Annals of Medicine and Surgery 68 (2021) 102681

Contents lists available at ScienceDirect

Annals of Medicine and Surgery

journal homepage: www.elsevier.com/locate/amsu

Cross-sectional Study

Depression among healthcare workers in North West Armed Forces hospital-Tabuk, Saudi Arabia: Prevalence and associated factors

Salha Ali Almarhapi *, Tahani Ahmed Khalil

Department of Family Medicine, North West Armed Forces Hospitals, Tabuk, Saudi Arabia

ARTICLE INFO

Keywords:
Depression
Healthcare workers
Patient health Questionnaire-9 (PHQ-9)
Prevalence

ABSTRACT

Background: Depression among healthcare workers results in adverse effects which might include impairment of work performance, reduced productivity and increase in the employee turnover rate. Despite of that, few published studies have been cited concerning depression among hospital healthcare workers in the Kingdom of Saudi Arabia. This study aims to estimate the prevalence and identify the determinants of depression among health care workers working at North West Armed Forces hospital in Tabuk city, KSA.

Methods: This is a cross-sectional study design that was adopted to include a representative sample of physicians and nurses working at North West Armed Forces hospital throughout the study period, provided that they worked at this hospital for at least 6 months. A self-administered questionnaire was applied including three parts; the socio-demographic characteristics of the participants, factors that could be associated with depression and the patient health-9 questionnaire to diagnose depression.

Results: The study included 255 healthcare workers. Females represent 58.8 % of the participants. Their age ranged between 22 and 50 years (30.6 ± 5.3 years). About two-thirds of them were nurses (64.3 %) and the remaining 35.7 % were physicians; mainly registrars (22.8 %). The prevalence of depression was 43.9 %. being severe among 0.8 % of them. Results of multivariate logistic regression analysis revealed that HCWs who lost beloved person in the last 6 months were at 3.67 higher risk for developing depression compared to those who didn't report such history (adjusted odds ratio = 3.67; 95 % confidence interval (CI) = 1.84–7.30, $p < 0.001$). Compared to HCWs of less than 5 years of experience, those with higher experience (5–10 and > 10 years) were at lower significant risk to develop depression (AOR = 0.16; 95 % CI = 0.07–0.037, $p < 0.001$ and AOR = 0.05; 95 % CI = 0.01–0.029, $p = 0.001$), respectively.

Conclusion: Depression is a relatively common health problem affecting healthcare workers in North West Armed forces hospital, Tabuk. However, in majority of cares, the depression was mild.

1. Introduction

Depression is a mental illness characterized by depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-worth, disturbed sleep or appetite, and poor concentration" and considered the commonest mental health problem [1]. The World Health Organization (WHO) reported that depression is the leading cause of disability for both genders [2]. Furthermore, it is one of the leading causes of mortality and morbidity worldwide, responsible for 4.4 % of the global disability [3]. According to the WHO, depression is a result of complex interaction of biological, psychological and social factors [4]. Gender is a risk factor regarding prevalence of depression, with higher rates among females compared to males, due to factors associated with social roles or hormonal imbalance, associated with menstruation, childbirth, and menopause [5]. Numerous studies have documented the prevalence and potential causes of depression in healthcare workers either physicians or nurses [6–10]. According to these studies, healthcare workers have an increased risk of depressive symptoms compared to the general population, mostly due the stressful nature of their work [11,12].

A systematic review and meta-analysis included studies from 15 countries revealed that the prevalence of depressive symptoms among physicians ranged from 20.9 to 43.2%with a pooled estimate of 28.8 % [13], while in another systematic review and meta-analysis of studies conducted among intensive care unit nurses, the pooled prevalence of depression was 12 % [14].

* Corresponding author.
E-mail address: saali29@hotmail.com (S.A. Almarhapi).

https://doi.org/10.1016/j.amsu.2021.102681
Received 13 July 2021; Received in revised form 4 August 2021; Accepted 4 August 2021
Available online 5 August 2021
2049-0801/© 2021 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Adverse effects of depression on the affected healthcare workers might include impairment of work performance, reduced productivity and increase in the employee turnover rate [15]. Also, it could negatively affect the quality of provided care to patients [11]. Furthermore, depression can result in higher rates of suicidal attempts among healthcare workers as among physicians, the rate of suicide was 1.4 for male and 2.3 for female higher compared to the general population [16].

Nowadays, healthcare workers are on the front line fighting against COVID-19 pandemic as they directly involved in the diagnosis, management, and care of patients, putting them at higher risk of mental health problems, particularly depression as a result of overwhelming workload, widespread media coverage of the situation, shortage of personal protection equipment, lack of specific drugs, and feelings of being inadequately supported and at higher risk for getting the infection than others [17].

Few published studies have been cited concerning depression among hospital healthcare workers in the Kingdom of Saudi Arabia (KSA) with no one from Tabuk city. Therefore, the present study was carried out to assess the magnitude and predictors of depression among this population where the findings could have public health significance for higher authorities.

2. Methodology

This is a cross-sectional study design which was carried out in Tabuk City. It is located 2200 feet above sea level and has a population of 657,000 according to the last estimation done in 2020 [18]. North West Armed forces hospital (NWAFH) is a tertiary care hospital with a capacity of 332 beds, where the study was specifically carried out. All physicians (n = 484) and nurses (n = 1232) working at NWAFH throughout the study period were eligible for inclusion in the study, provided that they worked at this hospital for at least 6 months. Using Roasoft online sample size calculator with the assumptions that the total population are 1716 physicians and nurses. Prevalence of symptoms of depression among healthcare workers was assumed to be 11.4 % based on the literature [19] with a Confidence Interval (CI) of 99 % with 5 % margins of errors. Accordingly, the calculated sample size was determined to be 232. Stratified random sampling technique with proportional allocation was adopted to select participants according to their job either physicians or nurses. A total of 72 physicians and 183 nurses were invited to participate in the study. Simple random technique was used through preparation of two separate lists of physicians and nurses and selection of the participants from these two lists using the random table generator website. A self-administered questionnaire was utilized for collecting data. It included three parts; the socio-demographic characteristics of the participants (age, gender, nationality, marital status, job title, specialty and satisfaction with salary), the factors that could be associated with depression such as history of chronic diseases, smoking, loss of beloved person within the last 6 months, body mass index (BMI), duration of work in the current facility, working in night shifts and family history of depression and the PHQ-9 questionnaire (Arabic and English versions) which composed of 9 statements. It was a multipurpose instrument used for screening, diagnosing, monitoring and measuring the severity of depression. It incorporates DSM-IV depression diagnostic criteria with others major depressive symptoms into a brief self report instrument and has 61 % sensitivity and 94 % specificity in adults [20–22].

The PHQ-9 has 9 statements with a score ranging from 0 to 3 for each statement (total score ranging from 0 to 27). The provisional diagnoses of depression, based on the total score was described by Liu et al. as follows: 0–4: no diagnosis, 5–9 mild depression, 10–14 moderate depression, 15–19 moderately severe depression and 20–27 as severe depression [21]. PHQ-9 is available free online; however, permission to use the Arabic version was requested from the corresponding author. The questionnaires were distributed electronically by the researcher herself on all physicians and nurses by Whatsapp app groups. Before beginning of data collection, the questionnaire was pre-tested on approximately 10 % of the sample to ensure that the wording, format, and sequencing of questions are appropriate. Results from the pilot study were included in the final draft as there was no significant difference.

Permissions from the program of Family Medicine at Tabuk and local Research and Ethics committee at NWAFH was obtained prior to study conduction. Additionally, permission was sought from the director of the NWAFH, and an informed consent was obtained from all the participants after describing the aim of the study. Statistical Package for Social Sciences (SPSS) software version 26.0 was utilized for data entry and analysis. Descriptive statistics (number, percentage for categorical variables and mean, standard deviation and range for continuous variables) and analytic statistics using Chi Square tests were applied. *P*-value ≤ 0.05 was considered statistically significant. By considering depression as a dichotomous variable, multivariate logistic regression analysis was done to identify factors associated with depression among healthcare staff at NWAFH-Tabuk after controlling for confounders. The adjusted measure of association between risk factors and depression among them was expressed as the odds ratio (OR) with 95 % Confidence Interval (95 % CI). Adjusted or crude ORs with 95 % CI that did not include 1.0 were considered significant. This study was reported using the Strengthening the reporting of cohort studies in surgery (STROCSS) checklist [23]. The research was registered in Research Registry with registration ID: researchregistry6940.

3. Results

The study included 255 healthcare workers. Their socio-demographic characteristics are summarized in Table 1. Females represented 58.8 % of the participants while the age ranged between 22 and 50 years with a mean value of 30.6 ± 5.3 years. More than two-thirds were Saudi nationals (69.4 %) and about two-thirds of the total

Table 1
Socio-demographic characteristics of the participants, NorthWest Armed forces hospital (n = 255).

	Frequency	Percentage
Gender		
Male	105	41.2
Female	150	58.8
Age (years)		
Range	22–50	
Mean ± SD	30.6 ± 5.3	
Nationality		
Saudi	177	69.4
Non-Saudi	78	30.6
Marital status		
Single	86	33.7
Married	158	62.0
Divorced	11	4.3
Job title		
Nurse	164	64.3
Registered nurse	161	63.1
Head nurse	3	1.2
Physicians	91	35.7
Intern	11	4.3
Registrar	58	22.8
Specialist/senior specialist	8	3.1
Consultant	12	4.7
Quality officer	2	0.8
Smoking status		
Never smoking	180	70.6
Current smoker	49	19.2
Ex-smoker	26	10.2
Body mass index		
Underweight	11	4.3
Normal	165	64.7
Overweight	61	23.9
Obese	18	7.1

participants were nurses (64.3 %). The prevalence of smoking was 19.2 %. About one-third (31 %) of HCWs were either overweight (23.9 %) or obese (7.1 %). Most of the participants (61.3 %) had less than 5 years of experience. About two-thirds (68.6 %) had working night shifts. Regarding their specialty, the commonest reported were Family Medicine (17.9 %), Emergency Medicine (14.1 %), and Pediatrics (12.2 %) (Table 2). Family history of depression/other psychiatric problems was observed among 20 % of the participants. History of losing beloved person in the last 6 months was reported by 20.4 % of the participants. Less than half of the participants (45.5 %) were not satisfied with their salary as and prevalence of chronic diseases among the participants was 14.1 %.

Prevalence of depression among healthcare workers was 43.9 %; being moderately severe and severe among 1.2 % and 0.8 % of them, respectively (Fig. 1). The highest age reported among participants with mild depression was 31.5 ± 5.7 while the lowest age was observed among those with moderately severe/severe was 26.6 ± 2.1, p = 0.048. Moderately severe and severe depressions were more observed among Saudi participants compared to non-Saudis with 13.6 % and 7.7 %, respectively (p = 0.033). Almost a quarter (23.1 %) were ex-smokers compared to 45 % of non-smokers and 51 % of current smokers were depressed. Furthermore, moderately severe and severe depression were reported among 2.8 % of non-smokers compared to none of current/ex-smokers. The overall association between smoking status and depression was statistically significant (p = 0.041). More than half (51.6 %) of HCWs who had work experience less than 5 years were depressed compared to 35.7 % with experience exceeding 10 years reporting depression. Also, 17.4 % of those whose work experience was <5 years expressed moderately severe/severe depressions compared to none for those whose experience exceeded 10 years (p = 0.018). About two-thirds (61.1 %) of HCWs with history of chronic diseases had depression compared to 41.1 % of those with no such history. More than a quarter (27.8 %) of those with history of chronic diseases had moderate depression while 9.1 % of those without history of chronic diseases had moderate/moderately severe/severe depression (p = 0.001). About two-thirds (67.3 %) of those with history of losing beloved person in the last 6 months were depressed compared to only 37.9 % of those without such history. Additionally, 3.8 % of those with history of losing beloved person in the last 6 months were moderately severe/severe depressed compared to only 1.5 % of those without such history (p < 0.001) (Table 3).

Results of multivariate logistic regression analysis revealed that HCWs who lost beloved person in the last 6 months were at 3.67 higher risk for developing depression compared to those who didn't report such history (adjusted odds ratio "AOR": 3.67; CI 95 %: 1.84–7.30, p < 0.001). Compared to HCWs of less than 5 years of experience, those with higher experience (5–10 and > 10 years) were at lower significant risk to develop depression (AOR:0.16; 95 % CI 95 %: 0.07–0.037, p < 0.001 and AOR:0.05; CI 95 %:0.01–0.029, p = 0.001), respectively. Age, nationality, smoking history and history of chronic diseases were not significantly associated with depression (Table 4).

Table 2
Work-related characteristics of the participants, NorthWest Armed forces hospital, Tabuk.

	Frequency	Percentage
Years of experience (n=253)		
<5	155	61.3
5–10	84	33.2
>10	14	5.5
Working in night shift		
No	80	31.4
Yes	175	68.6
Specialty		
Family Medicine	46	17.9
Pediatrics	31	12.2
General surgery	22	8.6
Specialized surgery	12	4.7
Emergency Medicine	36	14.1
Outpatient	16	6.3
Internal Medicine	22	8.6
Obstetrics and Gynecology	30	11.8
Psychiatry	13	5.1
Orthopedics	11	4.3
Others	16	6.3

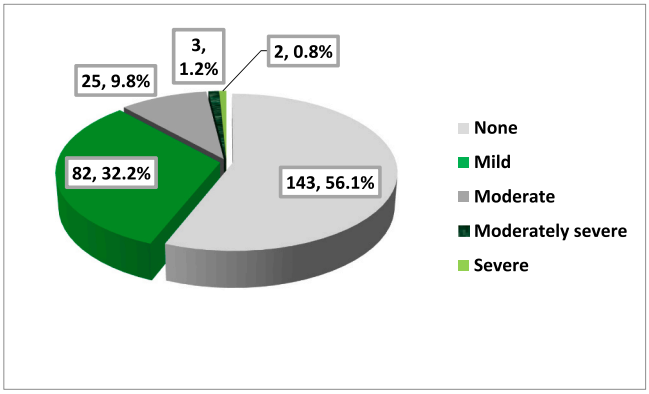


Fig. 1. Prevalence and severity of depression among the participants.

4. Discussion

As a result of the nature of the healthcare providers' working environment, they are at higher risk to develop depression [12,15]. Depression leads to disability among them which in turn, leads to functional impairment in both their workplace and personal lives. Additionally, depression of HCWs c could result in deterioration in patient care, if is manifested within the healthcare setting. Despite of this, relatively limited studies have been cited concerning depression among hospital healthcare workers in Saudi Arabia. Therefore, the present study was conducted to explore the prevalence and determinants of depression among health care workers (physicians and nurses) working at military hospital in Tabuk city.

In the current study, the prevalence of depression, based on PHQ-9 questionnaire, was 43.9 %; being mild, moderate, moderately severe and severe among 56.1 %, 32.2 %, 1.2 % and 0.8 % of them, respectively. Furthermore, the prevalence of depression among physicians and nurses were 50 % and 40.9 %, respectively with no significant difference. Local and international studies carried out everywhere reported variable figures. In National Guard hospital in Riyadh, the prevalence of major depressive disorder was 6.7 % and symptoms of depression was 11.4 % [19]. In Egypt, the prevalence of depressive symptoms among all HCWs was 71.4 % [24]. in Iraq, the overall prevalence of probable depressive symptoms was 70.2 % [25]. In Tunisia, 30.5 % of the medical residents had definite whereas 31.5 % had probable depression symptoms [26]. In Malaysia, the prevalence of depression among primary healthcare workers was 38 %; being moderate to severe among one-third of them [27]. In Pakistan, prevalence of mild to moderate depression among hospital physicians was 24.8 % while it was severe among 1.0 % of them [28]. In another study carried out in Pakistan, the prevalence of depression among nurses was 69.4 % [9]. In Nigeria, the prevalence of depression was 17.3 % in resident physicians and 1.3 % in non-resident physicians [29]. In Taiwan, the prevalence of depression was 13.3 % among physicians [30]. In Austria, the prevalence of major depression among physicians was 10.3 % [31]. In Croatia, using the Beck Depression Inventory II (BDI-II), he prevalence of moderate and severe depression among physicians was 12.2 % [32]. In Australia, prevalence rate of depression among nurses was 32.4 % [10]. Variation clearly observed between the studies, including the present one could be attributed partially to difference in the nature of the target population, different methodological approaches as well as different tools used to

Table 3
Factors associated with depression among healthcare workers, NorthWest Armed forces hospital, Tabuk.

	Depression according to PHQ-9				p-value[a]
	None N = 143	Mild N = 82	Moderate N = 25	Moderately severe/severe N = 5	
Gender					
Male (n = 105)	60 (57.1)	35 (33.3)	10 (9.5)	0 (0.0)	
Female (150)	83 (55.3)	47 (31.3)	15 (10.0)	5 (3.3)	0.305[a]
Age (years)					
Mean ± SD	30.5 ± 5.3	31.5 ± 5.7	28.8 ± 4.0	26.6 ± 2.1	0.048[b]
Nationality					
Saudi (n = 177)	106 (59.9)	47 (26.6)	20 (11.3)	4 (2.3)	
Non-Saudi (n = 78)	37 (47.4)	35 (44.9)	5 (6.4)	1 (1.3)	0.033[a]
Marital status					
Single (n = 86)	50 (58.1)	26 (30.2)	9 (10.5)	1 (1.2)	
Married (n = 158)	87 (55.1)	51 (32.3)	16 (10.1)	4 (2.5)	
Divorced (n = 11)	6 (54.5)	5 (45.5)	0 (0.0)	0 (0.0)	0.846[a]
Job title					
Nurse (n = 164)	97 (59.1)	50 (30.5)	15 (9.1)	2 (1.2)	
Physicians (n = 91)	46 (50.0)	32 (35.2)	10 (11.0)	3 (3.3)	0.447[a]
Job title (physicians)					
Intern (n = 11)	8 (72.7)	2 (18.2)	1 (9.1)	0 (0.0)	
Registrar (n = 58)	27 (46.6)	21 (36.2)	8 (13.8)	2 (3.4)	
Specialist/senior specialist (n = 8)	5 (62.5)	1 (12.5)	1 (12.5)	1 (12.5)	
Consultant (n = 12)	6 (50.0)	6 (50.0)	0 (0.0)	0 (0.0)	
Quality officer (n = 2)	0 (0.0)	2 (100)	0 (0.0)	0 (0.0)	0.398[a]
BMI					
Underweight (n = 11)	8 (72.7)	2 (18.2)	1 (9.1)	0 (0.0)	
Normal (165)	93 (56.4)	54 (32.7)	15 (9.1)	3 (1.8)	
Overweight (n = 61)	33 (54.1)	22 (36.1)	4 (6.6)	2 (3.3)	
Obesity (n = 18)	9 (50.0)	4 (22.2)	5 (27.8)	0 (0.0)	0.347[a]
Smoking status					
None (n = 180)	99 (55.0)	56 (31.1)	20 (11.1)	5 (2.8)	
Current smoker 49)	24 (49.0)	20 (40.8)	5 (10.2)	0 (0.0)	
Ex-smoker (n = 26)	20 (76.9)	6 (23.1)	0 (0.0)	0 (0.0)	0.041[a]
Years of experience (n=253)					
<5 (n = 155)	75 (48.4)	53 (34.2)	22 (14.2)	5 (3.2)	
5-10 (n = 84)	57 (67.9)	24 (28.6)	3 (3.6)	0 (0.0)	
>10 (n = 14)	9 (64.3)	5 (35.7)	0 (0.0)	0 (0.0)	0.018[a]
Working in night shift					
No (n = 80)	49 (61.3)	21 (26.3)	9 (11.3)	1 (1.3)	
Yes (n = 175)	94 (53.7)	61 (34.9)	16 (9.1)	4 (2.3)	0.499[a]
Specialty					
Family Medicine (n = 46)	23 (50.0)	12 (26.1)	8 (17.4)	3 (6.5)	
Pediatrics (n = 31)	20 (64.5)	9 (29.0)	2(6.5)	0 (0.0)	
General surgery (n = 22	11 (50.0)	9 (40.9)	2 (9.1)	0 (0.0)	
Specialized surgery (n = 12)	7 (58.3)	5 (41.7)	0 (0.0)	0 (0.0)	
Emergency Medicine (n = 36)	18 (50.0)	10 (27.8)	7 (19.4)	1 (2.8)	
Outpatient (n = 16)	11 (68.8)	4 (25.0)	1 (6.3)	0 (0.0)	
Internal Medicine (n = 22)	13 (59.1)	7 (31.8)	2 (9.1)	1 (3.3)	
Obstetrics and Gynecology (n = 30)	14 (46.7)	14 (46.7)	1 (3.3)		
Psychiatry (n = 13)	10 (76.9)	2 (15.4)	1 (7.7)	0 (0.0)	
Orthopedics (n = 11)	9 (81.8)	2 (18.2)	0 (0.0)	0 (0.0)	
Others (n = 16)	7 (43.8)	8 (50.0)	1 (6.3)	0 (0.0)	0.430[a]
History of chronic diseases					
No (n = 219)	129 (58.9)	70 (32.0)	15 (6.8)	5 (2.3)	
Yes (n = 36)	14 (38.9)	12 (33.3)	10 (27.8)	0 (0.0)	0.001[a]
Family history of depression					
No (n = 204)	121 (59.3)	58 (28.4)	21 (10.3)	4 (2.0)	
Yes (n = 51)	22 (43.1)	24 (47.1)	4 (7.8)	1 (2.0)	0.087[a]
History of loosing beloved person in the last 6 months					
No (n = 203)	126 (62.1)	63 (31.0)	11 (5.4)	3 (1.5)	
Yes (n = 52)	17 (32.7)	19 (36.5)	14 (26.9)	2 (3.8)	<0.001[a]
Satisfaction with salary					
No (n = 116)	72 (62.1)	31 (26.7)	10 (8.6)	3 (2.6)	
Yes (n = 139)	71 (51.1)	51 (36.7)	15 (10.8)	2 (1.4)	0.257[a]

[a] Chi-square test.
[b] One-way analysis of variance test (ANOVA).

Table 4
Predictors of depression among healthcare workers: Logistic regression analysis.

	B	SE	Adjusted odds ratio	95 % Confidence interval	p-value
Years of experience					
<5[a]			1.0	–	
5–10	−1.867	0.439	0.16	0.07–0.37	<0.001
>10	−3.109	0.961	0.05	0.01–0.29	0.001
Loosing beloved person in the last 6 months					
No[a]			1.0	–	
Yes	1.300	0.351	3.67	1.84–7.30	<0.001

B: Slope SE: Standard error [a] Reference category.
Terms of age, nationality, smoking and history of chronic diseases were removed from the final logistic regression model (not significant).

diagnose depression. Therefore, comparison between them is not practical.

In this study, the low experienced healthcare workers were at higher risk for depression compared to more experienced ones. The same has been documented by others [19]. Variable channels faced at the new work environment could explain this depression among lower experienced HCWs. However, some others observed that more experienced nurses were more depressed [24,28]. As expected, HCWs who reported

loss of beloved persons in the last 6 months were at higher risk for depression in the current study, even after controlling for confounders. This factor was not investigated among risk factors of depression of healthcare workers in the studies included in literature, despite its importance.

In agreement with other studies, no gender difference was reported in the current study regarding the prevalence of depression [29,30]. However, studies in Egypt [24] and Tunisia [26] reported that females were at higher risk for depression compared to males and attributed this to the differences between the natures of genders, job roles and psychological coping skills between male and female healthcare workers. On the other hand, some others reported that males were at higher risk for depression than females [27].

In some studies, insufficient salary was a predictor for depression among healthcare workers [9,24]. In the current study, salary was not a significant predictor for depression among the respondents, probably relatively sufficient salary was offered to healthcare workers in Saudi Arabia, although a considerable proportion (45.5 %) of healthcare workers were not satisfied with their salary in the present study.

The present study revealed no role of healthcare worker' marital status in depression. The same has been observed by others [29]. Contrary to that, some others reported that married healthcare workers were more likely to have depression [24], and some reported that singles were more likely to have depression [19]. In the present study, working in night shifts was not associated with depression. In another study carried out in Tunisia, resident physicians with a greater number of night shifts per month were more depressed [26]. Also, in Taiwan, physicians being on more night duty per month were more likely to be depressed [30].

The present study has some important limitations that should be addressed. It included only healthcare workers working at military hospital in Tabuk (single-centre study), so, the generalization of the results should be interpreted with caution. As a result of the cross-sectional nature of the study, it is difficult to establish causality between depression and its associated factors. Finally, some important factors that might be related to depression were not investigated in this study such as job satisfaction and detailed work-related factors. Despite of those limitations, this study is the first of its kind, up to our knowledge, investigated depression among healthcare workers in Tabuk, Saudi Arabia using a validated tool.

5. Conclusion

In conclusion, depression is a relatively common health problem affecting healthcare workers in NorthWest Armed forces hospital, Tabuk. However, in majority of cares, the depression was of mild degree. Therefore, screening for depression, on regular basis, for healthcare workers and referral of severe cases for psychiatric consultation are needed. In addition, further longitudinal study including healthcare workers from other hospitals in Tabuk is warranted to have a clearer image of the situation.

Sources of funding

None.

Ethical approval

Ethical approval obtained from the IRB of North West Armed Forces hospital at tabuk.

Consent

Informed consent was obtained according and in guidelines of the declaration of Helsinki.

Author contribution

All authors contributed evenly in the conceptualization, drafting, data analysis, writing and proofreading of the research.

Registration of research studies

1. Name of the registry: researchregistry
2. Unique Identifying number or registration ID: researchregistry6940
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): https://www.researchregistry.com/register-now#user-researchregistry/registerresearchdetails/60df014e3b0b3e002545a2d4/

Guarantor

Salha Ali Almarhapi.

Declaration of competing interest

The authors declare no conflict of interest.

References

[1] S. Seid, O. Abdu, M. Mitiku, K.S. Tamirat, Prevalence of depression and associated factors among HIV/AIDS patients attending antiretroviral therapy clinic at Dessie referral hospital, South Wollo, Ethiopia, Int. J. Ment. Health Syst. 14 (1) (2020) 55.
[2] W.H. Organization, Depression: a Global Crisis: World Mental Health Day, World Health Organization Links, Geneva, 2012.
[3] I.E. Obi, P.N. Aniebue, K. Okonkwo, T.A. Okeke, N. Ugwunna, Prevalence of depression among health workers in Enugu, South East Nigeria, Niger. J. Clin. Pract. 18 (3) (2015) 342–347.
[4] P.R. Albert, Why is depression more prevalent in women? J. Psychiatry Neurosci. 40 (4) (2015) 219–221.
[5] R.H. Salk, J.L. Petersen, L.Y. Abramson, J.S. Hyde, The contemporary face of gender differences and similarities in depression throughout adolescence: development and chronicity, J. Affect. Disord. 205 (2016) 28–35.
[6] K. Ahola, J. Hakanen, Job strain, burnout, and depressive symptoms: a prospective study among dentists, J. Affect. Disord. 104 (1–3) (2007) 103–110.
[7] A.M. Fahrenkopf, T.C. Sectish, L.K. Barger, P.J. Sharek, D. Lewin, V.W. Chiang, et al., Rates of medication errors among depressed and burnt out residents: prospective cohort study, BMJ (Clinical research ed) 336 (7642) (2008) 488–491.
[8] K. Tomioka, N. Morita, K. Saeki, N. Okamoto, N. Kurumatani, Working hours, occupational stress and depression among physicians, Occup. Med. (Oxf.) 61 (3) (2011) 163–170.
[9] A. Ali, A. Rasheed, S. Naz, M. Siddiqu, A study of depression and associated factors among nurses working in tertiary care hospitals in Karachi, Isr. Med. J. 10 (2018) 138–142.
[10] S. Maharaj, T. Lees, S. Lal, Prevalence and risk factors of depression, anxiety, and stress in a cohort of Australian nurses, Int. J. Environ. Res. Publ. Health 16 (1) (2018).
[11] A.J. Ferrari, A.J. Somerville, A.J. Baxter, R. Norman, S.B. Patten, T. Vos, et al., Global variation in the prevalence and incidence of major depressive disorder: a systematic review of the epidemiological literature, Psychol. Med. 43 (3) (2013) 471–481.
[12] R. Kaplan, Depression in Healthcare Workers, vol. 4, Academia edu [Internet, 2009, pp. 40–41.
[13] D.A. Mata, M.A. Ramos, N. Bansal, R. Khan, C. Guille, E. Di Angelantonio, et al., Prevalence of depression and depressive symptoms among resident physicians: a systematic review and meta-analysis, Jama 314 (22) (2015) 2373–2383.
[14] M. Karanikola, M. Giannakopoulou, M. Mpouzika, C.P. Kaite, G.Z. Tsiaousis, E. D. Papathanassoglou, Dysfunctional psychological responses among Intensive Care Unit nurses: a systematic review of the literature, Rev. Esc. Enferm. USP 49 (5) (2015) 847–857.
[15] F. Cocker, K. Sanderson, A.D. LaMontagne, Estimating the economic benefits of eliminating job strain as a risk factor for depression, J. Occup. Environ. Med. 59 (1) (2017) 12–17.
[16] E.S. Schernhammer, G.A. Colditz, Suicide rates among physicians: a quantitative and gender assessment (meta-analysis), Am. J. Psychiatr. 161 (12) (2004) 2295–2302.
[17] J. Lai, S. Ma, Y. Wang, Z. Cai, J. Hu, N. Wei, et al., Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019, JAMA Netw Open 3 (3) (2020), e203976-e.
[18] S. Mackey, The Saudis: inside the Desert Kingdom, WW Norton & Company, 2002.
[19] N. AlFahhad, Prevalence and factors associated with depression among health care workers in National Guard Hospital in Riyadh, KSA, Int J Med Develop Countries 2 (3) (2018) 92–96.
[20] K. Kroenke, R.L. Spitzer, J.B. Williams, The PHQ-9: validity of a brief depression severity measure, J. Gen. Intern. Med. 16 (9) (2001) 606–613.

[21] S.I. Liu, Z.T. Yeh, H.C. Huang, F.J. Sun, J.J. Tjung, L.C. Hwang, et al., Validation of Patient Health Questionnaire for depression screening among primary care patients in Taiwan, Compr. Psychiatr. 52 (1) (2011) 96–101.
[22] H. Belhadj, R. Jomli, U. Ouali, Y. Zgueb, F. Nacef, Validation of the Tunisian version of the patient health questionnaire (PHQ-9), Eur. Psychiatr. 41 (S1) (2017) S523–S.
[23] R. Agha, A. Abdall-Razak, E. Crossley, N. Dowlut, C. Iosifidis, G. Mathew, STROCSS 2019 Guideline: Strengthening the reporting of cohort studies in surgery, Int. J. Surg. 72 (2019) 156–165.
[24] L.G. El-Hamrawya, N.N. Hegazy, S.M. El-Halawany, Prevalence of depressive symptoms among healthcare providers in Shibin El-Kom city in Menoufia governorate, Menoufia Medical Journal 31 (2) (2018) 708.
[25] L.A. Alkhazrajy, S. Sabah, S.M. Hassan, Prevalence of depressive symptoms among primary health care providers in Baghdad, Int J Health Psychol Res 2 (2014) 1–20.
[26] M. Marzouk, L. Ouanes-Besbes, I. Ouanes, Z. Hammouda, F. Dachraoui, F. Abroug, Prevalence of anxiety and depressive symptoms among medical residents in Tunisia: a cross-sectional survey, BMJ Open 8 (7) (2018), e020655.
[27] M.P.B.E. Izzudin, A. Al–Bedri, V. Subramaniam, P. Matthews, C.A. Theng, Prevalence and related factors of depression among healthcare personnel at primary healthcare centers, Depression 6 (14.4) (2018) 4–5.
[28] K. Atif, H.U. Khan, M.Z. Ullah, F.S. Shah, A. Latif, Prevalence of anxiety and depression among doctors; the unscreened and undiagnosed clientele in Lahore, Pakistan, Pak J Med Sci 32 (2) (2016) 294–298.
[29] A. Gu, G. Onyeama, M. Bakare, M. Igwe, Prevalence of depression among resident doctors in a teaching hospital, South East Nigeria, International Journal of Clinical Psychiatry 3 (1) (2015) 1–5.
[30] L.J. Wang, C.K. Chen, S.C. Hsu, S.Y. Lee, C.S. Wang, W.Y. Yeh, Active job, healthy job? Occupational stress and depression among hospital physicians in Taiwan, Ind. Health 49 (2) (2011) 173–184.
[31] W. Wurm, K. Vogel, A. Holl, C. Ebner, D. Bayer, S. Mörkl, et al., Depression-Burnout overlap in physicians, PloS One 11 (3) (2016), e0149913.
[32] M. Tomljenovic, B. Kolaric, D. Stajduhar, V. Tesic, Stress, depression and burnout among hospital physicians in Rijeka, Croatia, Psychiatr. Danub. 26 (Suppl 3) (2014) 450–458.