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Anxiety and depression and the related factors in nurses of Guilan University of Medical Sciences hospitals during COVID-19: A web-based cross-sectional study

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ABSTRACT

Background: The outbreak of COVID-19 is an unprecedented challenge to the health systems in Iran. We aimed to assess the psychological impact of this outbreak on nurses in the hospitals of Guilan University of Medical Sciences that is one of the top provinces of incidence of COVID-19.

Methods: In a web-based cross-sectional study, 441 nurses working were selected from the hospitals, from 7 to 12 April 2020. Anxiety and depression were measured using the Generalized Anxiety Disorder-7 and the Patient Health Questionnaire-9, respectively. Simple and multiple logistic regression models were used to identify the factors related to anxiety and depression.

Results: The majority were in contact with suspected or confirmed COVID-19 cases (93.4%) and their relatives had been infected with COVID-19 (42%). The mean of anxiety-7 and depression total scores were 8.64 ± 5.60 and 8.48 ± 6.19, respectively. Female (OR = 3.27, 95% CI = 1.01–10.64), working in COVID-19 designated hospital (OR = 1.82, 95% CI = 1.13–2.93), being suspected with COVID-19 infection (OR = 2.01, 95% CI = 1.25–3.26), and insufficient personal protective equipment (OR = 2.61, 95% CI = 1.68–4.06) were associated with anxiety. Depression was significantly associated with female sex (OR = 4.62, %95 CI = 1.24–17.16), having chronic disease (OR = 2.12, 95% CI = 1.20–3.74), being suspected or confirmed with COVID-19 infection (OR = 3.44, 95% CI = 2.11–5.59, and OR = 2.21, 95% CI = 1.04–4.70, respectively), and insufficient personal protective equipment (OR = 1.86, 95% CI = 1.19–2.91).

Conclusion: The finding declares healthcare workers are at high risk for mental illness. Continuous supervision of the psychological consequences following infectious diseases outbreaks should be a part of the preparedness efforts of health care systems.

1. Background

At the end of 2019, a cluster of unexplained symptoms of acute respiratory failure and fatal pneumonia was reported in Wuhan, China (Karimi-Zarchi et al., 2020). Epidemiological findings suggested an infectious disease caused by a newly discovered coronavirus. As of March 9, 2020, about 3800 Chinese died from the disease. In February 2020 the World Health Organization named it Coronavirus disease (2019). It is now commonly known as the COVID-19 (Huang & Zhao, 2020; Sohrabi et al., 2020). Currently, COVID-19 is the sixth health crisis of public health worldwide (Arab-Mazar, Sah, Rabaan, Dhama, & Rodríguez-Morales, 2020).

On Feb. 21, COVID-19 was reported in Iran. Iran has been experiencing an epidemic of COVID-19 and is one of the top countries that

have the highest incidence of the novel Coronavirus (Nemati, Ebrahimi, & Nemati). Qom, a popular religious tourism city in about 100 miles south of the capital Tehran, is where the first cases of COVID-19 were identified in Iran (Muniz-Rodriguez et al., 2020; World HealthOrganization, 2020).

In a short time after Qom, Guilan province reported healthcare system saturation due to very high patient loads and intensive care needs. The high rate of infection, mortality due to severe lung damage, and lack of a specific treatment for the disease created a great crisis in Guilan province (Liu et al., 2020).

Following the global emergency of COVID-19, healthcare workers, especially nurses were encountered with an increasing workload. In the early days of the outbreak, many medical workers in Guilan province became infected and died (Li et al., 2015). As a result of close contact with the infected patients, the nurses had high-level concerns about the epidemic, uncertainty of its duration, and the possibility of transmitting the disease to their family members (Chen et al., 2020). Also, wearing heavy protective equipment for a long time and difficulty in performing care procedures were the most important causes of fatigue and anxiety in the nurses (Liu et al., 2020).

Many studies have shown psychological disorders during the epidemic of acute respiratory diseases in nurses. In this regard, anxiety and depression are the negative emotional states and the common psychological barriers of nurses (Li et al., 2015; Wu et al., 2009).

Koh et al. found that more than 50% of Singapore's clinical staff experienced anxiety, stress, and increased workload during the SARS epidemic (Koh et al., 2005). Despite Guilan is one of the areas with a high prevalence of COVID-19 in Iran, to date, the immediate psychological impact of COVID-19 on the hospital nurses is still unknown. We aimed to assess the level of anxiety and depression among the nurses that have been involved with COVID-19 patients and to determine its predictors among Guilan hospital nurses.

2. Methods

2.1. Study design and participants

This is a cross-sectional study that was conducted in Guilan province. Guilan is an area critically affected by COVID-19 in the north of Iran. Using convenience sampling, 441 hospital nurses during the prevalence of COVID-19 were selected from 25 hospitals of Guilan University of Medical Sciences (GUMS). The nurses entered the study if they were working in one of the hospitals in Guilan province during the outbreak of COVID-19. In addition, as the study instrument was an electronic questionnaire, the nurses responded to the questionnaire if they had access to the electronic platform. Also, the incomplete questionnaires were excluded from the study.

2.2. Instruments

2.2.1. Demographic variables
Demographic variables consisted of age, sex, marital status, parents' status, place of residence, educational level, job title, and years of working experience.

2.2.2. COVID-19-related variables
The COVID-19-related variables consisted of: (1) having chronic diseases, (2) working in COVID-19 designated hospitals, (3) being in contact with suspected or confirmed COVID-19 cases, (4) families, relatives or friends infected with COVID-19, (5) death of families, relatives or friends due to COVID-19, (6) health status, and (7) having sufficient personal protective equipment.

2.2.3. Generalized anxiety Disorder-7 (GAD-7)
The GAD-7 is a 7-item self-administered instrument that is widely used to measure GAD based on DSM-IV criteria (Spitzer, Kroenke,

Williams, & Löwe, 2006). Items are rated on a 4 point Likert-type scale ranging from 0 (not at all) to 3 (nearly every day). The total score can range from 0 to 21, and a total score of 10 or more is considered indicative of GAD symptoms. The Persian version of this instrument has been shown to have good reliability and validity (Omani-Samani, Maroufizadeh, Ghaheri, & Navid, 2018). The obtained Cronbach's alpha coefficient of *GAD-7* in the current study was 0.896.

2.2.4. Patient Health Questionnaire-9 (PHQ-9)
The PHQ-9 is a 9-item self-administered instrument that is widely used to measure depressive symptoms based on the DSM-IV criteria (Kroenke & Spitzer, 2002). Items are rated on a 4-point Likert-type scale ranging from 0 (not at all) to 3 (nearly every day). The total score can range from 0 to 27, and a total score of 10 or more is considered indicative of depressive symptoms. The Persian version of this instrument has been shown to have good reliability and validity (Maroufizadeh, Omani-Samani, Almasi-Hashiani, Amini, & Sepidarkish, 2019). Cronbach's alpha coefficient was 0.890.

2.3. Data collection

Data were collected from 7 to 12 April 2020. 441 nurses completed the study questionnaires. To prevent COVID-19 transmission through direct contact, we used an electronic web-based questionnaire. Data collection was conducted through social media and the questionnaires were available for the participants using the online platform of WhatsApp. We sent the questionnaires to the nursing virtual groups through the nursing managers in the hospitals of Guilan province where the COVID-19 patients had been admitted. Participation in this study was voluntary.

2.4. Statistical analysis

In this study, continuous variables were expressed as mean ± standard deviation (SD) and categorical variables as frequency (percentage). Simple and multiple logistic regression analyses were performed to determine the predictors of anxiety and depressive symptoms. The crude and adjusted odds ratio (OR) and 95% confidence interval (CI) were calculated. Statistical analysis was done with SPSS for Windows, version 16.0 (SPSS Inc., Chicago, IL, USA), and the level of significance was set at 0.05.

2.5. Ethical consideration

This study was approved by the Ethics Committee of Guilan University of Medical Sciences, Rasht, Iran (Ethics Code: IR.GUMS.REC.1399.007), and all nurses were informed about the aim of the study and the voluntary nature of their participation.

3. Results

3.1. Participants' characteristics

The demographic and COVID-19-related characteristics of the participants are outlined in Table 1. The mean age of the participants was 36.34 ± 8.74 years. Most of them were female (95.2%), married (76.0%), had children (59.9%), residents in the urban areas (94.1%), and had a BSN degree (87.8%). The majority were in contact with suspected or confirmed COVID-19 cases (93.4%) and their families, relatives or friends had been infected with COVID-19 (42%). 61.9% stated that their protective equipment was sufficient.

3.2. Distribution of GAD-7 and PHQ-9 total scores

The mean of GAD-7 and PHQ-9 total scores were 8.64 ± 5.60 and 8.48 ± 6.19, respectively. Table 2 also shows the distribution of scores

Table 1
Demographic characteristics of the nurses (n = 441).

	Mean ± SD or n (%)
Age (years)	36.34 ± 8.74
< 30	131 (29.7)
30–40	143 (32.4)
> 40	167 (37.9)
Sex	
Male	21 (4.8)
Female	420 (95.2)
Marital status	
Single	106 (24.0)
Married	335 (76.0)
Parent status	
No child	177 (40.1)
One or more children	264 (59.9)
Place of residence	
Rural	26 (5.9)
Urban	415 (94.1)
Education	
Diploma	6 (1.4)
Associate degree in nursing (ADN)	4 (0.9)
Bachelor of Science in Nursing (BSN)	387 (87.8)
Master of Science in Nursing (MSN)	42 (9.5)
Doctorate	2 (0.5)
Job title	
Certified Nursing Assistant (CAN)	2 (0.5)
Licensed Practical Nurse (LPN)	6 (1.4)
Registered Nurse (RN)	340 (77.1)
Head Nurse	49 (11.1)
Supervisor	40 (9.1)
Matron	4 (0.9)
Years of working experience (years)	11.07 ± 7.47
< 5	131 (29.5)
5–15	181 (41.0)
> 15	130 (29.5)
Chronic diseases	
No	364 (82.5)
Yes	77 (17.5)
Working in COVID-19 designated hospital	
No	136 (30.8)
Yes	305 (69.2)
Contact with suspected/confirmed COVID-19 cases	
No	29 (6.6)
Yes	412 (93.4)
Families, relatives or friends infected with COVID-19	
No	256 (58.0)
Yes	185 (42.0)
Death of families, relatives or friends due to COVID-19	
No	369 (83.7)
Yes	72 (16.3)
Health status	
Healthy	281 (63.7)
Suspected with COVID-19	120 (27.2)
Confirmed with COVID-19	40 (9.1)
Personal protective equipment	
Sufficient	273 (61.9)
Insufficient	168 (38.1)

COVID-19: Coronavirus Disease 2019; SD: Standard deviation.

Table 2
Distribution of nurses across the GAD-7 and PHQ-9 severity ratings (n = 441).

Scale/severity	n (%)
GAD-7	
No anxiety (0–4)	117 (26.5)
Mild (5–9)	153 (34.7)
Moderate (10–14)	87 (19.7)
Severe (15–21)	84 (19.0)
PHQ-9	
None-minimal (0–4)	128 (29.0)
Mild (5–9)	148 (33.6)
Moderate (10–14)	88 (20.0)
Moderately severe (15–19)	47 (10.7)
Severe (20–27)	30 (6.8)

GAD-7: Generalized Anxiety Disorder-7; PHQ-9: Patient Health Questionnaire-9.

with the healthy nurses, those with suspected COVID-19 infection reported higher GAD symptoms (OR $_{Adj}$ = 2.01, 95% CI: 1.25–3.26). The nurses who had not had access to adequate personal protective equipment reported higher GAD symptoms than other nurses (OR $_{Adj}$ = 2.61, 95% CI: 1.68–4.06).

3.4. Factors associated with depressive symptoms

Based on multiple logistic regression analysis, female nurses were 4.62 times more likely to have depressive symptoms than male nurses (OR $_{Adj}$ = 4.62, 95% CI: 1.24–17.16) (Table 4). Having chronic diseases increased the likelihood of having depressive symptoms by 112 percent (OR $_{Adj}$ = 2.12, 95% CI: 1.20–3.74). Compared with healthy nurses, those with suspected COVID-19 and confirmed COVID-19 infection reported higher depressive symptoms (OR $_{Adj}$ = 3.42, 95% CI: 2.11–5.59, and OR $_{Adj}$ = 2.21, 95% CI: 1.04–4.70, respectively). Nurses who had not had access to adequate personal protective equipment reported higher depressive symptoms than other nurses (OR $_{Adj}$ = 1.86, 95% CI: 1.19–2.91).

4. Discussion

Most participants were female (95.2%), were married (76.0%), and had a BSN degree (87.8%). The prevalence of anxiety and depression measured by using GAD-7 and PHQ-9 was 38.8% and 37.4%, respectively. In another study conducted in Iran, Nemati et al. (2020) also found that there was a high prevalence of stress levels among nurses at the time of the COVID-19 outbreak (Nemati et al.; Nemati, Ebrahimi, & Nemati, 2020). In line with Iran's findings, studies conducted in china reported the psychological distress was highly prevalent among health care providers (Huang & Zhao, 2020; Lai, Shih, Ko, Tang, & Hsueh, 2020; Maunder et al., 2003).

Lai et al. (2020) conducted a study in 34 hospitals in China on 1257 health care providers (60.8%) nurses, 39.2% physicians). 50.4% of the participants had symptoms of depression, while 44.6% had anxiety symptoms (Lai J). In another study by Huang et al. (2020), higher levels of anxiety among health care providers were reported compared to others at the time of the COVID-19 outbreak (Huang, 2020). Moreover, previous studies reported adverse psychological reactions to the SARS outbreak among health care providers (Bai et al., 2004; Chua et al., 2004; Lee et al., 2007; Maunder et al., 2003).

According to the World Health Organization, the COVID-19 pandemic is likely to have both long- and short-term impacts on mental health (World HealthOrganization, 2020). To recognize the importance of the mental health implications of the pandemic, the World Health Organization released a list of considerations to address the mental well-being of high-risk groups, including health care providers (Organization:https://www.who.int/docs/default-source/coronaviruse/situat ion-reports/20200318-sitrep-

falling within GAD-7 and PHQ-9 severity cutoffs. Based on a cut-off value of 10, the prevalence of GAD and depressive symptoms were 38.8% (n = 171) and 37.4% (n = 165), respectively.

3.3. Factors associated with GAD symptoms

Simple and multiple logistic regression analyses were applied to identify factors associated with GAD among the nurses (see Table 3). Based on multiple logistic regression analysis (i.e., adjusted analysis), female nurses were 3.27 times more likely to have GAD than male nurses (OR $_{Adj}$ = 3.27, 95% CI: 1.01–10.64). The nurses who worked in COVID-19 designated hospitals were 1.82 times more likely to have GAD than other nurses (OR $_{Adj}$ = 1.82, 95% CI: 1.13–2.93). Compared

Table 3

Association between GAD and demographic/COVID-19-related variables among nurses.

Variables	Prevalence of anxiety, n (%)	Simple logistic regression		Multiple logistic regression	
		OR Crude (95% CI)	P	OR Adj (95% CI)	P
Age (years)					
< 30	52 (39.7)	1		1	
30–40	62 (43.4)	1.16 (0.72 – 1.88)	0.539	0.77 (0.27 – 2.19)	0.630
> 40	57 (34.1)	0.79 (0.49 – 1.26)	0.323	0.39 (0.12 – 1.34)	0.137
Sex					
Male	4 (19.0)	1		1	
Female	167 (39.8)	2.81 (0.93 – 8.48)	0.068	3.27 (1.01 – 10.64)	0.049
Marital status					
Single	46 (43.4)	1		1	
Married	125 (37.3)	0.78 (0.50 – 1.21)	0.263	1.08 (0.57 – 2.06)	0.807
Parent status					
No child	77 (43.5)	1		1	
One child or more	94 (35.6)	0.72 (0.49 – 1.06)	0.096	0.66 (0.34 – 1.27)	0.212
Place of residence					
Rural	8 (30.8)	1		1	
Urban	163 (39.3)	1.46 (0.62 – 3.42)	0.390	1.44 (0.57 – 3.63)	0.439
Education					
Diploma/AND/BSN	156 (39.3)	1		1	
MSN/Doctorate	15 (34.1)	0.80 (0.42 – 1.54)	0.502	0.61 (0.28 – 1.34)	0.218
Job title					
CAN/LPN/RN	140 (40.2)	1		1	
Head Nurse	17 (34.7)	0.79 (0.42 – 1.48)	0.459	1.03 (0.49 – 2.18)	0.938
Supervisor/Matron	14 (31.8)	0.69 (0.35 – 1.35)	0.284	0.78 (0.35 – 1.70)	0.528
Years of working experience					
< 5	50 (38.5)	1		1	
10–15	71 (39.2)	1.03 (0.65 – 1.64)	0.891	1.64 (0.59 – 4.61)	0.345
> 15	50 (38.5)	1.00 (0.61 – 1.65)	0.999	2.87 (0.84 – 9.82)	0.093
Chronic diseases					
No	135 (37.1)	1		1	
Yes	36 (46.8)	1.49 (0.91 – 2.44)	0.115	1.59 (0.90 – 2.79)	0.109
Working in COVID-19 designated hospital					
No	43 (31.6)	1		1	
Yes	128 (42.0)	1.56 (1.02 – 2.40)	0.040	1.82 (1.13 – 2.93)	0.013
Contact with suspected or confirmed COVID-19 cases					
No	9 (31.0)	1		1	
Yes	162 (39.3)	1.44 (0.64 – 3.24)	0.378	1.26 (0.52 – 3.02)	0.610
Families, relatives or friends infected with COVID-19					
No	95 (37.1)	1		1	
Yes	76 (41.1)	1.18 (0.80 – 1.74)	0.398	1.00 (0.63 – 1.60)	0.991
Death of families, relatives or friends due to COVID-19					
No	136 (36.9)	1		1	
Yes	35 (48.6)	1.62 (0.97 – 2.69)	0.063	1.36 (0.75 – 2.48)	0.311
Health status					
Healthy	91 (32.4)	1		1	
Suspected with COVID-19	63 (52.5)	2.31 (1.49 – 3.57)	< 0.001	2.01 (1.25 – 3.26)	0.004
Confirmed with COVID-19	17 (42.5)	1.54 (0.79 – 3.03)	0.208	1.35 (0.63 – 2.85)	0.440
Personal protective equipment					
Sufficient	82 (30.0)	1		1	
Insufficient	89 (53.0)	2.62 (1.76 – 3.91)	< 0.001	2.61 (1.68 – 4.06)	< 0.001

COVID-19: Coronavirus Disease 2019; CI: Confidence Interval; OR: Odds Ratio: ADN: Associate Degree in Nursing; BSN: Bachelor of Science in Nursing; MSN: Master of Science in Nursing; CAN: Certified Nursing Assistant; LPN: Licensed Practical Nurse: RN; Registered Nurse.

58-COVID-19.pdf?sfvrsn = 20876712_2.).

Generally, the recent studies highlighted the effects of COVID-19 not only on nurses' physical health but also on their mental health (Dai et al., 2019; Huang, 2020; Lai et al., 2020; Nemati et al., 2020).

Understandably, the rapid spread of COVID-19 has put severe pressure on health care providers especially nurses around the world. But, during the COVID-19 pandemic, the level of anxiety and depression as psychological complications are so alarming, the availability of counseling services to promote mental well-being is essential for healthcare providers, especially nurses, women, and the front line workers exposed to COVID-19 (The State Council of China A notification to set up nationwide psychological assistance hotlines against the 2019-nCoV outbreak. Published February 2).

The study revealed that the female gender, being suspected of having a COVID-19 infection, and not having access to adequate personal protective equipment were the factors associated with depression and anxiety. Previous studies reported nurses, female gender, and front line workers engaged in the care of patients with COVID-19 experiencing more severe symptoms of depression and anxiety (Dai et al., 2019; Lai et al., 2020; Nemati et al., 2020).

Our findings further indicate that working in COVID-19 designated hospitals was also a risk factor for anxiety. In line with our findings, other studies have shown front line health providers in designated COVID-19 hospitals were at especially high risk for symptoms of psychological distress, and also some mental health and psychosocial considerations may be made during the outbreak (Samara Rosenfeld. COVID-19 Affects Mental Health of Nurses).

During the Coronavirus outbreak, causes of anxiety and depression among health care providers were reported to be a higher prevalence of the virus, the transmission from human to human, as well as the high fatality of the virus (Dai Y). In addition, the increasing influx of suspected and actual cases of COVID-19 and shortages of supplies leads to

Table 4

Association between depression and demographic/COVID-19-related variables among nurses.

Variables	Prevalence of depression, n (%)	Simple logistic regression		Multiple logistic regression	
		OR Crude (95% CI)	P	OR Adj (95% CI)	P
Age (years)					
< 30	48 (36.6)	1		1	
30–40	56 (39.2)	1.11 (0.68 – 1.81)	0.668	1.35 (0.47 – 3.92)	0.579
> 40	61 (36.5)	1.00 (0.62 – 1.60)	0.984	1.14 (0.33 – 3.96)	0.841
Sex					
Male	3 (14.3)	1		1	
Female	162 (38.6)	3.77 (1.09 – 12.99)	0.036	4.62 (1.24 – 17.16)	0.022
Marital status					
Single	47 (44.3)	1		1	
Married	118 (35.2)	0.68 (0.44 – 1.06)	0.092	0.66 (0.34 – 1.29)	0.226
Parent status					
No child	72 (40.7)	1		1	
One child or more	93 (35.2)	0.79 (0.54 – 1.17)	0.247	0.81 (0.41 – 1.61)	0.552
Place of residence					
Rural	8 (30.8)	1		1	
Urban	157 (37.8)	1.37 (0.58 – 3.22)	0.472	1.15 (0.45 – 2.92)	0.770
Education					
Diploma/ADN/BSN	150 (37.8)	1		1	
MSN/Doctorate	15 (34.1)	0.85 (0.44 – 1.64)	0.631	0.77 (0.35 – 1.69)	0.518
Job title					
CAN/LPN/RN	132 (37.9)	1		1	
Head Nurse	20 (40.8)	1.13 (0.61 – 2.98)	0.697	1.35 (0.64 – 2.85)	0.426
Supervisor/Matron	13 (29.5)	0.69 (0.35 – 1.36)	0.280	0.66 (0.30 – 1.48)	0.315
Years of working experience					
< 5	49 (37.7)	1		1	
10–15	65 (35.9)	0.93 (0.58 – 1.48)	0.748	0.77 (0.27 – 2.19)	0.618
> 15	51 (39.2)	1.07 (0.65 – 1.76)	0.799	0.95 (0.27 – 3.29)	0.935
Chronic diseases					
No	125 (34.3)	1		1	
Yes	40 (51.9)	2.07 (1.26 – 3.40)	0.004	2.12 (1.20 – 3.74)	0.010
Working in COVID-19 designated hospital					
No	44 (32.4)	1		1	
Yes	121 (39.7)	1.37 (0.90 – 2.11)	0.143	1.49 (0.92 – 2.40)	0.101
Contact with suspected or confirmed COVID-19 cases					
No	10 (34.5)	1		1	
Yes	155 (37.6)	1.15 (0.52 – 2.53)	0.736	1.02 (0.43 – 2.43)	0.966
Families, relatives or friends infected with COVID-19					
No	90 (35.2)	1		1	
Yes	75 (40.5)	1.26 (0.85 – 1.86)	0.249	0.96 (0.60 – 1.55)	0.876
Death of families, relatives or friends due to COVID-19					
No	131 (35.5)	1		1	
Yes	34 (47.2)	1.63 (0.98 – 2.71)	0.062	1.34 (0.73 – 2.45)	0.342
Health status					
Healthy	78 (27.8)	1		1	
Suspected with COVID-19	69 (57.5)	3.52 (2.25 – 5.50)	< 0.001	3.44 (2.11 – 5.59)	< 0.001
Confirmed with COVID-19	18 (45.0)	2.13 (1.08 – 4.18)	0.028	2.21 (1.04 – 4.70)	0.039
Personal protective equipment					
Sufficient	85 (31.1)	1		1	
Insufficient	80 (47.6)	2.01 (1.35 – 2.99)	0.001	1.86 (1.19 – 2.91)	0.006

COVID-19: Coronavirus Disease 2019; CI: Confidence Interval; OR: Odds Ratio: ADN: Associate Degree in Nursing; BSN: Bachelor of Science in Nursing; MSN: Master of Science in Nursing; CAN: Certified Nursing Assistant; LPN: Licensed Practical Nurse; RN: Registered Nurse.

the double pressures and concerns of health care providers (Zhu et al., 2020). Studies have also shown that nurses are afraid of spreading the infection to their families, colleagues, and friends (Du Toit, 2020).

5. Study strength and limitations

As the study relied on participants' self-reported data, it may have resulted in the over or underestimation of the study variables. Generalization of the study findings is also limited as the study respondents were recruited from a web-based sampling. In this study 95.2% participants were female. There is a shortage of male nurses in Iran as 23% the nurses are male. As male and female nurses have some different perspectives about occupational subjects and caring (Zamanzadeh et al., 2013), it is a limitation in the current study.

6. Conclusion

Our study showed a major mental health disorder of the nurses during the COVID-19 epidemic in Guilan. The finding declares healthcare workers are at high risk for mental illness. Lack of access to adequate personal protective equipment and suspected COVID-19 infection were associated with higher GAD and depressive symptoms. Continuous supervision of the psychological consequences following infectious diseases outbreaks should be a part of the preparedness efforts of health care systems.

7. Availability of data and materials

The datasets used and/or analyzed during the present study are available from the corresponding author on reasonable request.

8. Ethical consideration

This study was approved by the Ethics Committee of Guilan University of Medical Sciences, Rasht, Iran (Ethics Code: IR.GUMS.REC.1399.007), and all nurses were informed about the aim of the study and the voluntary nature of their participations.

9. Ethics approval and consent to participate

This study was approved by the Ethics Committee of GUMS, Rasht, Iran (Ethics Code: IR.GUMS.REC.1399.007), and all nurses were informed about the aim of the study and the voluntary nature of their participations.

CRediT authorship contribution statement

Moluk Pouralizadeh: Conceptualization, Project administration, Supervision, Original draft. **Zahra Bostani:** Writing, Review & editing, Original draft. **Saman Maroufizadeh:** Formal Analysis, Methodology, Software, Original draft. **Atefeh Ghanbari:** Supervision. **Maryam Khoshbakht:** Data curation, Validation, Supervision. **Seyed Amirhossein Alavi:** Data curation, Software. **Sadra Ashrafi:** Review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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