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Depression, anxiety, and suicidal ideation in nurses with and without symptoms of secondary traumatic stress during the COVID-19 outbreak

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ABSTRACT

Background: Nurses tend to experience a lot of Secondary Traumatic Stress (STS) during the outbreak of the COVID-19. This study aimed to evaluate the prevalence of STS and comparing depression, anxiety, and Suicidal Ideation (SI) in nurses with and without STS symptoms during the COVID-19 outbreak.

Method: The research method of this study was descriptive-comparative. The statistical sample consisted of 315 nurses working in hospitals of Malayer city, western Iran, selected through census method. Data were collected using the STS Scale, Beck's Depression Inventory (BDI-13), Anxiety Inventory (BAI), and SI scale. Data were analyzed using the independent *t*-test, multivariate analysis of variance (MANOVA), and multivariate analysis of covariance (MANCOVA).

Results: This study showed that 161 nurses (51.11%) had symptoms of STS. The prevalence of STS symptoms in nurses in emergency, ICU/CCU, medical emergencies, and other wards was 62.27%, 62.02%, 51.61%, and 26.32%, respectively. The results of the MANCOVA showed that the nurses with STS symptoms received higher scores in depression, anxiety, and SI than the ones without STS symptoms ($p < 0.01$).

Conclusion: Hospital authorities and nursing psychiatrists should pay more attention to the STS symptoms in nurses during the COVID-19 outbreak, and its effects on depression, anxiety, and SI.

Introduction

December 2019, a novel coronavirus was reported in Wuhan, China, (Thompson, 2020) and spread rapidly in less than four months in all countries (Zangrillo et al., 2020). The COVID-19 disease caused by the novel coronavirus has caused >110 million infections and 2,455,000 deaths by 21 February 2021, worldwide (World Health Organization [WHO], 2021). As the leading country in terms of the number of cases and deaths due to COVID-19 in the Eastern Mediterranean region, Iran faces major challenges in controlling this disease (Ariapooran & Khezeli, 2021). COVID-19 has symptoms such as respiratory disorders, runny nose, dry cough, dizziness, sore throat, and body aches that can be accompanied by headaches, and fever (Chen et al., 2020). Uncertainty regarding the treatment of COVID-19 and its short- and long-term blows is the main concern of the people and policymakers (Sharif, Aloui, & Yarovaya, 2020).

Erosive and excessive stress due to the care and treatment of patients with COVID-19 in nurses can cause common mental disorders such as

anxiety and depression (Dar, Iqbal, & Mushtaq, 2017; Graeme, 2020; Mo et al., 2020; Shen, Zou, Zhong, Yan, & Li, 2020). Previous studies have reported a prevalence of depression in nurses and physicians from 25% to 43% (Kuhn & Flanagan, 2017; Maharaj, Lees, & Lal, 2018; Melnyk et al., 2018). In a study conducted in Iran, 24.9% of nurses had depressive symptoms and 27.9% had anxiety symptoms, and the rate of the depression was higher in female nurses than male counterparts (Asad Zandi, Sayari, Ebadi, & Sanainasab, 2011). A study has revealed that 14.3%, 10.7%, and 91.2% of nurses reported moderate to high rates of depression, anxiety, and fear during the COVID-19 outbreak, respectively (Hu et al., 2020). Problems with appetite and indigestion, fatigue, sleep problem, nervousness, crying, and SI were found to be the main problems in ICU nurses during the COVID-19 outbreak (Shen et al., 2020). A qualitative study indicated that nurses experienced the higher levels of fatigue, discomfort, and helplessness during the COVID-19 outbreak (Sun et al., 2020). Another study showed that 42.8% and 13.1% of nurses had moderate and severe anxiety symptoms during the COVID-19 outbreak, respectively (Savitsky, Findling, Erel, & Hendel,

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2020).

Although SI has widely been studied in western Iran (Ariapooran, Heidari, Asgari, Ashtarian, & Khezeli, 2018; Ariapooran & Khezeli, 2018; Khezeli et al., 2019), but during the COVID-19 pandemic, it has received less attention, especially among nurses. Some studies have shown that the suicide rates compared to the general population is higher among the nurses (Davidson, Proudfoot, Lee, Terterian, & Zisook, 2020; Fink-Miller & Nestler, 2018).

Secondary Traumatic Stress (STS) is one of the problems that nurses may experience in caring for patients. STS is defined as the behavioral consequences and natural emotions arising from knowledge about a stressful event experienced by another person and helping one injured person (Figley, 2013). The prevalence of STS in different countries is estimated to be from 7% to 67.64% depending on the target groups or regions (Duffy, Avalos, & Dowling, 2015; Günüşen, Wilson, & Aksoy, 2017; Von Rueden et al., 2010). In a study conducted in Iran, the prevalence of STS in married nurses was reported to be 22.4% (Ariapooran & Raziani, 2019). Another study reported the total prevalence of STS in nurses of Malayer city, located in the west part of Iran to be 39.9%, significantly higher in emergency nurses [41.5%] than in non-emergency wards [37.9%] (Ariapooran, 2013). Some studies demonstrated that nurses with STS symptoms experienced more depression (Ariapooran & Raziani, 2019) and anxiety (Bock, Heitland, Zimmermann, Winter, & Kahl, 2020) than nurses without STS symptoms. Furthermore, STS was found to be correlated with anxiety (Colombo, Emanuel, & Zito, 2019).

This study aimed to investigate the prevalence of STS and comparing depression, anxiety, and SI in nurses with and without symptoms of STS during the COVID-19 outbreak. Given that nurses are more exposed to stress due to COVID-19 than other people, (Mo et al., 2020; Shen et al., 2020), research on psychological problems associated with COVID-19 like STS is useful. Such research can promote a better understanding of the negative mental health consequences of the providing COVID-19 treatment for health care providers.

Methods

Sample and procedure

This was a descriptive-comparative study and aimed at investigating the STS prevalence and comparing depression, anxiety, and SI in nurses with and without STS symptoms during the COVID-19 outbreak. The statistical population of this study consisted of all nurses working at three hospitals in Malayer city, located in the west part of Iran in 2020. The sampling was done through census method due to Covid-19 conditions. Accordingly, the sample was comprised of all nurses including 525 nurses (205 in Shahid Gharazi Hospital, 200 in Imam Hossein Hospital, and 120 in Mehr Hospital). As a matter of fact, in total, 339 nurses completed the data gathering tools, demonstrating a response rate of 64.57%. After reviewing the questionnaires, 24 incomplete questionnaires were removed from the study, and the sample size was reduced to 315 nurses.

Measures

The data in this study were collected using the demographic information form, STS Scale, Beck Depression Inventory (BDI-13), Beck Anxiety Inventory (BAI), and Beck Scale for Suicidal Ideation (BSSI).

1. *Secondary Traumatic Stress Scale (STSS)*: Bride, Robinson, Yegidis, and Figley (2004) developed this scale which contains 17-items scored on a 5-point Likert scale from 1 (never) to 5 (often). The optimal cut-off point is 38 with a sensitivity of 0.93 and a specificity of 0.91. Accordingly, using this value, 93% of those who met the core criteria for PTSD would correctly be identified as having PTSD, and 91% of those who did not meet the core criteria for PTSD would be

identified as not having PTSD (Bride, 2007). This scale has three subscales including intrusion (5 items), avoidance (7 items), and arousal (5 items). The Cronbach's alpha for STS was 0.93, and for intrusion, avoidance, and arousal subscales equaled 0.80, 0.83, and 0.87, respectively (Bride et al., 2004). In examining the validity of this scale, Bride et al. (2004) found a significant relationship between depression ($r = 0.502$), anxiety ($r = 0.555$) and STS. Ariapooran (2013) reported the Cronbach's alpha coefficients for the full STSS, intrusion, avoidance and arousal subscales as 0.90, 0.68, 0.81, and 0.78, respectively. Another study conducted in Iran (Ariapooran & Raziani, 2019) also reported a favorable internal consistency of STSS questions.

2. *Beck Depression Inventory (BDI-13)*: This 13-item scale was developed by Beck and Beck (1972). It consisted of 21 items rated from 0 to 3. BDI-13 measures normal (0–3), mild (4–7), mild to moderate (8–11), moderate (12–15), and severe (16–39) depression. The Cronbach's alphas of the BDI-13 was reported to range from 0.78 to 0.97 indicating favorable to high internal consistency (Beck & Beck, 1972; Beck, Rial, & Rickels, 1974). In a study conducted in Iran, the Cronbach's alpha, Spearman-Brown, and Guttman's alpha coefficients of BDI-13 were found to be 0.85, 0.70, and 0.67, respectively (Dadfar & Kalibatseva, 2016). Moreover, in a study conducted among Iranian nurses, the Cronbach's alpha coefficient of BDI-13 was reported as 0.77 (Ariapooran, 2019). The present study calculated the Cronbach's alpha of BDI-13 to equal 0.78 which is almost consistent with the original version of BDI-13 and the one in other studies.
3. *Beck Anxiety Inventory (BAI)*: This 21-item (Beck & Steer, 1993) inventory, consisted of 21 items rated from 0 to 3 (basically = 0, mild = 1, moderate = 2, and severe = 3). The scores of BAI ranged from 0 to 63. BAI measures normal (0 to 7), mild (8 to 15), moderate (16 to 25), and severe (26 to 63) anxiety (Beck & Steer, 1993). BAI has been translated into Persian, and the Cronbach's alpha coefficient and the reliability of the one-week interval were calculated to equal 0.92 and 0.75 (Kaviani & Mousavi, 2008). In another study conducted in Iran, the Cronbach's alpha coefficient of BAI was estimated to be 0.92 (Rafiei & Seifi, 2013). The present study calculated the Cronbach's alpha of BAI to equal 0.81.
4. *Beck Scale for Suicidal Ideation (BSSI)*: Beck, Kovacs, and Weissman (1979) developed a scale that measures the severity of suicidal ideation using 19 items; each rated from 0 to 2. The total score of the BSSI ranges from 0 to 38, in which higher scores indicate the more intense suicidality. The first 5 questions of this questionnaire are screening tests, and the answers to these questions indicate the tendency or unwillingness to commit active or inactive suicide. BSSI measures the absence of SI (0–5), presence of SI (6–19), and readiness to suicide (20–38). The Cronbach's alpha coefficient of BSSI was calculated to be 0.89 (Beck et al., 1979). Anisi, Majdian, and Mirzamani (2010) performed semantic equivalence by translating and back translating BSSI into Persian language and reported the Cronbach's alpha coefficient of 0.90 for BSSI in a sample of Iranian soldiers. Another study conducted in Iran reported that the Cronbach's alpha coefficient of BSSI was witnessed to be 0.84 (Hakim-Shooshtari et al., 2016) and 0.95 (Rezapour-Shahkolai et al., 2020). The present study calculated the Cronbach's alpha of BSSI to be 0.74.

Data collection and ethical consideration

In this study, the researchers referred to the hospitals of Malayer city for one month. After explaining the purposes of the research to the nurses in different wards, an informed consent form was delivered to them and they filled it out. The participants completed the questionnaire which lasted for about 45 min. Moreover, owing to the contagious nature of the coronavirus, preventive measures were observed, including wearing a mask and observing social distance. The participants were also assured that their data would be confidential, and the results would

be published in an article without their personal information. This study received ethical approval from the Ethics Committee of Malayer University, Iran (IR.MALAYERU.REC.1399.002).

Analysis

Data were analyzed by IBM SPSS Statistics (Version 24). Frequency and percentage were used to evaluate the prevalence of STS in nurses. The multivariate analysis of covariance (MANCOVA) was also used to compare depression, anxiety, and SI to each other in order to control the effect of age and occupational experience in nurses with and without STS. It is worth mentioning that in previous studies, the role of age and occupational history in nurses' psychological problems, including depression, was confirmed (Ariapooran, 2019).

Results

As shown in Table 1, among all nurses, 195 (61.90%) were female, and 120 (38.10%) were male. In addition, 228 (72.38%) had a BA and 87 (27.62%) had an MA degree. Among the nurses, 115 nurses (36.51%) were single, and 200 (63.49%) were married. Furthermore, 79 (23.80%) of them were nurses in ICU and CCU, 31 (9.84%) were nurses in medical emergencies, 110 (34.92%) were nurses in emergency and 95 (30.16%) were nurses in other wards (such as surgery and pediatrics). In terms of work shift, 204 (64.76%) nurses had rotating work shifts, and 111 (35.24%) had fixed morning shifts. The mean age of all nurses was 34.69 ± 8.33 , and the mean of work experience was 11.30 ± 8.40 years. The mean of work hours in each shift was 13.36 ± 7.44 h.

As revealed by Table 2, 51.11% of nurses had STS symptoms. In addition, 31.66% of males and 63.08% of females had STS symptoms. Furthermore, 71.26% of nurses with a BA degree and 43.42% of nurses with an MA degree had STS symptoms. Among single nurses, 51.30% and married nurses 51.1% had STS symptoms. The prevalence of STS symptoms in nurses in emergency, ICU and CCU, medical emergencies, and other wards was 62.27%, 62.02%, 51.61%, and 26.32%, respectively. The results of the independent *t*-test indicated that the STS mean was higher in female nurses as compared to males. The mean was also higher in nurses with a BA degree than in nurses with an MA, and higher in single nurses than in married nurses. According to the results of multivariate analysis of variance (MANOVA), there was a significant difference between STS in nurses based on different wards (emergency, ICU and CCU, medical emergencies, and other wards). According to the LSD post-hoc test, the STS mean in ICU and CCU nurses was higher than in nurses in emergency, medical emergencies, and other wards. Additionally, in emergency nurses, the STS mean was higher than in medical

Table 1
Demographic characteristic of nurses.

Group	n (%)
Gender	
Males	120 (38.10%)
Females	195 (61.90%)
Educational levels	
Bachelor	87 (27.62%)
M.A	228 (72.38%)
Marital status	
Single	115 (36.51%)
Married	200 (63.49%)
Occupational wards	
Emergency	110 (34.92%)
ICU & CCU	79 (23.80%)
Medical emergencies	31 (9.84%)
Other wards	95 (30.16%)
Work shift	
Rotating work shifts	204 (64.76%)
Fixed morning shifts	111 (35.24%)
All participants	N = 315

	Mean	SD
Age	34.69	8.33
Work experience	11.30	8.40
Work shifts	13.33	7.44

Table 2
Prevalence and comparison the STS symptoms in nurses based on demographic variables in the outbreak of COVID-19.

Group		With STS	Without STS	M ± SD	Statistic test (p)
		F(%)	F(%)		
Gender	Males	38 (31.66%)	82(55%)	33.76 ± 11.78	<i>t</i> = -5.04 (p < 0.001)
	Females	123 (63.08%)	72 (36.92%)	40.31 ± 10.82	
Educational levels	Bachelor	62 (71.26%)	25 (28.74%)	41.88 ± 10.92	<i>t</i> = 3.93 (p < 0.001)
	M.A	99 (43.42%)	129 (56.58%)	36.26 ± 11.53	
Marital status	Single	59 (51.30%)	56 (48.70%)	39.50 ± 12.44	<i>t</i> = 1.97 (p < 0.05)
	Married	102 (51.0%)	98 (49.0%)	36.84 ± 11.04	
Occupational wards	Emergency	74 (62.27%)	36 (37.73%)	38.90 ± 8.67	<i>f</i> = 19.91 (p < 0.001)
	ICU & CCU	46 (62.02%)	33 (37.98%)	44.38 ± 14.32	
	Medical emergencies	16 (51.61%)	15 (48.39%)	34.00 ± 10.66	
	Other wards	25 (26.32%)	70 (73.68%)	32.34 ± 9.21	
All participants	N = 315	161 (51.11%)	154 (48.89%)		

M = mean; SD=standard deviation.

emergencies and other wards (p < 0.05). However, there was no significant difference in the STS mean between medical emergency nurses and nurses in other wards.

Before MANCOVA, the Box test was conducted for the homogeneity of variance-covariance matrices, and the results indicated that this condition was observed (*F* Box = 1.730; p < 0.52). The Levin test was also used to examine the equality of variances between the groups. The results confirmed the equality of variances for depression (*f* = 1.243; p < 0.182), anxiety (*f* = 2.211; p < 0.135) and SI (*f* = 2.424; p < 0.091). Table 2 presents the results of MANCOVA which compare depression, anxiety, and SI (the age and educational level are controlled).

As Table 3 reveals, by controlling the effect of age, occupational experience, and work shifts, there was a significant difference between depression, anxiety, and SI in nurses with and without STS symptoms. In other words, nurses with STS symptoms received higher scores in depression, anxiety, and SI than the ones without STS symptoms.

Discussion

This study was an attempt to investigate the prevalence of STS and to compare depression, anxiety, and SI in nurses with and without STS symptoms during the COVID-19 outbreak. The results indicated that 51.11% of nurses had STS symptoms. In addition, the prevalence was higher in female nurses as compared to the male nurses, and the results of the independent *t*-test confirmed the higher mean score of STS in female nurses as compared to the male nurses. This result is similar to previous findings, in which STS rates ranged from 7% to 67.64% (Duffy et al., 2015; Günüşen et al., 2017; Von Rueden et al., 2010). However, the prevalence of STS in the present study was higher than the prevalence reported in previous study in Iran (Ariapooran & Raziani, 2019) and also in a study on the nurses of Malayer (Ariapooran, 2013). The results of this study also confirmed the results of the study by Vagni,

Table 3

Comparison the depression, anxiety, and SI in Nurses with and without STS symptoms in the outbreak of COVID-19.

	Group	M ± SD	SS	MS	F _{1,315}	p	EF
Depression	Without STS	4.45 ± 3.36	1141.44	1141.44	49.075	0.001	0.14
	With STS	8.07 ± 4.57					
Anxiety	Without STS	7.91 ± 7.84	4293.45	4293.45	79.436	0.001	0.20
	With STS	15.19 ± 6.93					
SI	Without STS	3.90 ± 3.04	975.62	975.62	38.452	0.001	0.11
	With STS	7.79 ± 6.56					

M = mean; SD = standard deviation; SS = sum of squares; MS = mean square; EF = effect size.

Maiorano, Giostra, and Pajardi (2020) who stated that health and emergency workers were at risk for STS during the COVID-19 outbreak. A study showed that observing the injury of another person (Cieslak et al., 2014) can cause STS symptoms in nurses. Regarding the high rate of STS in female nurses as compared to male, it seems that there are differences in vulnerability to stress from COVID-19 when gender is considered.

The results demonstrated that nurses holding a BA degree nearly 30% more than nurses holding an MA degree experienced STS symptoms in the COVID-19 outbreak, and the results of the independent *t*-test also confirmed the higher mean STS in nurses with a BA degree as compared to those holding an MA degree. Before this study, no studies had compared the difference between STS and nurses with different academic degrees. It seems that nurses with a MA degree have higher organizational positions in the hospital and may experience the physical problems and feel less pain as compared to those with a BA degree. In addition, the social status and even higher income of nurses with an MA degree in this profession cannot be ignored. It is necessary to mention that, caution must be taken in this respect, and it is necessary to duplicate the study.

The results showed that 51.3% of single nurses and 51.1% of married nurses had STS symptoms. The results of the independent *t*-test confirmed the high levels of STS in single nurses as compared to their married counterparts. Ariapooran and Raziani (2019) showed that the prevalence of STS among married nurses was 22.4%. Another study revealed that being married was one of the protective factors against the symptoms of secondary trauma (Byrne, 2006). Married nurses are more likely to receive social support from their spouses during the COVID-19 outbreak, and they are less likely to have STS as compared to their single counterparts, since social support reduces the rate of STS (Ariapooran, 2013; Galek, Flannelly, Greene, & Kudler, 2011), and being single is positively associated with a higher level of stress (Ta, Gesselman, Perry, Fisher, & Garcia, 2017).

This study indicated that the prevalence of STS symptoms was higher in nurses in emergency wards and ICU-CCU as compared to those in medical emergencies and other wards. Furthermore, the results of MANOVA and LSD post-hoc tests showed that the mean STS in nurses in ICU-CCU as compared to those in emergency, medical emergencies, and other wards. In addition, STS was higher in emergency nurses as compared to those in medical emergencies and other wards. However, there was no significant difference in the level of STS between nurses in medical emergency and nurses in other wards. A study previously done by Ariapooran (2013) reported that the prevalence of STS was higher in emergency nurses as compared to non-emergency nurses. It seems that emergency nurses experience more STS symptoms due to witnessing patients' problems and pain, especially patients with COVID-19, which is consistent with the emotional contagion model (Figley, 2013). Because critically ill patients with COVID-19 are being treated and cared for in the ICU-CCU, nurses in these wards appear to experience higher STS due to observing the patients' problems. A similar situation occurs for nurses in medical emergencies in comparison with other wards except for the ICU nurses.

The MANCOVA results showed that nurses with STS symptoms received higher scores in depression, anxiety and SI as compared to those without STS symptoms. We found a large effect size (0.20) for the

anxiety. This result was consistent with the previous studies showing that nurses with STS symptoms experienced more depression (Ariapooran & Raziani, 2019; Bock et al., 2020) and anxiety (Bock et al., 2020) as compared to those without STS symptoms. Nevertheless, previous studies have not explored the relationship between STS and SI. Furthermore, previous studies showed that secondary trauma, trauma memories, and stressful events were positively associated with depression (Ashbaugh, Marinos, & Bujaki, 2017; Thabet, Thabet, & Vostanis, 2016). Moreover, due to the association between post-traumatic stress disorder (PTSD) and STS (Burr, O'Brien, Brown, Penfil, & Hertzog, 2020), it can be stated that this finding is similar to previous findings confirming the association of PTSD with depression, anxiety, and SI (Cheng, Liang, Fu, & Liu, 2020; Ni et al., 2020). It is likely that the pain and problems of patients with COVID-19, and the fear of COVID-19 disease can cause feelings of sadness, anxiety and even SI in nurses. It has been shown that the nurse-patient relationship causes psychological symptoms, such as depression in nurses (Haugan, Innstrand, & Moksnes, 2013), and feeling of more stress in the workplace and fatigue associated with patient care were the risk factors for SI in nurses (Chin et al., 2019). Due to the high effect size for anxiety, it can be said that in previous studies in the COVID-19 outbreak, anxiety was one of the major problems in nurses (Savitsky et al., 2020). Therefore, STS in the COVID-19 outbreak had probably a greater effect on anxiety than depression and SI in nurses.

One of the limitations of this study was the lack of interviews for STS assessment, which was due to the busy schedule of nurses in COVID-19 conditions. Interviews can be more accurate than self-report questionnaires. Therefore, for future research studies, it is recommended that interviews be conducted for the prevalence of psychological problems and disorders. Additionally, the infection of nurses and their acquaintances with COVID-19 were not studied, while these factors can affect the results, especially the prevalence of STS. Furthermore, in this study, we used the Persian versions of STSS, BDI, BAI, and BSSI. In some cases, the Cronbach's alpha of the questionnaires was lower as compared to some other studies, which was probably due to the special conditions of nurses when answering questions in the present study, and the different groups of participants in different studies.

Conclusions

The results of the present study support the high prevalence of STS in nurses (CCU-ICU and emergency nurses) during the COVID-19 outbreak. Moreover, in this study, the high rate of depression, anxiety, and SI was confirmed in nurses with STS symptoms as compared to those without STS symptoms. Thus, psychologists, counselors, and psychiatrists working in hospitals should pay attention to the high rate of STS symptoms and its role in increasing the rate of depression, anxiety, and SI in nurses. This also highlights the role of psychiatric nurses in identifying the problem, and providing counseling and supportive care for nurses involved in COVID-19 related wards. It is also important for nurses with STS symptoms to use training and psychological therapies in the outbreak of COVID-19.

Declaration of competing interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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