issues (f: 9)	<ol style="list-style-type: none"> 1. Prepaid tuition and fee for courses in the current semester despite receiving inefficient training (f: 4) 2. Prepaid living costs of the current semester despite presence in the campus (f: 1) 3. Loss of their part-time job by which they afford their education and living costs (f: 1) 4. Fear of not being able to find a job after COVID-19 crisis due to more economic bankruptcy (f: 3)
Miscellaneous (f: 12)	<ol style="list-style-type: none"> 1. Lack of access to non-urgent medical services (f: 1) 2. More off time to explore unsolvable problems (f: 2) 3. Low experience in exposure to such crisis (f: 2) 4. Exaggeration while responding the questionnaire to seek attention (f: 1) 5. The feeling of humanity's failure and unsuccessfulness (f: 3) 6. The feeling of disappointment (f: 2) 7. Assuming COVID-19 as a God's wrath (f: 1)

(13.7%; Figure 4S). Among the non-HCW respondents, the majority self-identified themselves as homemakers (36.2%) followed by students (11.1%) and office workers (9.5%; Figure 5S).

The experience of the patients concerning COVID-19 infection was summarized in Table 3S. Majority of the survey respondents were healthy individuals (83.1%). Most respondents (75.1%) were practicing social isolation.

The PSS for the respondents ranged from 0 to 40 with the median (IQR) of 21 (15 to 25). More than half of the survey respondents (55.9%) demonstrated a high level of stress as defined by the total PSS of ≥ 20 . A weak but statistically significant negative correlation was observed between the respondents' age and their total PSS (Spearman's ρ correlation coefficient, -0.20 , $P < 0.001$). The median of total PSS

was higher for females compared to male respondents (female: 21; IQR: 16 to 26; male: 17; IQR: 12 to 23; $P < 0.001$) as well as that for non-HCWs (21; IQR: 16 to 26) compared to HCWs (19; IQR: 14 to 24; $P < 0.001$). However, no significant difference was observed between the total PSS among different groups of HCWs ($P = 0.698$). The total PSS between different job categories among non-HCWs showed a significant difference with higher PSS in students (23; IQR: 18 to 27) and homemakers (22; IQR: 16 to 26) versus lower scores in retirees (14; IQR: 10 to 18). The total PSS between the individuals living in Iran and those living in other countries did not show a statistically significant difference ($P = 0.83$). Similar patterns of differences were observed for both distress and coping components of PSS-10 (Table 4S).

Table 2. The Sources of the Stress among Female Homemakers.

Themes (Frequency)	Subthemes (Frequency)
Family issues (f: 39)	<ol style="list-style-type: none"> 1. Hygiene and health of the family (f: 37) <ol style="list-style-type: none"> a. They assume themselves responsible at the helm of family health and household hygiene (f: 12) b. Excessive worry about the children's and spouse's health who has to leave home to work outside (f: 12) c. Excessive worry about children's and own health because the spouse has to leave home to work outside (f: 5) d. Excessive worry about the seniors' health and hygiene, i.e., parents, who were dependent on the for the daily activity (f: 3) e. Increase in the house cleaning workload (f: 5) 2. They don't have free time for own because spouse and kids have to stay at home (f: 1) 3. Increasing in family disputes (f: 1)
Social life issues (f:12)	<ol style="list-style-type: none"> 1. Exposure to news (f: 7) <ol style="list-style-type: none"> a. Spending more time using social media and checking the news (f: 4) b. Uncertainty about the accuracy of news due to less face-to-face interaction with the society outside (f: 3) 2. Limitation in outdoor activities and entertainments (f: 4) <ol style="list-style-type: none"> a. Cancellation of daily window-shopping, picnic, and gym (f: 3) b. Cancellation of bringing the kids to school and school-related social activities (f: 1) 3. Missing the parents and siblings due to self-isolation (f: 1)
Financial issues (f:2)	<ol style="list-style-type: none"> 1. Unemployment of the head of the family (f: 1) 2. Management of the household budget during the financial crisis (f: 1)
COVID-19 issues (f:1)	<ol style="list-style-type: none"> 1. Lack of knowledge about COVID-19 (f: 1)
Miscellaneous (f:12)	<ol style="list-style-type: none"> 1. Staying at home was more noticeable and depressing for homemakers than others (f: 3) 2. Distractive effect of everyday face to face interaction in the society on individuals who leave home to work outside (f: 6) 3. The nature of the housekeeping tasks gives them the opportunity of mental rumination about unpleasant events (f: 3)

A statistically significant difference was observed between the levels of stress in individuals with different health status ($P < 0.001$) with a higher median of total PSS reported for hospitalized individuals (Table 4S, Figure 6S). The total PSS were higher in those who were practicing self-isolation ($P < 0.001$; Table 4S).

A multivariate binomial logistic regression was designed with high (total PSS ≥ 20) and low (total PSS < 20) levels of perceived stress as the dependent variable and model input variables including those variables that were found as statistically significant in the bivariate analysis. The independent factors in predicting total PSS were summarized in Table 5S. The strongest independent factors in predicting a higher PSS were found as being a patient hospitalized for other medical conditions (odds ratio [OR], 6.0; 95% CI, 1.5 to 24.9; $P = 0.013$) and being female (OR, 2.3; 95% CI, 2.1 to 2.5; $P < 0.001$).

Qualitative Study

Students

Total numbers of 102 codes were extracted from 42 answers that categorized into 4 main themes consisted of 25 sub-themes. Data saturation was noted from the 35th answer. (Table 1).

School-related issues, the most frequently mentioned category, was the strongest theme with 42 retrievals among codes. The following quotations were some examples of original data.

The virtual education platform of our university is a mess of things. I could not participate in the online classes because of problems with audio, or video, or connection every time. I did not learn anything while I am expected to take the final exam.

Homemakers

Evaluation of 31 answers resulted in 66 codes. Data were saturated at the 21st answer. We categorized the codes into 4 main categories made up of 12 subcategories (Table 2).

Taking care of the hygiene of the household and health of the family was the most frequent reason mentioned as the cause of homemakers' high level of stress. The following quotations were some examples of the original data.

I am stressed because my husband has lost his job. The family income has dramatically decreased and we have some family disputes.

HCWs

Assessing 27 answers brought about 78 codes. We found that data were saturated at the 25th answer. We sorted the codes into 4 main categories subdivided into 14 subcategories. We brought some examples of the original data below (Table 3).

I am afraid that I get the disease or take the disease home. If I catch the disease, who will take care of my baby boy?

Table 3. The Sources of the Stress Mentioned by Healthcare Providers.

Themes (Frequency)	Subthemes (Frequency)
COVID-19 disease (f: 42)	<ol style="list-style-type: none"> 1. Fear of transmission of the disease (f: 35) <ol style="list-style-type: none"> a. Fear of getting infected by SARS-COV2 (f: 12) b. Fear of taking the disease home as an asymptomatic carrier (f: 21) c. Fear of transmitting the disease to the colleagues and other patients (f: 2) 2. Competency in the management of the disease (f: 5) <ol style="list-style-type: none"> a. Lack of enough evidence about the disease, treatments, and its complications (f: 1) b. Uncertainty about the prognosis of the disease in our patients (f: 3) 3. Higher rate of delivering bad news to the patients (f: 1) 4. Fear of death due to COVID-19 (f: 2)
Shortages (f: 22)	<ol style="list-style-type: none"> 1. Personal protective equipment (PPE) (f: 15) <ol style="list-style-type: none"> a. Shortage of PPE (f: 9) b. Low quality of PPE (f: 3) c. Increased price of PPE (f: 2) d. Uncomfortable for long time use (f: 1) 2. Medical supplies, equipment, and supports for helping patients (f: 7) <ol style="list-style-type: none"> a. Shortage of medication (f: 3) b. Shortage of supportive care equipment like ICU bed and ventilator (f: 1) c. Shortage of professional human resources (f: 3)
Financial issues (f: 3)	<ol style="list-style-type: none"> 1. Decreasing the income of the private offices (f: 2) 2. Fear of losing the job if they refuse to accept a temporary job transfer to the COVID-19 isolation wards (f: 1)
Social life (f: 3)	<ol style="list-style-type: none"> 1. Isolation from my family, relatives, and friends due to direct contact with COVID-19 patients (f: 3)
Miscellaneous (f: 9)	<ol style="list-style-type: none"> 1. Lack of support for taking care of the HCWs' kids (f: 1) 2. Stigma of being a COVID-19 carrier due to direct contact with the patients (f: 1) 3. Family's insistence on quitting that job (f: 1) 4. Feeling disappointed because individuals do not take the warnings seriously (f: 3) 5. Fearful patients (f: 1) 6. Inefficient policy to manage the current crisis (f: 1)

Note. ICU = intensive care unit.

Male Participants

Of 21 answers, 53 codes were highlighted. Data were saturated at the 18th answer. The codes were classified into 4 main categories composed of 16 subcategories (Table 4).

Among Men's self-image category, the sense of natural superiority in physical and mental strength was the most frequent subcategory. We brought some examples of the original data below.

I think that men think that they are powerful due to physical strength or mental excellence in handling difficult situations. Therefore, they have higher self-esteem, which helps them to cope better with stressful situations.

Discussion

To our knowledge, this is the first large study examining the correlates of stress among a large sample of Iranian citizens who have access to the internet and use social medias, the second country hit hard by the pandemic, and still a hot spot. This study showed that Iranian social media users perceived a moderate level of stress, which, compared to the findings of previous study, is lower.²⁴ It might be due to lower sample size and less diversity among participants in that study. Those scores were higher than the established community norm of 12.²⁵ Literature review showed no previous

evidence for the level of PSS among Iranian general population before COVID-19 pandemic. However, it revealed that the average of our participants' PSS was higher than the amount of that perceived by Iranian women with infertility referred for the assisted reproductive technology treatment.²⁶ In this study, the level of stress among COVID-19 patients, HCWs, and healthy controls during the COVID-19 pandemic was a little higher compared to that among Asian patients, HCWs, and healthy controls during SARS outbreak.²⁷⁻²⁹ We think cumulative stress due to rapidly mounting economic crisis and sociopolitical stressors in the country might be the reason for this difference. Since religion has formed a large part of the Iranians' orientation system, and it is a highly accessible resource in their socio-cultural context, it is speculated that Iranians may soothe their stress using religious and spiritual coping methods in the case of insufficient resources and services.³⁰ However, we showed that our participants had higher levels of stress compared to Asian communities during SARS. It might be rooted in the result of Payir's study that showed Iranian adults endorsed the importance of science at high levels regardless of their level of religiosity.³¹ Therefore, the government's negligence in establishing and implementing the pandemic-related rules and regulations based on the best current evidence might further increase the stress among Iranians.

Table 4. The Mechanisms of Coping with the Stress Mentioned by Male Participants.

Themes (Frequency)	Subthemes (Frequency)
Self-image (f: 23)	<ol style="list-style-type: none"> 1. Sense of natural superiority in physical strength given by patriarchal society (f: 7) <ol style="list-style-type: none"> a. Higher muscularity (f: 1) b. Sense of stronger sex in nature (f: 1) 2. Sense of natural superiority in mental strength given by patriarchal society (f: 5) <ol style="list-style-type: none"> a. Courage (f: 1) b. Realism (f: 1) c. Rationalism (f: 1) d. Problem-solving (f: 1) e. Self-esteem (f: 1) 3. Carefree amid a contagion (f: 3) 4. Men do not declare the true level of their stress (f: 4) 5. Men care less about the crisis in the society than those in the family (f: 2) 6. Higher ability in coping with stress due to high previous exposure to a stressful situation (f: 2)
Participants' image of women (f: 16)	<ol style="list-style-type: none"> 1. Women showed extraordinary stress in response to COVID-19 pandemic because of: (f: 16) <ol style="list-style-type: none"> A. Natural feminine characters: (f: 10) <ol style="list-style-type: none"> a. Caring more about life and safety (f: 2) b. Since caring more about how society judges them, they want to perform perfectly (f: 2) c. Easily scared (f: 3) d. Emotional sensitivity (f: 1) e. Persistence on making the best of what they need (f: 1) f. Biological causes like female hormones (f: 1) B. Acquired feminine characters: (f: 5) <ol style="list-style-type: none"> a. Sense of weaker sex in nature (f: 1) b. Low self-esteem due to gender discrimination, social restrictions, and financial independence (f: 3) c. Sense of low competency for crisis management (f: 1) C. Unusually constant present of men at home and its consequences like domestic violence (f: 1)
Financial issues (f: 4)	<ol style="list-style-type: none"> 1. The priority is the financial support of the family rather than COVID-19 infection (f: 4)
Problem-solving mechanisms (f: 4)	<ol style="list-style-type: none"> 1. Getting ready for the worst-case scenario (f: 1) 2. Taking the role of protector of the family (f: 1) 3. Believe in a superior power (God) (f: 1) 4. The priority is mental tension reduction then solving the problem (f: 1)
Miscellaneous (f: 6)	<ol style="list-style-type: none"> 1. Invalid news about the preventive effect of smoking and alcohol consumption on COVID-19 infection on social media (f: 1) 2. Men are more exposed to the everyday face to face interaction and out-of-home work, which has a distracting effect (f: 5)

We also found no difference in the level of stress between participants in Iran and outside, showing a consistent global pattern of pandemic-related stress. We also found a correlation between social distancing and perceived stress. This could indicate that some level of stress is adaptive and resulting in better compliance with safety measures. The stress is higher among women, homemaker, HCW, and student participants, which was in concordance with the findings in China and Europe during COVID-19 pandemic.^{32,33} Literature revealed that women usually show higher levels of impact in response to stress and trauma.³⁴ Homemaker and student participants are dealing with significant transition and uncertainty. Homemakers, those include feeling responsible for the safety of family, challenge with exposure to contradicting news and instructions on social media about how to take such measures, changes in the family dynamics as the children and spouses are now spending more time at home, interpersonal stress for the same reason, and financial difficulties. Students also have to deal with a quick transition to online school and uncertainty

about when the schools open. This is worse given internet infrastructure in Iran is not ideally set for all online work.

Moreover, we found that the amount of stress inversely correlated to the participants' age, which was in line with the previous findings.^{8,24} We also observed that retirees had a significantly lower level of stress. This finding may be due to financial security, less use of unofficial social media, autonomy to choose to stay home regardless of governors' order, and less change in the normal routine of their life.

Based on the findings in this large number of HCWs, they across different disciplines seem to be stressed almost equally, regardless of their level of contact with COVID-19 patients. The effect of frontline exposure with the patients on the amount of stress perceived by HCWs during an infectious disease outbreak is a controversy among previous literature.^{28,35}

Besides, our findings showed that non-HCW did not consider the current crisis less stressful than HCWs did, which was in concordance with the findings of previous studies

during COVID-19 and SARS outbreaks.^{8,29,32} However, the sources of stress may be different between these groups. For example, students mostly identified school-related issues as the source of stress versus homemakers mentioned family-related issues. Whereas, HCWs ranked COVID-19-related issues including fear of death, fear of transmission, and enough competency in the management of the disease as the strongest stressor. In contrary to what published literature has claimed that Iranian HCWs have access to PPE, HCWs ranked shortage, low quality, and increase in price of PPE as the second source of stress.³⁶ The stressors identified by Iranian HCW in this study were mostly similar to the stressors mentioned by HCWs in the United States.³⁷ Furthermore, our participants mentioned some additional sources of stress including worry for shortage in medications and therapeutic equipment that they perceived it as their incompetence, job loss, financial insecurity, feeling disappointed and not being understood, and feeling of being stigmatized as a COVID-19 carrier. COVID-19-related stigma and discrimination have been previously reported among HCWs and COVID-19 survivors.^{20,38,39} COVID-19-related stigma has some drivers and facilitators that identification of them helps to decrease the nesting of the stigma epidemic via developing an antistigma psychoeducational guide.^{20,40} The most frequent source of stress among the most stressful groups has directly related to their job and their principal role in this period. A higher level of stress among women, homemakers, students, and HCWs certainly does not mean that they do not use coping mechanisms. The investigation of their coping mechanisms was not our objective because this study aimed to identify the sources of stress among overwhelmed groups. Besides, we had to shorten the interview and make the questions easy to understand to have more accurate answers and overcome the virtual interview bias.

Furthermore, we identified the groups that perceived lower levels of stress along with their coping mechanisms. Male participants' coping mechanisms were mostly inspired by gender-oriented self-image rooted in perspectives induced by a patriarchal society. However, it is evident that they are dealing with some stressors during COVID-19 pandemics, as well, which we had to cut the investigations down in benefit of a short and more understandable interview in a virtual setting.

One of the limitations of this study is the generalizability of the findings. Access to the internet and social media, using self-reporting tools, willingness to participate in a survey, virtual interviews, and nonprobability sampling are affecting the representativeness of the study. Using web-based tools, nonprobability sampling and virtual interviews were inevitable in the middle of pandemics for sake of public safety; 72.8% of Iranian families had access to the Internet; 70.5% of them used social media based on the national census in 2017, held by the statistical centre of Iran; however, that access has been increasing by every year as far as broadband Internet penetration rate reached 94% in the first few months

of 2020, Communication Regulatory Authority of the Islamic Republic of Iran declared.^{41,42} Therefore, we assumed that, of 100 citizens, 94 individuals had access to the Internet at the time of our study. Moreover, we had to use self-reporting tools for data gathering in this study due to safety rules and regulations such as social distancing and self-isolation. The effect of social desirability bias on our data was one of the self-reporting bias, which was prospected during the design phase of the data collection method. To reduce social desirability bias, we chose a predesigned and validated self-reporting instrument; we also guaranteed anonymity and confidentiality at the time of data collection.⁴³ Our self-reported data can be assumed somehow accurate because we kept the questions short and clear; we avoided difficult concepts; we kept the time frame or recall period short; we guaranteed a strong sense of anonymity and no fear of reprisal. Furthermore, as an incentive to increase the willingness to participate in the study, our team guaranteed to reveal the result of the participants' PSS, give a brief interpretation of their PSS, and provide the healthcare seekers with virtual primary support. Finally, the results must be conservatively interpreted and generalized.

Women participated in the study 2 times more than men, which may be due to nonprobability sampling, higher levels of stress in women leading to more health-seeking behaviour and a higher rate of social media use. Also, a limited number of hospitalized participants completed the survey due to different reasons including healthcare providers and patients' families refused to send them the questionnaire, patients' refusal to complete the survey due to physical or emotional inability, and prohibition of unnecessary contact with isolated COVID-19 wards.

In conclusion, although the findings cannot be easily generalized to the clinical population, it might provide some insight into the sources of stress to be explored among patients who are seen in psychiatric and primary care clinics. The sources of stress in highly vulnerable groups, specifically those mentioned by students, are mostly modifiable. It is expected that authorities and governors provide infrastructures to cope with changes. We suggest that field workers use modified WHO-Psychological First Aid guide to reduce the stress in the public.⁴⁴ Since the high level of stress has mental health consequences such as suicide as the worst-case scenario, we suggest the close monitoring of the population by surveys.⁴⁴ The development, implementation, and evaluation of mental health interventions, guided by a framework, such as training of the healthcare providers to efficiently screen the psychiatric consequences and providing some publicly available self-learning audiovisual tools to educate the general population about the prevention, alarm signs, and the therapeutic choices of these psychiatric consequences is recommended.⁴⁵ Moreover, using a precise and comprehensive COVID-19 mental healthcare toolkit can brought up evidence for research approaches, evaluate the impact of the pandemics on various populations, and shorten the time to action.⁴⁶

Authors' Note

Masoomeh Faghankhani, Faezeh Sodagari, Arash Javanbakht, and Amir Hossein Jalali Nadoushan equally contributed to this study. The raw data for adults was uploaded as an Excel file.

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Supplemental Material

The supplemental material for this article is available online.

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