Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci **February 2022; 8(1):169-179**

RESEARCH ARTICLE **DOI:** 10.19127/mbsjohs.986506

"Perceived job stress and COVID- 19 pandemic related stress predictors among Nurses working in Saudi Arabia"

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Received: 24 August 2021, Accepted:21 December 2021, Published online: 25 February 2022

Abstract

Objective: As the coronavirus disease 2019 (COVID-19) pandemic hastens the global health care systems which take the lead to great psychological stress on health care professionals especially nurses with COVID-19 illness patient care. This study focused on perceived job stress and covid-19 pandemic related job stress predictors among nurses working in ministry of health hospitals and health centers in Muhayil Aseer town, Saudi Arabia during the first wave of COVID-19 pandemic.

Methods: An analytical cross-sectional study addressed to examine the prevalent perceived job stress and covid-19 related perceived job stress predictors among nurses. A web-based google form english questionnaire was designed in sections aimed at collecting socio demographic and job variables, including the Perceived Stress Scale (PSS) and the Covid-19 pandemic related job stress predictors questionnaire. The data were collected using convenient sampling technique.

Results: 164 nurses have participated in this study among them, the overall nurses 97.57 % had experienced job stress during peak time of Corona virus spread and of them more than half (59.76 %) of the (98) nurses had moderate level of job stress and the mean PSS score 21.8 that represents moderate stress level. In multivariate regression analysis model, the perceived safety risk (LR= 95.53, χ^2 (6) = 27.91, P=.000), perceived worry (LR= 97.23, $\chi^2(6)$ = 29.60, P=.000) and perceived work difficulty (LR= 100.92, $\chi^2(6)$ = 33.29, P=.000) were found as significant predictors of perceived job stress during Covid-19 pandemic.

Conclusion: This study revealed that job stress is a common prevailing problem among nurses and the COVID-19 pandemic related job stress predictors were perceived safety risk and perceived worry about health while covid-19 exposure and perceived work difficulty as overworked during pandemic. Although efforts were enhanced to support their psychological well-being, more attention should be paid to the mental health of nursing staffs. The study recommends that strong strategy improvements need to be held in the health care institutions to reduce nurses' stress and enable them to combat the ongoing and future occurrences of pandemic effectively.

Keywords: Nurses' job stress, job Stress predictors, COVID-19 Pandemic, Perceived stress

Suggested Citation: Shylaja. J Asiri H M T, Makther N M A A, Alsayed A A A, Asiri H A YA A, Aqili F A M, Alammari A H M. Perceived job stress and COVID- 19 pandemic related stress predictors among Nurses working in Saudi Arabia". Mid Blac Sea Journal of Health Sci, 2022;8(1):169-179

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INTRODUCTION

World Health Organization (WHO) states that COVID-19 is an infectious disease caused by a newly discovered coronavirus (7). Worldwide, the highly contagious respiratory infection caused by the coronavirus 2 (SARS-CoV-2) has caused not only an economic crisis, but an increase in mortality and morbidity, and emotional distress among people. Globally the fatality rate and the consequences of COVID-19 have led to fears, worries, and anxiety.

A dramatic impact wrought by this occurrence on all aspects of our lives by new normalcy style (9). The coronavirus disease 2019 (COVID-19) pandemic has also strained the health system. The FDA has taken numerous actions to help increase supplies of medical equipment needed to fight COVID-19 and protect healthcare workers. The measures were undertaken to manage Healthcare Personnel with SARS-CoV-2 Infection or Exposure to SARS-CoV-2 in terms of handling Confirmed Coronavirus Disease (COVID-19) Patients. (11)

In the outbreak period, among health professionals, especially frontline nurses, faced great challenges and endured higher risks of psychological problems such as depression, anxiety, and insomnia (4). They are being exposed for several working hours per day to COVID infected patients, face several issues that lead to physical/psychological disturbance (1).

Stress is a normal human reaction that happens to everyone resulting in physical, emotional, and intellectual responses whereas Job stress is the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker (24, 25). The global COVID-19 pandemic has created new causes of job-related stress (8). In this light of magnitude, this present study sought to explore perceived job stress level among nurses during the COVID-19 outbreak in Saudi Arabia.

This study aimed to explore perceived job stress level and stress predictors related to COVID-19 pandemic among nurses during the outbreak in Saudi Arabia.

METHODS

Study Design:

An analytical cross-sectional study was conducted in December 2020 during the COVID-19 outbreak first wave in Saudi Arabia. An ethical approval was granted only from the Institutional research committee at College of Applied medical Sciences, Muhayil Aseer, Saudi Arabia.

Sample population:

This study included both male and female nurses who were currently working in ministry of Health hospitals and health centers at Muhayil town area, Saudi Arabia at the time of the study. The participants excluded those who were on long vacation during outbreak.

Sample Recruitment:

The sample size was calculated using Raosoft software (9). The required sample size was estimated at the 95- confidence level with an estimated 50% response distribution and a margin of error of ±5%. The recommended minimum sample size is 169. An online google survey form was sent to all nurses who

were working in Ministry of Health Hospitals and Health Centers at Muhayil town, Saudi Arabia during the first wave of COVID-19 pandemic.

Data collection

Nurses were invited to participate via cell phone text messages. The messages explained the study objectives, the purpose of the study and guided the Nurses to complete the electronic english version questionnaire link. Convenience sampling technique was adopted to collect responses, only 164 working nurses responded.

Description of tool

The The online survey questionnaire was comprised of four parts:

(a) Socio-demographic data of the nurses, such as age, gender, nationality, marital status, and history of chronic diseases.

(b) Work-related characteristics, such as job title, qualification, working unit, working shift system, and working experience in years.

(c) The perceived stress scale (PSS) is a 10-items tool used to measure a Nurse's perception of stress over the past month. The PSS (4) is a validated, reliable (Cronbach's alpha 0.85), easy-to-use, and popular stress questionnaire. A Likert-type 5-point scale was used to capture responses in the PSS (never-0, almost never-1, sometimes-2, fairly often-3, and very often-4). The total sum score of PSS can range from 0 to 40 where the stress levels are 0 considered as No Stress, 1-13: low stress, 14-26: moderate and 27-40: high stress.

d) To assess the Nurse's perceived Job stress predictors, Covid pandemic related Perceived job stressor variables of 4 items questionnaire developed by researchers. The internal consistency of the tool reliability was tested using Cronbach's alpha (α= 0.699) and Inter item correlation mean (0.37) (Optimal mean inter-item correlation values range from .2 to .4 as recommended by Briggs & Cheek 1986). This questionnaire (table 4) includes work related perceived worry about health while exposure with covid positive patients, perceived the safety risk of Covid-19 infection with tested positive, perceived fear regard to covid fatality and Perceived work difficulty during covid pandemic. All the statement responses such as "Always/Little/Not at all" were considered as predictive factors of perceived job stress among Nurses.

Statistical analysis

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 16.0 software for windows (SPSS Inc., September 13, 2007). The percentages and frequencies were calculated for all nominal variables for the different items of the PSS-10 and Nurses' perceived job stress Predictor questionnaire-4. Also, we calculated the mean, median, and standard deviation ranges of the total score of the PSS-10. The significance of association of job characteristics with perceived stress score was analysed using in contingency tables by Pearson's chi-square test (categorical variables). To explore COVID-19 pandemic -related predictors associated with perceived job stress, multinominal logistic regression analysis was performed using the main effects method (17). In this regression model, the PSS score stress level was used as a dependent variable, while categorical variables were as perceived fear, perceived worry, and perceived safety risk and perceived work difficulty were measured as

predictive factors. Results are considered significant for P-values below 0.05 (P < 0.05).

RESULTS

Socio demographic Characteristics of Enrolled Nurses

Demographic characteristics of nurses who filled the online questionnaire are reported in Table 1. Most participants were almost equally distributed between <25 -40 years age categories, with only few 3 nurses (1.8%) aged more than 50 years old; 132 (80.5%) study subjects were female nurses. More than a half of our sample was married (54.9%) the majority (73.8%) 121 nurses were belonging to Saudi nationality. However, none of the sociodemographic characteristics of the nurses were associated with their perceived job stress levels.

In Table 2 stated that less than half of the nurses (81) 49.3% were working in a COVID-19 Unit, the majority 73.3% (22) nurses were holding a job position as head nurse reported moderate level of stress. The following job characteristics associated with their perceived job stress that are working unit (p=0.007) and nurses 'qualification (p=0.022), also the years of working experience (p=0.035) at 0.05 significance level respectively. Regarding the history of chronic health problems among studied nurses, the predominant one was lower back pain (32.3%) and then migraine headache (14.7%) depicted in figure 1.

Nurses' perceived job Stress predictors during Covid-19 pandemic

Figure 4 shows that most of the Nurses 67 (40.9%) were reported little perceived safety risk, and only 81(49.4%) of nurses were addressed that not at all perceived worry about health due to exposure with positive patients, and many of the nurses 67 (40.9%) experienced work difficult during COVID– 19, then 62 (37.8%) nurses perceived fear concerning Covid fatality during Pandemic peak in Saudi Arabia.

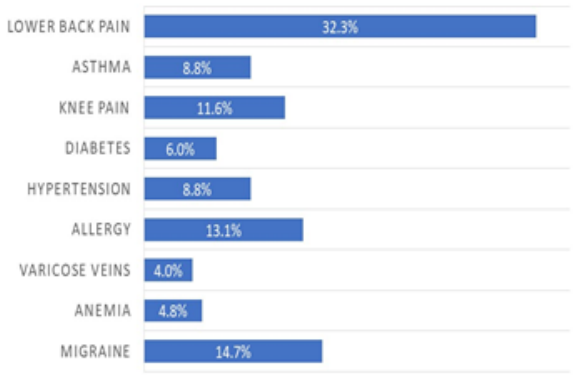

Figure 1. History of Chronic Health Problems Among Nurses

Nurses' perceived job Stress during Covid-19 pandemic

The descriptive statistics revealed that the Standard deviation (SD) 8.308 and overall mean Perceived job stress score was 21.8 on a 0-40 range PSS scale that depicts moderate stress level during pandemic period (Figure 2). The large (97.57 %) number of the nurses experienced job stress during peak time of Corona virus spread and more than half (59.76 %) of the 98 nurses had moderate level of job stress, 45 nurses had (27.44%) High stress, and 17 had (10.37%) low stress (Figure: 3).

Figure 2. Mean score of perceived stress related to Covid-19 pandemic

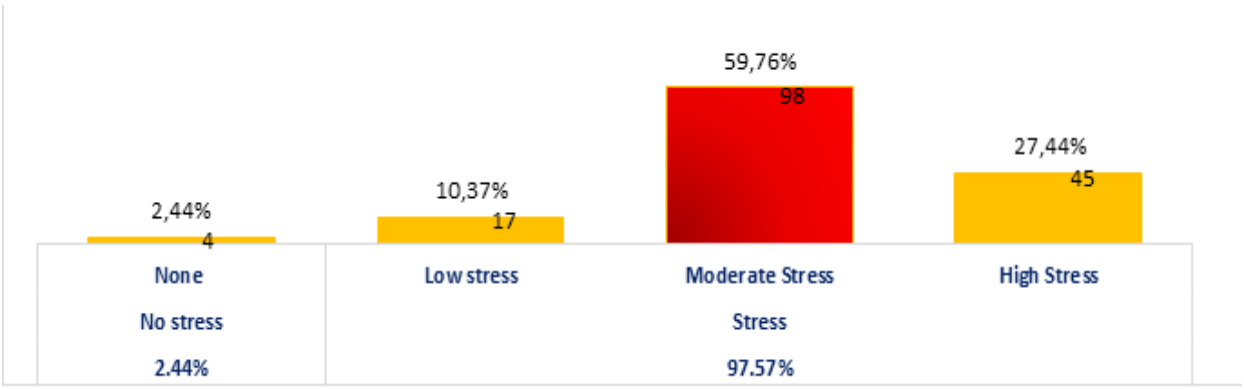

Figure 3. Nurse's Covid-19 pandemic related perceived job stress level

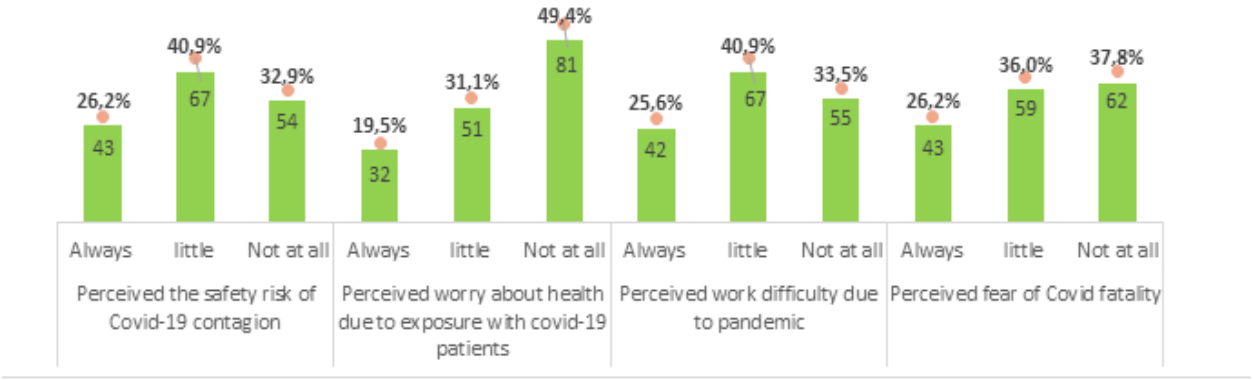

Figure 4. Nurses' perceived job stressors related to Covid-19 pandemic

Table: 1 Socio demographic Characteristics of Nurses (N=164)

	Perceived job Stress Level		
	Frequency (n) %	Chi square $_{df}$	P value
Gender			
Male Nurses	(32) 19.5 %	3.686_{3}	.297
Female Nurses	(132) 80.5%		
Age			
<25 – 30 years	(79) 48.2)	12.874_{9}	.168
31- 40 years	(74) 45.1%		
41-50 years	(8) 4.9 %		
>50 years	(3) 1.8%		
Nationality			
Saudi	(121) 73.8%	19.538_{12}	.076
Philippine	(22) 13.4%		
Indian	(14) 8.5%		
Egyptian	(2) 1.2%		
other nationality	(5) 3.0%		
Marital status			
Married	(90) 54.9 %	16.634_{9}	.055
Single	(69) 42.1%		
Separated	(3) 1.8%		
widowed	(2) 1.2%		

Table:2 Nurses' job Characteristics and perceived Job stress level

Job Characteristics	None	Low	Moderate	High	Chi-square $_{df}$	P- value
1. Nursing Qualification	4.1 % (2)	18.4% (9)	63.3% (31)	114.3% (7)	9.638_3	0.022
Diploma						
Bachelor	1% (2)	7.0% (8)	58.3% (67)	33.0% (38)		
2. Working Unit	2.4% (4)	6.1% (10)	32.9% (54)	9.1% (15)		
Non Covid unit					10.527_3	0.007
Covid Unit	.0% (0)	4.3% (7)	26.8% (44)	18.3% (30)		
3. Working Shift	.6% (1)	6.7% (11)	28.0% (46)	15.9% (26)	3.831_3	0.280
Rotated shift						
Same shift	1.8% (3)	3.7% (6)	31.7% (52)	11.6% (19)		
4. Working Experience	.0% (0)	2.4% (4)	9.8% (16)	5.5% (9)	16.725_9	0.053
Fresher < 1 year						
1- 10 years	.0% (0)	3.0% (5)	31.7% (52)	15.9% (26)		
11-20 years	2.4% (4)	4.9% (8)	16.5% (27)	6.1% (10)		
>20 years	.0% (0)	.0% (0)	1.8% (3)	.0% (0)		
5. Job Position	.0% (0)	.0% (0)	6.1% (10)	3.0% (5)	11.187_{12}	0.513
Nurse Intern						
Staff nurse	1.8% (3)	8.5% (14)	27.4% (45)	15.2% (25)		
Head Nurse	.6% (1)	.6% (1)	13.4% (22)	3.7% (6)		
Nurse Specialist	.0% (0)	.6% (1)	7.3% (12)	3.7% (6)		
Nurse Supervisor	.0% (0)	.6% (1)	5.5% (9)	1.8% (3)		
6. Work related exposure to Covid- 19 patients care	2.4% (4)	6.1% (10)	34.8% (57)	20.7% (34)	6.507_3	0.089
Yes						
No	.0% (0)	4.3% (7)	25.0% (41)	6.7% (11)		
7. Nurses who Tested Covid -19 Positive	.6% (1)	4.3% (7)	23.3% (38)	12.9% (21)	1.153_3	0.764
Yes						
No	1.8% (3)	6.1% (10)	36.2% (59)	14.7% (24)		

Table 3 – Multinominal Logistic Regression model parameter Estimates: Covid -19 pandemic related Nurses' perceived Job stressors

Stress Category		Low stress					Moderate stress					High stress				
Perceived Stressors		B	Std. Error	P value	Exp(B)	95% CI	B	Std. Error	P value	Exp(B)	95% CI	B	Std. Error	P value	Exp(B)	95% CI
1.Perceived safety risk	Not at all	.970	2940.76	1.00	2.637	.000-.[b]	.737	1808.	1.000	2.090	.000 -[b]	-17.281	2965.	.995	3.125E-8	.000-[b]
	Little	15.735	2318.71	.995	6.817E6	.000-.[b]	17.66	.565	.000	4.68E7	1.549E7-1.417E8	15.591	.000	.995.	5.904E6	59037.1-5903.10
	Always	0[c]	.	.	.		0[c]	.	.	.	.	0[c]	.	.	.	.
2.Perceived worry	Not at all	-.436	3291.51	1.00	.646	.000 -.[b]	-19.26	2863	.995	4.31E-9	.00-[b]	-36.806	4056	.993	1.036E-16	.000 -[b]
	Little	16.482	4467.302	.997	1.439E7	.00 -.[b]	-1.25	4162	1.000	.286	.00-[b]	-2.91	4162.	.999	.054	.000 -[b]
	Always	0[c]	.	.	.		0[c]	.	.	.	.	0[c]	.	.	.	.
3.Perceived work difficulty	Not at all	15.588	2699.92	.995	5.885E6	.000-.[b]	-1.588	1690	.999	.204	.00-[b]	-4.318	1690.	.998	.013	.000 -[b]
	Little	13.872	2551.05	.996	1.058E6	.00 -[b]	15.379	.574	.000	4.77E6	154830-1.472E7	13.826	.000	.	1.010E6	104.52 104.52
	Always	0[c]	.	.	.	.	0[c]	.	.	.	.	0[c]	.	.	.	.

Reference Category: No stress

Table 4 : COVID-19 Pandemic related job stress predictors Questionnaire

Items	Responses
1. Have you been perceived the safety risk of Covid-19 contagion?	Always, Little, Not at all
2. Have you felt worried about your health while exposure with covid positive patients?	Always, Little, Not at all
3. Have you felt difficulties as over worked to handle the patients during pandemic?	Always, Little, Not at all
4. Have you felt fear of covid fatality while providing nursing care for patients?	Always, Little, Not at all

Multinominal Logistic Regression Model of Nurse's job stress predictors related Covid-19 pandemic

Finally, the analysis plan considered a major effect method via using the multivariate logistic regression analysis. Table 3 displays the findings from the analysis model. Based on the model fitness LR test p value .000, the model containing the full set of predictors represents a significant improvement in fit (Likelihood Ratio χ^2 (24) = 188.578, P=.000). Pearson value is an additional chi-square goodness of fit test (χ^2 (132) = 32.531, p=1.000) for this model, when non-significant, that provides further evidence of a well-fitting model. Based on McFadden's, the full model containing our predictors represents a 58.2% improvement in fit. The overall classification accuracy for the model predicting category membership on the Dependent Variable (Job stress level). was 78.0%. In this model, the likelihood ratio and chi-square tests of the each (Independent Variables) predictors shown that a direct effect of perceived safety risk (LR= 95.53, χ^2 (6) = 27.91, P=.000), perceived worry (LR= 97.23, χ^2(6) = 29.60, P=.000) and perceived work difficulty during Covid-19 pandemic (LR= 100.92, χ^2(6) = 33.29, P=.000) were estimated as significant predictors of covid -19 pandemic related perceived job stress among nurses working in Saudi Arabia.

The Model parameter Estimates presented in the table 3. It shows that Nurses who perceived little safety risk of Covid-19 contagion were significantly predicted to have a moderate stress 17.66 times more than No stress category stress (Beta = 17.66, P value= .000). Secondly Nurses who perceived little work difficulty as over worked to handle the patients during pandemic Covid-19 were also significantly predicted to have a moderate stress 15.37 times more than No stress category stress (Beta = 15.37, P value= .000) respectively.

DISCUSSION

It is important to investigate perceived job stress level among health care providers during

COVID-19 pandemic. Especially nurses, are in frontline battle during this pandemic that cause emotional exhaustion which may lead to burnout gradually (13). We investigated in this study, the percentage of nursing staffs who were under stress and their job stress predictors related to Covid-19 pandemic.

Nurses job stress level and Sociodemographic Characteristics Association

Regarding sociodemographic characteristics of Nurses, we found that none were associated with their significantly associated with their job stress. Our study results are in line with some studies, that there was no relationship between the mean of perceived job stress of nurses and their gender stated in Alyahya.et.al, Farraji.et,al (2, 10). However, unlike our present study results, Romano.et.al and Shin et.al. (18, 23) reported that gender was significantly associated with nurses' stress. In our study, nurses' age group was not statistically significant. This is also

similar with these findings of Alyahya.et.al., Farraji.et,al and Romano et al., studies (2,10,18).

It is inferred that socio demographic characteristics may not have considerable impact on job stress concerning covid- 19 pandemic among nurses

Nurses job stress level and Job Characteristics Association

In our study, we investigated that some of the following job characteristics are significantly associated with Nurses' job stress level such as Nursing Qualification (P=0.035*) Working Experience (P=0.035*) and nursing Unit: Covid unit and non-covid unit (P=0.007*). It is evident that job stress is much related to particularly their working experience, level of qualification and working unit. It is apparent that working unit plays a greater role in causing job stress among nursing during outbreak.

The findings of this study have been shown to be consistent with the study undertaken by Bellanti et.al Shin et.al (3, 23) where Participants working in the Covid unit and ICU had a significantly higher than the other departments while those working in the General Ward.

In this current study, we found that significant association between the nurses' perceived job stress and their work experience (26).

Concerning the health problems experienced by the nurses, the very common problems were lower back pain (32.3%) and then migraine headache at the rate of (14.7%). Nurses are at a higher risk and six times higher prevalence to have lower back pain and back injury (5). These health problems could be from prolong standing and physical exhaustion during patient care. The other predominant health problem found in our results was headache, perhaps it might be due to keen concentration in clinical challenges related to their work. According to Atlanta-based Headache Center of Peachtree Neurological Clinic, headache usually stress-related; Still, headaches may indicate another underlying health issue. Our study results are almost parallel with study done by Kilic.et.al and Sabra.et.al (15, 19).

Nurses perceived job Stress during Covid-19 pandemic

The mean value of perceived job stress score was 21.8 on a 0-40 range PSS scale that depicts moderate stress. The overall nurses (97.57%) had experienced job stress during pandemic, of them (59.76 %) had moderate stress, and (27.44%) had high stress and then only (10.37%) experienced low stress respectively. It is evident that almost certainly all the nurses are facing job stress. The other recent study results that the Nurses stress level was moderate to high (10, 21).

COVID-19 related job stress predictors among Nurses

It is not surprising that nurses reported significantly higher mean score of perceived job stress. The literature has shown that, compared to other professionals, healthcare providers, especially nurses, have a higher risk of developing emotional distress like depression, anxiety, and burnout due to work-related stress (12). There are stress factors that appeared to increase the risk of developing job stress like perceived safety risk of covid-19 contagion, perceived worry about health while exposure covid-19 patients and perceived work difficulty as over worked to handle the covid-19 patients.

The recent studies conducted on nurses showed that predictors of job stress in the professional environment include the perceived fear of contracting

COVID-19, a decrease in the level of safety while conducting emergency medical procedures and nurses who tested positive to corona virus (14,16, 28). Of note, in our research only 3 significant job stress predictors related to Covid-19 revealed among nurses.

Limitations

This study limited only on nurses working in the government hospitals located in Muhayil town area, Aseer province of Saudi Arabia. And the second limitation was that only subjective health problems and job stress mentioned by nurses themselves were evaluated. Thirdly, the completion of job stress predictors model needs to be added with few more Covid-19 pandemic related factors. Un fortunately the sample size was less than recommended size just with 164 nurses only.

CONCLUSION

The substantial study findings reflected that job stress was perceived by almost all the nurses (97.57%) during pandemic and the job stress mean score was 21.8 which represents moderate level of perceived stress. The significant job stress predictors related to Covid-19 were "perceived safety risk, perceived worry about health while exposure and perceived work difficulty as over worked to handle the covid-19 patients". Therefore, this study recommends that the nurses need to be prepared well by strong strategy improvements for reducing the nurses' stress to pursue their efforts in more meaningful experience during pandemic (22, 27). A Longitudinal research studies need to be conducted to follow up on nurses' stress and develop evidence-based interventions.

Acknowledgments

We would like to thank the Dean of the college for support and encouragement in completion of this research work and grateful to all the nurses who willingly participated to this study.

Ethics Committee Approval: An ethical approval was granted only from the Institutional research committee at College of Applied medical Sciences, Muhayil Aseer, Saudi Arabia. This study was performed on nurses working in different hospitals in Muhayil Asir Town, Saudi Arabia. Informed consent obtained by the nurses only. Ethical committee of King Khalid University was not required.

Peer-review: Externally peer-reviewed.

Author Contributions:
Concept: H.M.T.A; N.M.A.A; A.A.A, Design: S.J; Literature search: S.J; H.A.A.A; F.A.M.A; A.H.M.A, Data Collection and Processing: ALL except S.J, Analysis, or Interpretation: S.J, Writing: S.J.

Conflict of Interest: The authors have no interests to declare

Financial Disclosure: The authors declared that no financial support received for this study.

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