Depression among Intensive Care Unit Nurses in Gaza Strip in light of COVID-19 Pandemic: A Need for Psychological Intervention

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ABSTRACT: *Covid-19 pandemic has reached mostly overreach country in the world, creating an international health crisis. The global scale of continuing transmission and high numbers of deaths and infection are major causes of concern. This pandemic had left serious effects on all aspects of life. The mental health status of Palestinians is already compromised because of the political context; especially that the Palestinian government was unable to meet the basic needs of the Palestinian population even before the exposure to Covid-19 pandemic. This study aimed to assess level of depression among nurses working at intensive care units at the governmental hospitals in the Gaza Strip, Palestine.*

Materials and methods: *A census sample was used in this study with 115 nurses working at intensive care units at governmental hospitals in the Gaza Strip completed and returned an electronic version of the Beck Depression Inventory.*

Results: *Results from this study revealed that96.5% of the participants had a relative, a friend or a colleague infected with COVID-19, a large number (44.3%) of ICU nurses were infected and (47.8%) of them had a family member, a friend or a colleague died due to COVID-19. Variant levels of depression were reported by participants with 26.1% of the participants have mild level of depression, 19.1% have moderate level and 7.0% have severe level. The highest score of Beck Depression inventory was 'sadness' (mean 1.19 ± 0.76) followed by the item 'pessimism' (mean 0.97 ± 0.84), while the lowest score was 'suicidal thoughts. Factors impacted the level of depression include: age that had a negative correlation ($r = -0.238$, $p = 0.010$), gender ($p = 0.008$), a family member infected with COVID-19 ($p = 0.036$) and having a chronic disease ($p = 0.037$).*

Conclusions and implications for practice: *Results of this study revealed high level of depression among ICU nurses working at intensive care units at governmental hospitals at the Gaza Strip, Palestine. Providing mental support and therapy to nurses working in intensive care units is important to help them overcome their depression and avoid negative consequences of depression. Psychological counseling, psychotherapy or psychiatrist reference are recommended according to the nurse's level of depression.*

KEYWORDS: *Nurses, Depression, Gaza Strip, Palestinian governmental hospitals, Intensive care units (ICUs), COVID-19, Beck Depression Inventory (BDI).*

I. INTRODUCTION:

Covid-19 pandemic has reached mostly all over the world, creating an international health crises. The global scale of continuing transmission, and high numbers of deaths are major causes of concern (Chatterjee et al., 2020). Globally, as of 22 May 2021, there have been 165,772,430 confirmed cases of COVID-19, including 3,437,545 deaths (World Health Organization, 2021).

Attention was initially placed on the effects of the pandemic on older people as the risk of dying from the infection increases with age (Lloyd-Sherlock, Ebrahim, Geffen, & McKee, 2020)). Fatality rate is estimated to be around 2% among overall ages, but it ranges from 0.2% in people under 50 to 14.8% in those over 80, and it is higher among patients with chronic comorbid conditions (Wu & McGoogan, 2020). This pandemic has caused serious effects on all aspects of life (Holmes et al., 2020).

At the peak of the pandemic in China, prevalence of psychological distress in the general population was as high as 35% (Yao et al., 2020). A systematic review conducted by Vindegaard and Benros (2020) of related literature, which included 43 studies, revealed worsening psychiatric symptoms among those with pre-existing psychiatric disorders. Moreover, Vindegaard and Benros (2020) added that studies of health care workers found increased depressive symptoms, anxiety, psychological distress, and poor sleep quality. On the other hand, studies of the general public revealed lower psychological well-being and higher scores of anxiety and depression compared to the time before the COVID-19 pandemic. Health care providers in 34 ICUs in China, experience high levels of psychological burden during

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COVID-19 pandemic. Prevalence of symptoms of anxiety, depression and peritraumatic dissociation was 50.4%, 30.4%, and 32%, with the highest rates among nurses (62.1%), depression (40.6%), and peritraumatic dissociation (46%) respectively (Azoulay et al., 2020).

When the pandemic reached the occupied Palestinian territories on March 5th 2020, the mental health status of Palestinians was already compromised because of the political context. Since 1967, and the fall of the West Bank (including East Jerusalem) and the Gaza Strip, under Israeli military rule, Palestinians have endured chronic exposure to political violence, oppression, subjugation, and lack of freedom (Giacaman et al., 2009). Generations of Palestinians have suffered from human rights violations; including land confiscation, displacement, control by the Israeli army of the movement of people and goods from one area to another – and outside the country – death, injury, disability, imprisonment, the lack of freedom, and injustice. The Palestinian Authority (PA) has little authority in practice, is burdened by starvation for funds and dependence on foreign aids (Mataria et al., 2009).

These adverse conditions negatively affected the physical and mental health services in Gaza and the Palestinian government was un able to meet the basic needs of the Palestinian population even before the exposure to Covid-19 pandemic which constituted an extra pressure on the Palestinians' lives and exhausted their limited resources.

Nurses in Gaza are mostly affected by these adverse conditions. Shortage of nurses working in the governmental sector was evident from distribution of the man power in the Palestinian Ministry of health, 1177 nurses work in Gaza while 2613 work in West Bank (Ministry of Health, 2019). Most nurses in Gaza receive low, incomplete salaries; therefore, low income, work overload and shortage of supplies exert additional sources of stress on the nurses working with Covid-19 patients, mainly on nurses working at the intensive care units (ICUs), those who work in hot area, and provide care to the sever cases and daily exposed to care with the dead cases. Therefore, this study aimed to assess level of depression among nurses working at intensive care units at the governmental hospitals in the Gaza Strip, Palestine.

II. METHODS AND MATERIALS:

Design, population, setting, and sampling:
A cross-sectional design was used in this study. The target population of this study is nurses working at the intensive care units at governmental hospitals in the Gaza Strip. Data were collected through and electronic questionnaire with was distributed to nurses through social media (Email, Facebook and WhatsApp applications). A census sample was used that targeted all nurses working in all ICU at governmental hospitals. A total of 115 nurses completed and submitted the questionnaire with a response rate of (90%).

Instrument:
The instrument used in this study consisted of two parts; the first part included demographic information about participants including age, gender, marital status, level of education, place of work, years of experience, level of exposure to infection of COVID-19, history of infection or death with COVID-19 among participants' family members, friends or relatives, and availability of personal protective equipment and if they have a history of any chronic disease.

The second part of the instrument is comprised of Beck Depression Inventory (BDI), which is a self-reporting questionnaire for evaluating the severity of depression in normal and psychiatric populations. It was developed by Beck *et al*. in 1961, It relied on the theory of negative cognitive distortions as central to depression. It includes twenty-one items were consolidated from clinical observations of attitudes and symptoms occurring frequently in depressed psychiatric patients and infrequently in non-depressed psychiatric patients(Beck, Steer, & Carbin, 1988). The BDI uses a 4-point Likert scale to evaluate the degree of depression where items are rated from 0 (not at all) to 3 (extreme form of each symptom). Therefore, the total score will range from 0 to 63 where scores of 0-13 indicate minimal range of depression, scores of14–19 indicated mild depression, _, scores of 20–28 indicated moderate depression _ and scores of 29–63 indicate severe depression _. The BDI showed to be valid and reliable screening instrument, and it has demonstrated excellent internal consistency (Cronbach's α = 0.79) in normative samples (Smarr & Keefer, 2011).

Data Analysis:
The Statistical Package for Social Science (SPSS), version 18, was used to compute and analyze the data. Data was analyzed using descriptive statistics (mean, range, standard deviation, and percentage) and frequency distribution tables. ANOVA and t-test were used to examine statistical significance between differences of the means of different variables. Pearson correlations test was used to examine if there were any correlation between total score of BDI and some sociodemographic variables.

Ethical Considerations:
Prior to conducting this research study, approval from the Internal Review Board at the Islamic University of Gaza was obtained. Participants were informed about the purpose of the study at the opening statement of the questionnaire and were assured that their participation is voluntary and that each one has the

right to refuse to complete the questionnaire. Data was collected anonymously from all participants. Confidentiality and anonymity were maintained during data analysis and in the final report.

III. RESULTS:

The participants in this study was 115 nurses; 77 of them are males and 38 are females, 49 of them have been working in Shifa Hospital, 18 in Gaza European hospital, 24 in Nasser Hospital, 14 in Shuhada Al-Aqsa hospital, while the rest (10) works in the Alandonisi hospital. Although 108 nurses in the study sample got in direct contact with people infected with COVID-19, only 7 of them had no direct contact with such infected people, and 51 of them were actually infected with COVID-19.The characteristics of participants are presented in table one. Participants' age ranged from 20 to 56 years with a mean of 31.42 (±7.75). The majority of participants were males (67.0%, n = 77), married (69.6%, n = 80). None of the participants were widowed or divorced. The majority of ICU nurses hold a bachelor degree in nursing (70.4% n= 81). Participants work at different hospitals with 42.6% (n = 49) working at Shifa Hospital which is the largest medical complex in the Gaza Strip and holds the largest ICU in the Strip. The years of experience of participants ranged between 6 month and 34 years with a mean of 7.57(±6.40).

While the great majority of participants got in direct contact with patients diagnosed with COVID-19 (93.9%, n = 108), less than half of them got the infection (44.3%, n = 51), 67 (58.3%) of them had a family member got infected with COVID-19 and 111 (96.5%) had a relative, a friend, or a colleague got infected with COVID-19. About half of the participants (47.8%, n = 55) had a family member a friend, or a colleague died with COVID-19 and most of them (77.4%, n = 89) had witnessed the death of a patient with COVID-19. The family size of participants ranged from two to 14 family members with a mean of 6.03 (±2.92). Finally, most of the participants (87.0%, n = 100) do not have any chronic disease and most of them (66.1%, n = 76) reported that personal protective equipment (PPE) were available partially in their place of work.

Table 1: Socio-demographic characteristics of participants

		Frequency	%
Age	Mean 31.42 (±7.75) Range 20 -56		
Gender	Male	77	67.0
	Female	38	33.0
Marital status	Married	80	69.6
	Single	35	30.4
	Divorced	0	
	Widowed	0	
Level of education	Associate Degree	14	12.2
	Bachelor	81	70.4
	Master	19	16.5
	Doctorate	1	.9
Place of work	Shifa Hospital	49	42.6
	Gaza European hospital	18	15.7
	Nasser Hospital	24	20.9
	Shuhada Alaqsa hospital	14	12.2
	Alandonisi hospital	10	8.7
Years of experience	Mean 7.57(±6.40) Range 6 month-34 years		
Got in direct contact with people infected with COVID-19	Yes	108	93.9
	No	7	6.1
Get infected with COVID-19	Yes	51	44.3
	No	64	55.7
A family member got infected with COVID-19	Yes	67	58.3
	No	48	41.7
A relative, a friend, or a colleague got infected with COVID-19	Yes	111	96.5
	No	4	3.5
A family member a friend, or a colleague died with COVID-19	Yes	55	47.8
	No	60	52.2
Witnessed the death of a patient with COVID-19	Yes	89	77.4
	No	26	22.6
PPE available	Yes, in adequate amounts	27	23.5
	Yes, partially	76	66.1
	No	12	10.4
Having a chronic disease	Yes	15	13.0
	No	100	87.0
Number of family members	Mean 6.03 (±2.92) Range 2-14 family member		

Results of Beck Depression Inventory

The scores for Beck Depression Inventory ranged between zero and 1.19. The item received the highest score was 'sadness' (mean 1.19 ± 0.76) followed by the item 'pessimism' (mean 0.97 ± 0.84). On the other hand, the

two items received the lowest scores were the item 'past failure' (mean 0.35 ± 0.73) followed by the item related to 'suicidal thoughts' (mean 0.10 ± 0.33)

Table 2: Descriptive statistics of Beck Depression Inventory

Item	Minimum	Maximum	Mean	SD
Sadness	0	3	1.19	0.76
Pessimism	0	3	0.97	0.84
Past failure	0	3	0.35	0.73
Loss of pleasure	0	3	0.78	0.81
Guilty feelings	0	3	0.80	0.70
Punishment feelings	0	3	0.63	0.88
Self-dislike	0	3	0.31	0.60
Self-criticalness	0	3	0.63	0.72
Suicidal thoughts	0	2	0.10	0.33
Crying	0	3	0.60	1.01
Agitation	0	3	0.82	0.78
Loss of interest	0	3	0.82	0.81
Indecisiveness	0	3	0.65	0.66
Worthlessness	0	3	0.63	0.80
Loss of energy	0	3	0.69	0.73
Changes in sleep	0	3	0.87	0.74
Irritability	0	3	0.93	0.59
Changes in appetite	0	3	0.68	0.72
Concentration difficulty	0	3	0.51	0.86
Irritability	0	3	0.79	0.71
Loss of interest in sex	0	3	0.48	0.64

Levels of depression among ICU nurses

The scores of Beck Depression Inventory were categorized into four categories; minimal depression (score 0-13), mild depression (score 14-19), moderate depression (score 20-28) and severe depression (score 29-63). About half of the participants (47.8%, n = 55) had minimal depression & only eight (7.0%) participants had severe depression (table 3).

Table 3: Levels of depression among ICU nurses

Level of anxiety	Score range	Frequency	Percent
Minimal depression	0-13	55	47.8
Mild depression	14-19	30	26.1
Moderate depression	20-28	22	19.1
Severe depression	29-63	8	7.0

Variables affecting depression

Results of Pearson correlation test (table 4) revealed that family size and years of experience did not correlate with the total score of Beck Depression Inventory. On the other hand, age had a negative correlation with total score of Beck Depression Inventory (r = -0.238, p = 0.010).

Table 4: results of Pearson Correlation test among total score and other variables

		Age in years	Family size	Years of experience	Total score
Age in years	r	1	.064	.913**	-.238*
	Sig.		.495	.000	.010
Family size	r	.064	1	.096	.017
	Sig.	.495		.307	.860
Years of experience	r	.913**	.096	1	-.151
	Sig.	.000	.307		.108
Total Score	r	-.238*	.017	-.151	1
	Sig.	.010	.860	.108	
*. Correlation is significant at the 0.05 level (2-tailed)					

On the other hand, results of t test (table 5) reveled that there were statistically significant differences between the total score of Beck Depression Inventory and the following variables: gender (p = 0.008), a family member infected with COVID-19 (p = 0.036) and having a chronic disease (p = 0.037). On the other hand, one way ANOVA results (table 5) showed that level of education (p = 0.008) and availability of PPE (p = 0.046) had an impact on the total score of Beck Depression Inventory.

Table 5: result of t test and one way ANOVA

Variable		N	Mean	SD	P value
Gender	Male	77	12.73	8.92	0.008
	Female	38	17.32	7.92	
Marital status	Married	80	13.46	8.78	0.153
	Single	35	16.03	8.84	
Level of education	Associate Degree	14	15.50	10.70	0.008
	Bachelor	81	14.42	8.37	
	Master	19	11.95	9.21	
	Doctorate	1	26.00		
Place of work	Shifa Hospital	49	14.73	9.32	0.337
	Gaza European hospital	18	17.28	7.81	
	Nasser Hospital	24	14.00	8.35	
	Shuhada Al-Aqsa hospital	14	12.50	5.13	
	Alandonisi hospital	10	9.40	12.04	
Got in direct contact with people infected with COVID-19	Yes	108	14.43	8.85	0.387
	No	7	11.43	8.79	
Get infected with COVID-19	Yes	51	15.51	8.45	0.171
	No	64	13.23	9.08	
A family member got infected with COVID-19	Yes	67	15.70	8.57	0.036
	No	48	12.21	8.89	
A relative, a friend, or a colleague got infected with COVID-19	Yes	111	14.41	8.64	0.277
	No	4	9.50	14.18	
A family member a friend, or a colleague died with COVID-19	Yes	55	14.31	8.73	0.940
	No	60	14.18	9.02	
Witnessed the death of a patient with COVID-19	Yes	89	14.28	8.33	0.944
	No	26	14.12	10.60	
PPE available	Yes, in adequate amounts	27	13.93	8.15	0.046
	Yes, partially	76	13.92	8.39	
	No	12	17.00	12.78	
Having a chronic disease	Yes	15	18.67	9.66	0.037
	No	100	13.58	8.57	

IV. DISCUSSION:

This study aimed to assess the level of depression among Palestinian nurses who work in the ICU departments of the governmental hospitals in the Gaza Strip during the COVID-19 pandemic. Results from this study revealed variant levels of depression among participants (table 3) with 26.1% of the participants have mild level of depression, 19.1% have moderate level, and 7.0% have severe level of depression. The highest score of BDI was for the 'sadness' (mean 1.19 ± 0.76) item followed by the item 'pessimism' (mean 0.97 ± 0.84), which can be explained by difficult life conditions prevailing in the Gaza Strip including siege (which was imposed by Israel against Gaza since 2006), political struggle and high levels of unemployment and poverty in Gaza Strip, while the lowest score was given to the item 'suicidal thoughts' (mean 0.10 ± 0.33). This low score to this item can be explained by the religious and cultural believes of the Palestinian that prohibits committing suicide. Several studies have assessed psychological symptoms in HCPs managing patients with COVID-19 (Pappa et al., 2020). The results of this study are in agreement with another study which showed that the prevalence of symptoms of anxiety and depression were 44.6% and 50.4%, respectively among their participants; which suggest that critical care setting exposes HCPs to more psychological burden (Lai et al., 2020). Such impact of COVID-19 is expected as ICU nurses already experience many stressors including huge workload, long-term fatigue, infection threat, and frustration with the death of patients whom they care for (Shen, Zou, Zhong, Yan, & Li, 2020).

Results of this study showed a large number of ICU nurses were infected with COVID-19 (44.3%), that is extremely higher than those reported by Azoulay et al. (2020) study in France who found the proportion of professionals infected in the 21 ICUs was 6.2%. This wide difference can be explained that 66.1% of the ICU nurses in Gaza believe that the personal protection equipment is partially available in Gaza hospitals. Adequate amount of PPE are necessary for health care providers to protect themselves from getting the infection. Research has identified that healthcare professionals have requested five things from their employer during the COVID-19 pandemic: hear me, protect me, prepare me, support me, and care for me (Shanafelt, Ripp, & Trockel, 2020).

Scores of BDI, reported by participants of this study, were not influenced by years of experience, this result is not consistent with another study which found that young nurses with no experience of caring for critically ill patients face a greater psychological crisis (Shen et al., 2020). This can be explained by the wide variation in the range of years of experience in my study sample, the range was (6 month-34 years), that did not clarify experience as a protective factor for ICU nurses against COVID-19 associated psychological stress.

Many factors that might contribute to high prevalence of high depression rates among ICU nurses in Gaza; including the exceptional conditions they live in the Gaza Strip. For example, Gaza suffers from siege imposed by Israel since 2006 with no free movement is possible in and out of the Gaza Strip. Following the 2014 war, movement of people and goods has been further restricted (UN Office for the Coordination of Humanitarian Affairs, 2019). Moreover, the high rates of poverty and unemployment prevailing in the Gaza Strip. Moreover, this generation of nurses was exposed to many Israeli offensives against Gaza including four major offensives in 2006, 2008, 2011 and 2014. This is besides the offensive against Gaza in May 2021 which took place after data collection for this study. The high level of exposure to contamination of Corona virus represents another risk factor to Gaza ICU nurse's depression as 44.3% of them got infected with the virus, 58.3% had an a family member infected and 96.5% of them had a relative, a friend, or a colleague infected. Results of this study showed statistically significant differences between the total score of Beck Depression Inventory between nurses who had a family member infected with COVID-19 (p = 0.036) and those who did not. On the other hand, study results revealed that 13.0 % of the nurses in the study sample have a history of chronic diseases, which increases the risk for contamination of Corona virus. A recent study found that 48% patients had a comorbidity; with hypertension being the most common (30%), followed by diabetes (19%) and coronary heart disease (8%) of patients (Zhou et al., 2020). My study found statistically significant differences between the total score of Beck Depression Inventory between nurses having a chronic disease (p = 0.037) and those who had not. About half of the participants (47.8%) had a family member a friend, or a colleague died with COVID-19; which also could be a factor that contributed to the high levels of depression reported by the participants of this study. Results from this study showed that male participants presented a lower mean score (12.73) for depression than female nurses (17.32). These results are congruent by the results of Sampaio, Sequeira, and Teixeira (2021) study. This can be expected as women are more emotionally vulnerable than men (McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008).

The mean age of the sample subjects was 31.42, age had a negative correlation with total score of Beck Depression Inventory (r = -0.238, p = 0.010) revealing that level of depression are lower among older nurses. This result goes in line with another study (Roberts et al., 2021). One study explains this reverse relationship as resilience increases with age (Sull, Harland, & Moore, 2015).

Results showed that level of education (p = 0.008) had an impact on the total score of Beck Depression Inventory. Results from Tercan, Bozkurt, Patmano, Saraçoğlu, and Gür (2020) study supports this finding. On the other hand, another study (Pouralizadeh et al., 2020) found that the educational level nurses who got in contact with suspected or confirmed COVID-19 cases was not associated with depression. This can be explained that COVID-19 is a newly discovered disease, and all nurses with different backgrounds have no previous knowledge about it.

V. CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

The results of this study revealed that the majority of ICU nurses reported different levels of depression. The highest reported score of BDI was 'sadness' followed 'pessimism', while the lowest score was 'suicidal thoughts. The extra stressors for the nurses from siege, Israeli occupation, political conflicts, and work overload play a role. While younger and female ICU nurses reported higher level of depression, other demographic variables such as level of education and years of experience had no significant impact on BDI scores.

It is Recommended that adequate well-trained nurses and personal protective equipment should be always available in the ICUs. Moreover, some other interventions including cognitive therapy, combining antidepressant drugs and psychological treatments, interpersonal psychotherapy, non-directive counselling, problem-solving therapy and relapse prevention programs are recommended to reduce levels of depression and avoid its negative consequences (Price, Butler, Hatcher, & Von Korff, 2007). These interventions should be tailored according to the nurse's level of depression. Future research studies should focus on strategies and programs to alleviate depression among ICU nurses and other front line health care providers during COVID 19 pandemic.

Conflict of interest:
Author reports no conflict of interest to conduct this study.

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