RESEARCH ARTICLE

PREVALENCE OF DEPRESSION, ANXIETY AND STRESS AND ASSOCIATED FACTORS AMONG NURSES WORKING IN A TERTIARY HOSPITAL IN AL-MADINAH CITY 2021, A CROSS SECTIONAL STUDY

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Manuscript Info	*Abstract*
	………………………………………………………… **Objectives :**The aim of the study is to determine the prevalence of depression, anxiety, stress and associated factors among the nurses working in Madinah cardiac center in Al-Madinah city **Methods :**This cross-sectional study was conducted among 199 nurses working in a tertiary care center, Saudi Arabia. Depression, anxiety and stress were measured by the validated 21‑Items Depression, Anxiety and Stress Scale (DASS-21). The t-test, analysis of variance (ANOVA) test and multivariate linear regression analysis were used to detect the differences between the variables. **Results :**The prevalence of depression, anxiety and stress symptoms were relatively high 52.2%, 67.3% and 36.6%, respectively.Depression, anxiety and stress were significantly associated with overtime hours ($P=0.006$, $P=0.026$ and $P=0.002$, respectively), who worked in in-patient department($P=0.014$, $P=0.026$ and $P=0.009$, respectively) and who worked in emergency compared to the nurses worked in surgical / operation room(OR) ($P=0.008$, $P=0.034$ and $P=0.007$, respectively). **Conclusion :**The prevalence of depression, anxiety and stress symptoms among nurses were 52.2%, 67.3% and 36.6%, respectively. Overtime hours and area of employment were significantly associated with depression, anxiety and stress symptoms.

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Introduction:-

Nurses known to be involved in a huge proportion of improving and promoting health services in the community, they are considered as one of the most important groups of service providers(1).Nurses are routinely deal with pain, suffering, events, and death of patients in the workplace and as a result, the improper emotional reaction as anxiety, stress, depression are known to cause major problems for nurses and thereafter to the patients. Overtime working hours, time constraints, meeting the patient need, irregular schedules and lack of professional support are all work-related stressors (2).Depression,anxiety and stress are the most common psychological disorders that affect the worker population which could decrease the productivity of the staff working in the hospital. Addressing these disorders and its associated risk factors will help to improve productivity, reduce absence and loss of resources on treatment, investigation, and rehabilitation (3).Higher levels of stress if it is not properly managed could lead or exacerbatebehavioral health problems such as smoking, eating disorders, alcohol dependence and substance abuse (2). Nurses have more severe mental problems than other healthcare professionals (4).Globally, an estimated 322

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million(4.4%) individuals suffer from depression and 264 million(3.6%) suffer from anxiety. In Saudi Arabia, the prevalence of depression and anxiety disorders were 4.5% and 4.3%, respectively(5).Depression is defined as "a range of scores on DASS that indicates the presence of self-blame, pessimism and loss of enjoyment". Anxiety is defined as "a range of scores that indicates a state of persistent apprehension and worry, accompanied by physical symptoms of sympathetic activation". Stress is defined as "a range of scores that indicates a state of over-arousal, tenseness and the inability to relax" (6).A systematic review and meta-analysis was conducted in 2021, more than nighty studies were included showing that the aggregate prevalence of depression, anxiety and stress were 35%, 37% and 43%, respectively (7).

Rationale :
Up to our knowledge the researchers has noticed that there are no studies showed the prevalence of depression among nurses in Al-Madinah. The depression, stress, and anxiety among nurses can impact their performance which ultimately affects the quality of care provided to the patients.

General objective:
The aim of the study is to determine the prevalence of depression, anxiety, stress and associated factors among the nurses working in Madinah cardiac center in Al-Madinah city.

Specific objective:
To determine the level of depression, anxiety, and stress among nurses.
To identify the relationship between demographic, work characteristics and depression among nurses.
To identify the relationship between demographic, work characteristics and anxiety among nurses.
To identify the relationship between demographic, work characteristics and stress among nurses.

Methods:-
Study design and setting
This study used a cross-sectional design. The study was conducted between October 2021 and December 2021 at Madinah cardiac center (MCC), Al Madinah, Saudi Arabia.

Sample and sampling criteria
The target population included all nurses working in Madinah Cardiac Center. The study sample size was calculated using OpenEpi web based on the following assumption: the estimated prevalence of depression among nurses was 40% and the statistical power was 80%, with 95% confidence interval [CI]. Given this assumption, the minimum required number of nurses was determined to be 175 nurses. A convenient non-probability sampling technique was utilized to recruit 199 nurses.

Inclusion and exclusion criteria
All nurses working in Madinah cardiac center (MCC) were enrolled in the study. Nurses were excluded if they were away from work or were on vacation during the data collection period.

Data collection tool
The study instrument consisted of three parts:
Part one contained demographic data such as age, gender, type of residence, marital status, income, and education qualification, part two contained work related conditions such as selection of profession (Nursing) with interest, years of experience,Working and overtime hours per week,having a flexible duty schedule, types of employment contract, and area of working. Part three contained the validated Depression Anxiety Stress Scales (DASS-21) to assess depression, anxiety, and stress (8). This scale contained 21 items, seven items for each subscale of depression, anxiety, and stress. The higher scores indicate more severe symptoms in each dimension. Each item was scored on a 4-point scale ranging from 0 to 3. A seven items for each subscale were summed to get the final score of depression, anxiety and stress and were multiplied by 2. The cut- off points for the presences of indicators of depression, anxiety and stress were over 9, 7 and 14 respectively (9). Cronbach's alpha was 0.86, 0.83, and 0.86 for depression, anxiety, and stress respectively (10).

Data collection procedure
The academic and training department of Madinah Cardiac Center was contacted to facilitate access to the nurses by providing list of all nurses working in the hospital. A total of 330 nurses were contacted by sending an invitation

letter only 199 nurses participated in this study by electronic survey using Google Forms which took around 5-10 minutes to fill.

Ethical Considerations
Ethical approval was obtained from the ethics committee of the General Directory in the Ministry of Health. Written consent was taken from each participating nurse, including an explanation of the study and they were notified that their participation is voluntary. The participants were informed that there is no anticipated risk regarding participation in this study and it will not affect their jobs as the data in the questionnaire is anonymous and stored in a secured location and only accessible by the research team. Indirect benefits regarding participation of the nurses such as enriching the knowledge and addressing gaps and challenges regarding this topic.

Statistical analysis
Data were entered and subsequently analyzed using SPSS version 25 (IBM Corp., Armonk, NY, USA), Quantitative variables were tested for normality, according to central tendency and dispersion. Mean and standard deviations (SD) were used for continuous variables. Frequencies (n) and proportion percentages (%) were used for categorical data. The t-test and analysis of variance (ANOVA) test were used to assess the association between the continuous and categorical characteristics. Multiple linear regression analysis was performed by using "Enter" technique to assess the possible factors associated with depression, anxiety and stress among nurses. Multi-collinearity was checked between the independent variables by using the variation inflation factor. A p-value of <0.05 was considered significant.

Results:-
One hundred and ninety-nine nurses were included in this study. Majority of the nurses were less than 32 years old (117, 58.8%), females (188, 94.5%), and married (97, 48.7%). Most of them had received bachelor qualification (193, 97%) and non-Saudi were (181, 91%). Many of them had no children (129, 64.8%) and were living in nurse's residence (153, 76,9%) (Table 1).Regarding work‑related characteristics, (193, 97%) had selected the Profession (Nursing) with Interest, had more than 40 working hours per Week (153, 76.9%), having a flexible Duty Schedule (125, 62.8%). Of these, (139, 69.8%) intended to leave hospital in the next 5 years if working conditions would not be changed(Table2). The prevalence of depression, anxiety and stress symptoms among nurses were 52.2%, 67.3% and 36.6%, respectively.Depression, anxiety and stress scale were higher and significantly associated with overtime hours per week among nurses (P=0.005, P=0.041 and P=0.003, respectively) and there is an overall significant association between area of employment with depression, anxiety and stress scale (P= 0.013, P= 0.015, and P= 0.009, respectively) (Table4).

In multiple linear regression analysis, work-related characteristics that were significantly associated with depression, anxiety and stress are nurses working more than eight overtime hours per week in comparison to the nurses working 1-8 overtime hours per week (P=0.006, P=0.026 and P=0.002, respectively), who worked in in-patient department(P=0.014, P=0.026 and P=0.009, respectively) and who worked in emergency compared to the nurses worked in surgical / operation room(OR) (P=0.008, P=0.034 and P=0.007, respectively) (Table5). The total model for depression, anxiety and stress was statistically significant and there was no evidence suggestive of multicollinearity between the variables in each model.

Discussion:-
This study aimed to determine the prevalence of depression, anxiety and stress and associated factors among nurses. Of the 199 nurses surveyed,more than half (52.2%) of the nurses had symptoms of depression, more than two-third (67.3%) of the nurses had symptoms of anxiety and more than one-third (36.6%) of the nurses had symptoms of stress.

The results of this study are in line with the previous study conducted in Saudi Arabia which has been reported that 53.8% for depression, 65.7% for anxiety and 38.3% for stress (10).

The present finding higher than previous studies which were 9% and 28.7% had symptoms of depression, 8% and 50.1% had symptoms of anxiety and 10% and 14.8% had symptoms of stress (11-13), and lower than other studies 89% for depression, 91% for anxiety and 84% for stress (14-16). The variation in the results could be attributed to using different assessment scale.Our findings regarding sociodemographic characteristics were failed to detect

significant association with depression, anxiety and stressin regards to previous findings which showedinconsistent results such as female gender, single and younger age were significantly associated with depression, anxiety and stress (17)(18).Current study found that overtime hours and area of employment were significantly associated with depression, anxiety and stress symptoms similar to previous studies regrading overtime hours and working in hospital ward (19)(20).Globally, work related stressors in healthcare setting increases concerns and significantly associated with physical and mental illnesses, compared to our results most of work related characteristics other than overtime hours and area of employment were not statistically significant associated with depression, anxiety and stress (21-23).According to the high level of depression, anxiety and stress among nurses working in the hospital, this study highlights the need for further studies to fill the gaps and to increase awarenessamong hospital and nursing managers to enhance the working environment in the hospitals.The study had some limitations.First,regarding the setting of the study, which is restricted in one center rather than the multicenter which may lack the external validity so, the inability to generalize findings to the population of Saudi Arabia. Second, this study is a cross-sectional study started with the retrospective pattern so the information will be at risk of recall bias. Third, the participating nurses may endure psychological distress in battling thecovid-19 pandemic which may affect the internal validity of the data.

Conclusion:-

The prevalence of depression, anxiety and stress symptoms among nurses were 52.2%, 67.3% and 36.6%, respectively.Overtime hours and area of employment were significantly associated with depression, anxiety and stress symptoms.

Table 1:- Sociodemographic characteristics of the nurses (n=199).

Characteristics	n (%)
Age	
<32	117 (58.8)
≥32	82 (41.2)
Gender	
Male	11 (5.5)
Female	188 (94.5)
Nationality	
Saudi	18 (9.0)
Non-Saudi	181 (91.0)
Educational qualification	
Diploma	4 (2.0)
Bachelor	193 (97.0)
Master	2 (1.0)
Marital status	
Single	102 (51.3)
Married	97 (48.7)
Number of children	
No children	129 (64.8)
1-2	56 (28.1)
3-5	14 (7.0)
Income	
< 8000 Saudi riyals	80 (40.0)
≥ 8000 Saudi riyals	78 (39.0)
Type of residence	
Nurses residence	153(76.9)
Private room	5 (2.5)
Apartment	34 (17.1)
Villa	7 (3.5)
Living arrangement	

Alone	64 (32.2)
With family	47 (23.6)
With friends	77 (38.7)
With strangers	11 (5.5)

Table 2:- Work‑related characteristics of the nurses (n=199).

Characteristics	n (%)
Selection of Profession (Nursing) with Interest	
Yes	193 (97.0)
No	6 (3.0)
Years of experience since the last graduation	
< 6 years	43 (21.6)
6-10 years	84 (42.2)
>10 years	72 (36.2)
Working hours per Week	
≤ 40	46 (23.1)
> 40	153 (76.9)
Overtime hours Per Week	
No overtime hours	80 (40.2)
1-8 hours	74 (37.2)
> 8 hours	45 (22.6)
Having a flexible Duty Schedule	
Yes	125 (62.8)
No	74 (37.2)
Type of work contract	
Temporary contract	105 (52.8)
Permanent contract	94 (47.2)
Charge of management responsibility	
No	162 (81.4)
Yes	37 (18.6)
Intent to leave hospital in the next 5 years if working conditions are unchanged	
Yes	139 (69.8)
No	60 (30.2)
Area of employment	
In-Patient	44 (22.1)
Out-Patient	16 (8.0)
ICU/CCU	93 (46.7)
Emergency	5 (2.5)
Surgical / OR	29 (14.6)
Administrative work	12 (6.0)

ICU: intensive care unit, CCU: cardiac care unit, OR: operation room

Table 3:- Sociodemographic characteristics associated with depression, anxiety and stress among nurses (n=199).

Characteristics	Depression		Anxiety		Stress	
	Mean (SD)	P-value	Mean (SD)	P-value	Mean (SD)	P-value
Age						
<32	12.5 (10.8)	0.102	13.2 (10.3)	0.420	13.5 (10.5)	0.474
≥32	10.2 (8.4)		12.1 (8.8)		12.5 (8.7)	
Gender						
Male	17.2 (10.2)	0.053	16.7 (8.2)	0.172	17.6 (9.2)	0.117

Female	11.2 (9.8)		12.5 (9.8)		12.8 (9.8)	
Nationality						
Saudi	15.3 (9.3)	0.098	16.4 (7.2)	0.098	16.2 (9.1)	0.160
Non-Saudi	11.2 (9.8)		12.4 (9.9)		12.8 (9.8)	
Educational qualification						
Diploma	6.5 (4.4)	0.569	7.5 (5.2)	0.501	8.5 (6.6)	0.630
Bachelor	11.7 (10.0)		12.9 (9.8)		13.2 (9.8)	
Master	10.0 (14.1)		10.0 (11.3)		12.0 (14.14)	
Marital status						
Single	12.0 (10.0)	0.562	13.3 (9.3)	0.633	13.2 (10.0)	0.883
Married	11.1 (9.9)		12.4 (10.1)		13.0 (9.6)	
Number of children						
No children	12.1 (10.2)	0.643	13.13 (10.0)	0.824	13.4 (10.0)	0.746
1-2	10.6 (9.1)		12.2 (8.8)		12.8 (8.9)	
3-5	10.8 (11.1)		12.1 (11.2)		11.4 (11.7)	
Income (SAR)						
< 8000	12.9 (10.1)	0.719	12.9 (10.1)	0.719	13.2 (10.0)	0.697
≥ 8000	12.3 (8.1)		12.3 (8.1)		12.5 (8.8)	
Type of residence						
Nurses residence	11.2(10.0)	0.073	12.2 (9.8)	0.109	12.7 (9.9)	0.359
Private room	20.4 (7.9)		20.0 (11.4)		20.0 (10.2)	
Apartment	10.8 (9.4)		13.2 (8.8)		13.4 (9.3)	
Villa	17.7 (8.4)		18.8 (8.6)		15.7 (7.6)	
Living arrangement						
Alone	11.2 (9.2)	0.791	12.3 (10.0)		13.0 (10.6)	0.769
With family	12.8 (9.7)		14.4 (8.2)		14.3 (8.9)	
With friends	11.1 (10.6)		12.3 (10.3)	0.638	12.5 (9.7)	
With strangers	11.8 (10.8)		11.8 (10.3)		12.1 (10.1)	

SD: standard deviation, SAR: Saudi riyals.

Table 4:- Work-related characteristics associated with depression, anxiety and stress among nurses (n=199).

Characteristics	Depression		Anxiety		Stress	
	Mean (SD)	**P-value**	**Mean (SD)**	**P-value**	**Mean (SD)**	**P-value**
Selection of Profession (Nursing) with Interest						
Yes	11.6 (10.0)	0.750	12.8 (9.8)	0.475	13.2 (9.8)	0.261
No	10.3 (5.9)		11.6 (3.4)		8.6 (6.5)	
Years of experience since the last graduation						
< 6 years	14.0 (10.7)	0.100	15.1 (9.9)	0.170	15.2 (9.5)	0.221
6-10 years	11.8 (10.3)		12.6 (10.1)		13.0 (10.6)	
>10 years	9.9 (8.7)		11.5 (9.0)		11.9 (8.8)	
Working hours per Week						
≤ 40	14.0 (8.8)	0.060	14.8 (9.1)	0.103	14.9 (9.7)	0.158
> 40	10.8 (10.1)		12.1 (9.8)		12.5 (9.8)	
Overtime hours Per						

Week						
No overtime hours	11.1 (9.3)	0.005*	11.9 (9.0)	0.041*	12.2 (9.1)	0.003*
1-8 hours	9.7 (8.5)		11.8 (8.7)		11.4 (8.8)	
> 8 hours	15.6 (12.0)		16.0 (11.8)		17.4 (11.3)	
Having a flexible Duty Schedule						
Yes	11.1 (10.4)	0.393	12.1 (9.9)	0.232	12.4 (10.2)	0.214
No	12.3 (9.1)		13.8 (9.3)		14.2 (9.0)	
Type of work contract						
Temporary contract	12.1 (9.6)	0.410	12.8 (9.5)	0.994	13.4 (9.4)	0.636
Permanent contract	11.0 (10.3)		12.8 (10.0)		12.7 (10.2)	
Charge of management responsibility						
No	11.5 (9.8)	0.940	12.5 (9.4)	0.393	13.0 (9.5)	0.872
Yes	11.7 (10.5)		14.0 (11.0)		13.3 (11.1)	
Intent to leave hospital in the next 5 years if working conditions are unchanged						
Yes	12.2(10.1)	0.188	13.6 (9.9)	0.060	13.7 (10.0)	0.136
No	10.2 (9.4)		10.8 (8.9)		11.5 (9.2)	
Area of employment						
In-Patient	14.8 (9.9)	0.013*	15.6 (9.3)	0.015*	16.4 (10.7)	0.009*
Out-Patient	9.6 (7.3)		13.3 (9.2)		11.1 (8.0)	
ICU/CCU	10.8 (10.1)		12.4 (9.9)		12.2 (9.4)	
Emergency	22.8 (8.3)		21.6 (11.8)		24.4 (10.8)	
Surgical / OR	9.1 (9.1)		8.7 (8.4)		10.8 (8.5)	
Administrative work	9.8 (10.0)		10.1 (9.0)		11 (9.5)	

SD: standard deviation, SAR: Saudi riyals, ICU: intensive care unit, CCU: cardiac care unit, OR: operation room. *
P value < 0.05.

Table 5:- Multiple linear regression analysis of characteristics associated with depression, anxiety and stress scale among nurses (n=199).

Work-related characteristics	B	SE	*P*-value	95% CI for β	Tolerance	VIF
Depression scale						
Number of overtime hours per week	4.557	1.624	0.006	(1.7-3.3)	0.987	1.014
Inpatient	4.077	1.639	0.014	(0.8-7.3)	0.984	1.016
Emergency	11.582	4.338	0.008	(3.0-20.1)	0.987	1.013
Anxiety scale						
Number of overtime hours per week	3.625	1.614	0.026	(0.4-6.8)	0.987	1.014
Inpatient	3.656	1.630	0.026	(0.4-6.8)	0.984	1.016
Emergency	9.195	4.314	0.034	(0.6-17.7)	0.987	1.013
Stress scale						
Number of overtime hours per week	4.904	1.589	0.002	(1.7-8.0)	0.987	1.014
Inpatient	4.226	1.604	0.009	(1.0-7.3)	0.984	1.016
Emergency	11.659	4.245	0.007	(3.2-20.0)	0.987	1.013

SE: Standard error, CI: confidence interval, VIF: Variance inflation factor.

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