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Research Paper

Investigating Self-rated Health Among Health Workers During COVID-19 Pandemic in Northwest Iran

Mohammad Reza Sheikhi[1], Zahra Hosseinkhani[2], Ramesh Hoseinzadeh Khezri[3], Zohre Froozanfar[4], Farzad Khodamoradi[5*]

1. Social Determinants of Health Research Center, Research Institute for Prevention of Non-Communicable Diseases, Qazvin University of Medical Sciences, Qazvin, Iran.
2. Metabolic Diseases Research Center, Research Institute for Prevention of Non-Communicable Diseases, Qazvin University of Medical Sciences, Qazvin, Iran.
3. Counseling and Mental Health Administration. Qazvin University of Medical Sciences, Qazvin, Iran.
4. Shiraz HIV/AIDS Research center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran.
5. Department of Social Medicine, Faculty of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

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ABSTRACT

Background: Health promotion among health workers requires appropriate evidence of relevant determinants.

Objective: This study was conducted to investigate the relationship between mental health and its measured covariates with self-rated health (SRH) among health workers during the COVID-19 pandemic in northwest Iran.

Methods: In this cross-sectional study, we recruited 569 health workers from three educational hospitals of Qazvin University of Medical Sciences, Iran. From July 1 to September 5 (2020), participants were asked to provide demographic and clinical information and to complete the symptom checklist 90 (SCL-90) questionnaire. The relationship between suboptimal SRH with each of the SCL-90 domains and measured covariates were analyzed using logistic regression models.

Findings: The Mean±SD age of participants was 34.73(7.95) years. A total of 148 health workers (26%) reported their suboptimal SRH, which was higher in women (odds ratio [OR]: 1.98; 95% confidence interval [CI]: 1.21, 3.24), as well as among participants without physical activity (OR: 2.14; 95% CI: 1.35, 3.39). Depression (OR: 2.13; 95% CI: 1.64, 2.77) and anxiety (OR: 3.76; 95% CI: 2.78, 5.09) showed significantly higher odds of suboptimal SRH. Also, other SCL-90 domains indicated a positive association with suboptimal SRH during the COVID-19 pandemic.

Conclusion: Mental health, gender, and physical activity were significant variables related to SRH. The current findings suggest that we should pay attention to mental health problems and other important covariates during the COVID-19 epidemic. Hence, policymakers should consider this issue in health promotion programs for health workers.

*** Corresponding Author:**
Farzad Khodamoradi, PhD.
Address: *Department of Social Medicine, Faculty of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran,*
Phone: *+98 (61) 42630051*
E-mail: *f_khodamoradi@yahoo.com*

Journal of
Inflammatory Diseases
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1. Introduction

In December 2019, an acute respiratory syndrome caused by a novel coronavirus (COVID-19) was reported for the first time in Wuhan, China [1]. After that, COVID-19 spread rapidly across the world and the World Health Organization declared it a health emergency [2]. The clinical spectrum of COVID-19 ranges from asymptomatic disease to pneumonia and life-threatening problems, including acute respiratory distress syndrome (ARDS), multiple organ failure, and eventual death [3-5].

Infectious disease epidemics affect the mental health of healthcare workers as well as that of the general population. An example of a psychological disorder was observed during the severe acute respiratory syndrome (SARS) epidemic in 2003 [6, 7]. Studies showed that healthcare workers were exposed to stress reactions, depression, anxiety, and poor physical health during the SARS epidemic [2, 6]. Similar results were reported for the Middle East respiratory syndrome (MERS) epidemic. COVID-19 can also cause psychological disorders similar to SARS and Middle East respiratory syndrome (MERS) [2, 8].

High workloads, fear of infection as a result of patient care, insufficient training, and lack of protective equipment are associated with poor mental and physical health in health workers [2]. Studies have shown that a lack of adequate information and insufficient guidance can increase stress among healthcare providers [9]. A large number of health workers are on the frontline to treat patients infected with COVID-19 and are faced with high levels of stress causing fear, anxiety, and depression [10]. Therefore, healthcare workers are at risk of mental health disorders [10, 11]. The COVID-19 pandemic not only caused public concern but also reduced the quality of life in healthcare workers and significantly affected their mental health of them [1, 10, 12]. Besides, socioeconomic stressors, such as caring for children at home, having an infected family member with COVID-19, or low household income were associated with mental health disorders in health workers [10].

Healthcare workers are in direct contact with COVID-19 patients, and special interventions are needed to maintain their mental health [8]. In addition, studies have also shown that the poor mental health of health workers could negatively influence their ability to provide patient care and treatment [13]. During an epidemic, it is essential to determine the physical and mental health of health workers and related factors to improve their performance. This study aims to investigate the relationship between mental health and its measured covariates with self-rated health (SRH) among health workers during the COVID-19 pandemic in northwest Iran.

2. Material and Methods

Design and participants

This cross-sectional study was conducted on health workers of Qazvin hospitals in the northwestern part of Iran during the COVID-19 pandemic until 2020. Six hospitals are affiliated with Qazvin University of Medical Sciences, three of which (Bouali, Velayat, and Shafa) are devoted to COVID-19 patients. Workers of all occupations participated in this study via a convenience sampling method. We included nurses, physicians, paraclinic staff, psychologists, health workers, administrative officers, and service employees.

The inclusion criteria included 18 years or older, no serious mental disease, such as schizophrenia and mental retardation, no physical illness affecting anxiety or depression, such as hypothyroidism or coronary heart disease. The exclusion criteria included people who refused to participate in the research or gave incomplete answers to the questions in the questionnaire

Measurements

Data were collected between July 1 and September 5, 2020, and the health workers affected by the COVID-19 epidemic responded to the questionnaires. We used symptom checklist 90 (SCL-90) to assess the mental health of health workers [14]. This questionnaire is a relatively short self-reported psychometric instrument designed to evaluate a broad range of psychological problems and psychopathologic symptoms. The SCL-90 consists of 90 items yielding nine scores on the primary symptom dimensions and three scores among global distress indices. The following primary symptom dimensions were assessed, somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism [15, 16]. The depression dimension shows a wide range of clinical signs associated with depression, including depressed mood, lack of interest in life's pleasures, absence of motivation, and loss of vital energy. In addition, feelings of helplessness, suicidal thoughts, and some cognitive and physical aspects of depression are included in this criterion. The anxiety dimension shows signs and symptoms that reflect clinically severe overt anxiety, such as nervousness, feelings

of pressure, and tremors in body organs, as well as sudden fears, panic, and anxiety about the future and some physical aspects of anxiety. Besides, other dimensions of the checklist involve questions evaluating people in those dimensions. The validity and reliability of SCL-90 have been assessed in Iran with Cronbach's alpha equal to 0.98 [17, 18]. We used the following question to measure SRH, "how would you rate your general health status?". This question is answered on a five-point Likert scale (i.e. very good, good, moderate, bad, very bad), ranging from one to five scores. The participants who marked the question as "bad" or "very bad" were assigned to the suboptimal group, and the others were classified as the optimal group.

Statistical analysis

Based on their responses to the SRH question, the health workers were assigned to suboptimal and optimal groups. We assessed the participants based on their SRH according to different demographic and occupational variables, including age, gender, physical activity, marital status, education, residence, job, and employment type. The association between suboptimal SRH with measured covariates and each of the SCL-90 domains was examined in logistic regression models. Potential adjusted confounders were age, gender, physical activity, marital status, education, residence, occupation, and employment type. We used univariate analysis to identify the determinant variables for SRH separately. In the multiple analyses, we entered variables with $p<0.2$ into the univariate analysis. We conducted the analysis using STATA version 14.0 (Stata Corp. LP), considering $\alpha=0.05$ for the analysis.

3. Results

A total of 569 health workers from three hospitals completed the questionnaires. Sixty-one subjects refused to participate in the study (response rate: 96.65). The Mean±SD age of participants was 34.73 (7.95) years (range: 18–59). Table 1 presents the descriptive statistics of samples, in which 297 participants (52.1%) were female, 411 (72.3%) were married, and 37 (6.5%) were high school students or diploma holders. Among the participants, 468 participants (82.2%) were residents of Qazvin, and 311 (54%) were nurses. A total of 148 (26%) participants reported their suboptimal SRH as "very bad" or "bad".

Overall, according to the adjusted analysis, women show significantly higher odds of suboptimal SRH than men (OR: 1.98; 95% CI: 1.21, 3.24). Participants without physical activity had significantly higher odds of suboptimal SRH than those with physical activity (OR: 2.14; 95% CI: 1.35, 3.39) during the COVID-19 pandemic. No association was observed between age, marital status, education, and residence with SRH. Table 2 presents the result of the association between measured covariates and suboptimal SRH in logistic regression analysis.

Depression (OR: 2.13; 95% CI: 1.64, 2.77) and anxiety (OR: 3.76; 95% CI: 2.78, 5.09) showed significantly higher odds of suboptimal SRH during the COVID-19 pandemic. Moreover, other SCL-90 domains present significant values in the analysis. Table 3 presents the result of the relationship between SCL-90 domains and suboptimal SRH.

4. Discussion

The present study was conducted on a sample of health workers in the northwest of Iran and showed that 26% of participants reported their SRH suboptimal as "very bad" or "bad". The suboptimal SRH was more prevalent among women and people without physical activity. Also, it was found that depression, anxiety, and other SCL-90 domains have a positive relationship with suboptimal SRH.

Based on the results of this study, suboptimal SRH was more in women than in men. Suboptimal SRH in women may be influenced by social factors as well as genetic, biological, chemical, hormonal, and environmental factors [19]. Furthermore, women may be more prone to psychosis than men, which may reduce SRH in stressful situations, such as COVID- 19 outbreaks [20]. These findings are similar to previous studies showing better SRH results in men than in women [2, 18-21].

Since lifestyle is one of the most important factors in SRH [21], physical activity was examined in this study as one of the lifestyle factors. According to the results, suboptimal SRH is more prevalent in health workers without physical activity. A systematic review examining the benefits of physical activity found that physical activity promotes health and reduces mortality [22]. Besides, this finding was consistent with the results of other studies [23-25].

Our study found a relationship between mental health factors and suboptimal SRH. It has been shown that compared to other recent epidemics, COVID- 19 has a more global expansion, affecting daily life and a variety of occupations, which may have a significant impact on the mental health of people. In addition, with the continuation of this epidemic, there is still a significant degree

Journal of
Inflammatory Diseases
(Previous Title: The Journal of Qazvin University of Medical Sciences)

Table 1. The background characteristics of health workers based on self-rated health in Qazvin City, Iran, in 2020 (n=569)

Variables		No. (%)/Mean±SD		
		Total	Optimal SRH	Suboptimal SRH
Gender	Female	297(52.1)	201(47.8)	96(65.3)
	Male	272(47.9)	220(52.2)	52(34.7)
Age (y)		34.73±7.95	35.25±8.27	33.20±6.69
Education	High school/ Diploma	37(6.5)	33(7.3)	4(2.7)
	Associate	69(12.1)	55(13.2)	14(9.6)
	Bachelor	379(66.6)	271(63)	108(73.9)
	Master	49(8.6)	37(8.4)	12(8.3)
	Higher degrees of master	35(6.2)	27(8.1)	8(5.5)
Marital status	Married	411(72.3)	306(72.7)	105(70.9)
	Single	150(26.3)	109(25.9)	41(27.7)
	Divorced/widowed	8(1.4)	6(1.4)	2(1.4)
Physical activity	Yes	262(46)	208(49.7)	54(35.7)
	No	307(54)	210(50.3)	97(64.3)
Residence	Native	468(82.2)	345(81.4)	123(84.8)
	Non-native	101(17.8)	79(18.6)	22(15.2)
Job	Physician	24(4.4)	18(4.4)	6(4.9)
	Nurse	311(54)	220(51.6)	91(62.2)
	Para-clinic	82(14.9)	73(17.2)	9(6.4)
	Psychologist	4(0.7)	4(0.9)	0(0)
	Health worker	8(1.4)	3(0.7)	5(3.7)
	Administrative officer	68(11.9)	52(12.3)	16(10.9)
	Service employee	72(12.7)	55(12.9)	17(11.9)
Employment type	Official	207(35.2)	153(36)	54(37.5)
	Contract employee	252(43.5)	192(45.2)	60(41.7)
	Novice employee	101(17.3)	76(17.9)	25(17.4)
	Other	9(4)	4(0.9)	5(3.4)

SRH: Self-rated health.

Journal of
Inflammatory Diseases

of uncertainty about its final impact, including the duration of the pandemic as well as social distance precautions that can lead to mental health disorders and various mental illnesses lowering SRH [26]. These results are similar to previous studies around the world that examined this relationship [19, 26-28].

In this research, depression, and anxiety were associated with suboptimal SRH, which was consistent with the

Table 2. Logistic regression analysis between self-rated health (SRH) and measured covariates in health workers, Qazvin City, Iran, in 2020

Variables		Crud OR (95% CI) [P]	Adjusted OR (95% CI) [P]
Age		0.96 (0.94, 0.99) [0.08]	0.96 (0.93, 1.01) [0.056]
Gender	Male	1	1
	Female	2.16 (1.46, 3.20) [<0.001]	1.98 (1.21, 3.24) [0.006]
Marital status	Married	1	1
	Single	1.10 (0.72, 1.68) [0.644]	0.69 (0.39, 1.19) [0.188]
	Divorced/widowed	0.95 (0.18, 4.79) [0.953]	0.39 (0.44, 3.63) [0.414]
Education	High school/diploma	1	1
	Associate degree	2.07 (0.62, 6.84) [0.231]	2.73 (0.54, 13.78) [0.224]
	Bachelor	3.26 (1.12, 9.46) [0.029]	3.01 (0.65, 13.78) [0.155]
	Master	2.59 (0.76, 8.84) [0.128]	2.66 (0.50, 14.15) [0.249]
	Higher degrees of master	2.66 (0.71, 9.90) [0.143]	3.11 (.0.54, 17.65) [0.200]
Residence	Native	1	1
	Non-native	0.78 (0.46, 1.30) [0.346]	0.97 (0.54, 1.76) [0.930]
Physical activity	Yes	1	1
	No	2.02 (1.32, 3.11) [<0.001]	2.14 (1.35, 3.39) [0.001]

Journal of
Inflammatory Diseases

Table 3. Logistic regression analysis between self-rated health (SRH) and domains of Symptom checklist 90 (SCL-90) in health workers, Qazvin City, Iran, in 2020 (P<0.001)

Variables		Crud OR (95% CI)	Adjusted OR (95% CI)
Model 1	Phobic, anxiety	0.2.54 (1.95, 3.31)	2.13 (1.60, 2.85)
Model 2	Depression	2.33 (1.82, 2.99)	2.13 (1.64, 2.77)
Model 3	Paranoid	2.43 (1.91, 3.11)	2.45 (1.86, 3.21)
Model 4	Psychotism	4.05(2.82, 5.81	3.47 (2.38, 5.08)
Model 5	Somatization	2.89 (2.26, 3.70)	2.95 (2.26, 3.86)
Model 6	Interpersonal sensitivity	3.61 (2.66, 4.89)	4.72 (3.31, 6.72)
Model 7	Obsessive–compulsive	3.61 (2.74, 4.74)	3.56 (2.66, 4.77)
Model 8	Anxiety	3.73 (2.83, 4.92)	3.76 (2.78, 5.09)
Model 9	Aggressive	3.72 (2.68, 5.17)	3.43 (2.38, 4.94)
Model 10	GSI	1.91 (1.44, 2.52)	1.43 (1.04, 1.97)
Model 11	PST	1.04 (1.03, 1.05)	1.05 (1.03, 1.05)
Model 12	PSDI	-	-

Journal of
Inflammatory Diseases

Abbreviations: OR: Odds ratio; CI: Confidence interval. Notes: Estimates were adjusted for gender, age, education, residence, job, and employment type. GSI: Global severity index; PST: Positive symptom total; PSDI: Positive symptoms distress index.

Journal of
Inflammatory Diseases
(Previous Title: The Journal of Qazvin University of Medical Sciences)

findings of some other studies indicating this relationship [29-35]. From a mental health standpoint, a situation in which a person is infected with COVID-19 and may accidentally transmit it to others without realizing can lead to anxiety in that person [31]. Furthermore, the lack of timely and effective strategies against COVID-19 may increase people's worry and thus increase their stress and anxiety, which can reduce SRH [36]. Furthermore, due to similar epidemic, situations, such as the COVID-19 epidemic, serious concerns, such as fear of death and feelings of loneliness and anger can develop in health-care workers. In addition, in such conditions, face-to-face and traditional communication are reduced, which can lead to increased mental health problems, such as anxiety, and depression and influence SRH [19].

Limitations

Our study has several limitations. First, the cross-sectional design of this research limits the causal inference between mental health factors and their measured covariates with SRH. Second, we rely on self-reported data that may be less accurate, including SRH, which is a subjective measure and may not reflect objective measurements of mental health, although it has well-established and strong predictive potential for health-related outcomes. Third, mental health factors such as anxiety and depression have not been evaluated by a mental health professional.

5. Conclusion

In summary, this study showed that "very bad" or "bad" suboptimal SRH was more common in women and in participants without physical activity during the COVID-19 epidemic. Depression and anxiety showed a positive association with suboptimal SRH. Moreover, other SCL-90 domains present significant values. Therefore, we should pay attention to mental health problems during the COVID-19 epidemic and intervene to reduce psychological problems.

Ethical Considerations

Compliance with ethical guidelines

The study was conducted based on the Helsinki Declaration and was approved by the Ethics Committee of the Qazvin University of Medical Sciences in Iran (IR.QUMS.REC.1399.018). The participants can familiarize themselves with the informed consent before starting the survey. The participants can stop taking the survey at any time without explanation.

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Authors' contributions

Conceptualization and data compilation: Mohammad Reza Sheikhi; Study design, data compilation, statistical analysis: Zahra Hosseinkhan and Farzad Khodamoradi; Drafting the manuscript: All authors; Revising the manuscript: Mohammad Reza Sheikhi, Zahra Hosseinkhani, Ramesh Hoseinzadeh Khezri, Farzad Khodamoradi; All authors read and approved the final manuscript.All authors read and approved the final manuscript.

Conflict of interest

The authors declared no conflict of interest.

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References

[1] Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsi E, Katsaounou P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the covid-19 pandemic: A systematic review and meta-analysis. Brain Behav Immun. 2020; 88:901-7. [DOI:10.1016/j.bbi.2020.05.026] [PMID] [PMCID]

[2] Li J, Xu J, Zhou H, You H, Wang X, Li Y, et al. Working conditions and health status of 6,317 front line public health workers across five provinces in China during the covid-19 epidemic: A cross-sectional study. BMC Public Health. 2021; 21(1):106. [DOI:10.2471/BLT.20.255471]

[3] Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. Lancet. 2020; 395(10223):507-13. [DOI:10.1016/S0140-6736(20)30211-7] [PMID] [PMCID]

[4] Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020; 382(18):1708-20. [DOI:10.1056/NEJMoa2002032] [PMID] [PMCID]

[5] Grasselli G, Zangrillo A, Zanella A, Antonelli M, Cabrini L, Castelli A, et al. Baseline characteristics and outcomes of 1591 patients infected with SARS-CoV-2 admitted to ICUs of the Lombardy region, Italy. JAMA. 2020; 323(16):1574-81. [DOI:10.1001/jama.2020.5394] [PMID] [PMCID]

[6] Chew NWS, Lee GKH, Tan BYQ, Jing M, Goh Y, Ngiam NJH, et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during covid-19 outbreak. Brain Behav Immun. 2020; 88:559-65. [DOI:10.1016/j.bbi.2020.04.049] [PMID] [PMCID]

[7] Chen NH, Wang PC, Hsieh MJ, Huang CC, Kao KC, Chen YH, et al. Impact of severe acute respiratory syndrome care on the general health status of healthcare workers in Taiwan. Infect Control Hosp Epidemiol. 2007; 28(1):75-9. [DOI:10.1086/508824] [PMID]

[8] Bachilo EV, Barylnik JB, Shuldyakov AA, Efremov AA, Novikov DE. Mental health of medical workers during the covid-19 pandemic in Russia: Results of a cross-sectional study. MedRxiv. 2020. [Unpublished article] [DOI:10.1101/2020.07.27.20162610]

[9] Gold JA. Covid-19: Adverse mental health outcomes for healthcare workers. BMJ. 2020; 369:m1815.[DOI:10.1136/bmj.m1815] [PMID]

[10] Stojanov J, Malobabic M, Stanojevic G, Stevic M, Milosevic V, Stojanov A. Quality of sleep and health-related quality of life among health care professionals treating patients with coronavirus disease-19. Int J Soc Psychiatry. 2021; 67(2):175-81. [DOI:10.1177/0020764020942800] [PMID] [PMCID]

[11] Zhou Y, Zhou Y, Song Y, Ren L, Ng CH, Xiang YT, et al. Tackling the mental health burden of frontline healthcare staff in the covid-19 pandemic: China's experiences. Psychol Med. 2021; 51(11):1955-6. [DOI:10.1017/S0033291720001622] [PMID] [PMCID]

[12] Zheng Y, Wang L, Feng L, Ye L, Zhang A, Fan R. Sleep quality and mental health of medical workers during the coronavirus disease 2019 pandemic. Sleep Biol Rhythms. 2021; 19(2):173-80. [DOI:10.1007/s41105-020-00304-7] [PMID] [PMCID]

[13] Pearman A, Hughes ML, Smith EL, Neupert SD. Mental health challenges of United States healthcare professionals during covid-19. Front Psychol. 2020; 11:2065. [DOI:10.3389/fpsyg.2020.02065] [PMID] [PMCID]

[14] Petrowski K, Schmalbach B, Kliem S, Hinz A, Brähler E. Symptom-checklist-K-9: Norm values and factorial structure in a representative German sample. Plos One. 2019; 14(4):e0213490. [DOI:10.1371/journal.pone.0213490] [PMID] [PMCID]

[15] Derogatis L, K Savitz. The SCL-90-R and the brief symptom inventory (BSI) in primary care. In: Maruish ME, editor. Handbook of psychological assessment in primary care settings. Oxfordshire: Taylor & Francis; 2017. [Link]

[16] Derogatis LR, Unger R. Symptom checklist□90□revised. The Corsini encyclopedia of psychology. 2010; 1-2. [DOI:10.1002/9780470479216.corpsy0970]

[17] Akhavan Abiri F, Shairi M. [Validity and reliability of Symptom checklist-90-revised (SCL-90-R) and brief Symptom inventory-53 (BSI-53) (Persian)]. Clin Psychol Pers. 2020; 17(2):169-95. [DOI:10.22070/CPAP.2020.2916]

[18] Anisi J, Babaei S, Barani M, Mohammadlo H, Ebrahimi F. [Determine the psychometric properties by Symptom checklist-90-revised (SCL-90-R) among military forces (Persian)]. Ebnesina 2016; 17(4):13-8. [Link]

[19] Cortés-Álvarez NY, Piñeiro-Lamas R, Vuelvas-Olmos CR. Psychological effects and associated factors of covid-19 in a Mexican sample. Disaster Med Public Health Prep. 2020; 14(3):413-24. [DOI:10.1017/dmp.2020.215] [PMID] [PMCID]

[20] Elran-Barak R, Mozeikov M. One month into the reinforcement of social distancing due to the covid-19 outbreak: Subjective health, health behaviors, and loneliness among people with chronic medical conditions. Int J Environ Res Public Health. 2020; 17(15):5403. [DOI:10.3390/ijerph17155403] [PMID] [PMCID]

[21] Meireles AL, Xavier CC, de Souza Andrade AC, Proietti FA, Caiaffa WT. Self-rated health among urban adolescents: The roles of age, gender, and their associated factors. Plos One. 2015; 10(7):e0132254. [DOI:10.1371/journal.pone.0132254] [PMID] [PMCID]

[22] Warburton DER, Bredin SSD. Health benefits of physical activity: A systematic review of current systematic reviews. Curr Opin Cardiol. 2017; 32(5):541-56. [DOI:10.1097/HCO.0000000000000437] [PMID]

[23] Södergren M, Sundquist J, Johansson SE, Sundquist K. Physical activity, exercise and self-rated health: A population-based study from Sweden. BMC Public Health. 2008; 8:352. [DOI:10.1186/1471-2458-8-352] [PMID] [PMCID]

[24] Elinder LS, Sundblom E, Rosendahl KI. Low physical activity is a predictor of thinness and low self-rated health: Gender differences in a Swedish cohort. J Adolesc Health. 2011; 48(5):481-6. [DOI:10.1016/j.jadohealth.2010.08.005] [PMID]

[25] Yang F, Jiang Y. Heterogeneous influences of social support on physical and mental health: Evidence from China. Int J Environ Res Public Health. 2020; 17(18):6838. [DOI:10.3390/ijerph17186838] [PMID] [PMCID]

[26] Xiaoming X, Ming A, Su H, Wo W, Jianmei C, Qi Z, et al. The psychological status of 8817 hospital workers during covid-19 epidemic: A cross-sectional study in Chongqing. J Affect Disord. 2020; 276:555-61. [DOI:10.1016/j.jad.2020.07.092] [PMID] [PMCID]

[27] Talevi D, Socci V, Carai M, Carnaghi G, Faleri S, Trebbi E, et al. Mental health outcomes of the covid-19 pandemic. Riv Psichiatr. 2020; 55(3):137-44. [DOI:10.1708/3382.33569] [PMID]

[28] van Tilburg TG, Steinmetz S, Stolte E, van der Roest H, de Vries DH. Loneliness and mental health during the covid-19 pandemic: A study among Dutch older adults. J Gerontol B Psychol Sci Soc Sci. 2021; 76(7):e249-55. [DOI:10.1093/geronb/gbaa111] [PMID] [PMCID]

[29] Xiong J, Lipsitz O, Nasri F, Lui LMW, Gill H, Phan L, et al. Impact of covid-19 pandemic on mental health in the general population: A systematic review. J Affect Disord. 2020; 277:55-64. [DOI:10.1016/j.jad.2020.08.001] [PMID] [PMCID]

[30] Song B, Zhao Y, Zhu J. Covid-19-related traumatic effects and psychological reactions among international students. J Epidemiol Glob Health. 2021; 11(1):117-23. [DOI:10.2991/jegh.k.201016.001] [PMID] [PMCID]

[31] Han RH, Schmidt MN, Waits WM, Bell AKC, Miller TL. Planning for mental health needs during covid-19. Curr Psychiatry Rep. 2020; 22(12):66. [DOI:10.1007/s11920-020-01189-6] [PMID] [PMCID]

Journal of
Inflammatory Diseases
(Previous Title: The Journal of Qazvin University of Medical Sciences)

[32] Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (covid-19) epidemic among the general population in China. Int J Environ Res Public Health. 2020; 17(5):1729. [DOI:10.3390/ijerph17051729] [PMID] [PMCID]

[33] Wang C, Pan R, Wan X, Tan Y, Xu L, McIntyre RS, et al. A longitudinal study on the mental health of general population during the covid-19 epidemic in China. Brain Behav Immun. 2020; 87:40-8. [DOI:10.1016/j.bbi.2020.04.028] [PMID] [PMCID]

[34] Chakraborty N. The covid-19 pandemic and its impact on mental health. Prog Neurol Psychiatry. 2020; 24(2):21-4. [DOI:10.1002/pnp.666]

[35] Fan H, Nie X. Impacts of layoffs and government assistance on mental health during covid-19: An evidence-based study of the United States. Sustainability. 2020; 12(18):7763. [DOI:10.3390/su12187763]

[36] Lu WH, Ko NY, Chang YP, Yen CF, Wang PW. The coronavirus disease 2019 pandemic in Taiwan: An online survey on worry and anxiety and associated factors. Int J Environ Res Public Health. 2020; 17(21):7974. [DOI:10.3390/ijerph17217974] [PMID] [PMCID]