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PREVALENCE AND SOCIO-BEHAVIOURAL FACTORS ASSOCIATED WITH DEPRESSIVE DISORDERS AMONG PRIMARY HEALTH CARE PHYSICIANS IN SHEBIN EL-KOM DISTRICT, MENOUFIA GOVERONRATE, EGYPT, DURING COVID 19 PANDEMIC

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ABSTRACT

This study was directed to investigate the prevalence of depressive disorders among primary health care (PHC) physicians in Shebin El-komdistrict, Menoufia governorate during the novel corona virus epidemic in Egypt between 1st July and 1st September 2020. Additionally, some socio-behavioral factors were studied to show the association between them and the presence of depressive disorders among the studied group. The sample size of the study was (194) physicians (139 females and 55males). A pre-designed questionnaire was sent via email to all participants. The questionnaire composed of two sections; the first section included seventeen questions about some socio-behavioral characteristics of the participants, while the second section included the patient health questionnaire 9(PHQ9) for screening of depressive disorders. The estimated prevalence of depressive disorders among studied group was (85.6%).There was highly significant difference between depression and no-depression groups regarding gender, monthly income and weekly working hours (p<0.001).Depression was higher among female physicians (77.1%), physicians with monthly income less than 4000 LE (89.2%) and physicians who work more than 48 hours per week (72.9%). Additionally, there was significant difference between depression and no-depression groups regarding age group, marital status, paternal status, and previous COVID-19 infection (p<0.05). Depression was higher in age group 25-34 years (96.4%) and married physicians (62.7%). Depression was higher in physicians who were previously infected with COVID-19 than others who were not previously infected. Prevalence of depressive disorders among PHC physicians in Shebin El-kom district was high during novel corona virus epidemic in Egypt. Physicians with monthly income less than 4000 LE (OR= 9.14, 95% CI= 3.51-23.8), physicians with age group 25-34 years old (OR= 5.3, 95% CI= 1.24-22.7) were riskier for depression. Female gender, weekly working hours more than 48 hours, previous history of COVID-19 infection and marriage were significant predictors (risk factors) for depression. Our results warrant special attention to the mental health of physicians during the novel corona virus pandemic. The development of psychological support programs for health care workers, including PHC physicians, during the outbreak of infectious diseases is of significant importance.

KEYWORDS: *Depression, Primary Health Care, Physicians, Shebin El-Kom, Menoufia, Egypt, COVID-19, Novel Corona Virus, SARS-Cov-2*

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a global pandemic caused by Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV-2) [1].The COVID-19 pandemic is a major public health problem that affects most countries of the globe, with over11 million individuals infected and about12000000 victims who lost their lives till the end of October 2020. The outbreak was first revealed in late December 2019, when clusters of pneumonia cases of unknown etiology were found to be associated with epidemiologically linked exposure to a seafood market and untraced exposures in the city of Wuhan of Hubei province [2]. Widespread outbreaks of infectious diseases such as COVID-19 are associated with psychological distress and symptoms of mental illness [3]. In addition to being a public physical health emergency, COVID-19 affected global mental health, as evidenced by panic-buying worldwide as cases soared [4]. Resident doctors who study or practice medicine in developing countries encounter additional challenges including shortage of health sector budget, low income and disparities in health care distribution. Moreover, the need to study and work simultaneously make them more susceptible to psychological problems such as depression [5]. A study conducted to determine the rate of depression among resident doctors in Tehran, Iran, reported that 31.2% of the total study population had symptoms of depression (26% of the males and 39% of the females) [6]. In Zambia, a study conducted in 2011, showed that among primary health care providers, there was great stigma and discrimination towards mental illness [7]. Several questionnaires had been used for assessment of the depressive disorders. The PHQ-9 (Patient Health Questionnaire version 9) is the self-report of the PRIME-MD (Primary Care Evaluation of Mental Disorders) inventory designed to screen for depressive symptoms [8]. A score of 10 or greater on the PHQ-9 has a sensitivity of 88% and a specificity of 88% for the diagnosis of major depression [9]. Diagnostic validity of the PHQ-9 is comparable to clinician-administrated assessments [10]. Considering that social, cultural and economic factors have significant effect on mental health, it is necessary to perform additional studies in different regions of socially and economically diverse countries [11]. Therefore, interest in the psychological well-being of physicians has increased recently, warranting further research regarding factors that influence the mental health of physicians [12].The pressure on the global health care workforce continues to intensify. This pressure takes two forms. The first is the potentially overwhelming burden of illnesses that stresses health system capacity and the second is the adverse effects on health care workers, including the risk of infection [13].Research shows that many doctors would rather seek help from friends and family than look for psychological/psychiatric consultation [14]. During the severe acute respiratory syndrome (SARS) outbreak in 2003, 18 to 57% of health professionals experienced serious emotional problems and psychiatric symptoms during and after the event [15].The severity of the COVID-19 outbreak in China is also causing mental health problems among healthcare workers such as stress, anxiety and depressive disorders [16]. Therefore, health professionals who are in direct contact with infected patients need to have their mental health regularly screened and monitored, especially in relation to depression, anxiety and suicidal ideation [15]. Stressful life events will trigger psychiatric illness for the first time or relapses in those who already have an enduring mental illness. In other instances, the emotional load linked to severe and lethal illnesses like COVID-19 pandemic can affect vulnerable people beyond their point of resistance, leading to increased stress reactions, depression, suicide, homicide, and psychosis [17].

OBJECTIVES OF THE STUDY

- Estimate the prevalence of depressive disorders among PHC physicians in Shebin El-Kom district, Menoufia governorate, during novel corona virus epidemic in Egypt.
- Study some socio-behavioral factors associated with depressive disorders among PHC physicians in Shebin El-Kom, Menoufia governorate during novel corona virus epidemic in Egypt.

MATERIAL AND METHODS

The study was conducted in Shebin El-kom district, Menoufia governorate, Egypt, among PHC physicians, during the corona virus epidemic between 1st July and 1st September of 2020. A pre-designed questionnaire with an informed consent was sent to participants via email.

Administrative Design

An informed web-based consent was sent via email to all participants in the research before giving any personal information and replaying to the questionnaire used in the study.

TECHNICAL DESIGN

Place of the Study

The study was conducted in Shebin El-kom district, Menoufia governorate, Egypt, during the novel corona virus epidemic (from 1st July to 1st September).

Study Sample (Subjects)

The study included (194) primary health care physicians working in Shebin El-kom PHC units & centers.

Time of the Study

Pilot study was done during the period from (20 /6/ 2020) to (30/6/2020). The collection of data was done during the period from (1/7/2020) to (1/9/2020). The organization and analysis of data was done during the period of (5/9/2020) to (15/11/2020).

Study Design

This cross-sectional web-based observational study was done to estimate the prevalence of depressive disorders among PHC physicians in Shebin El-Kom district, Menoufia governorate. Additionally, some socio-behavioral factors were studied to show their association with depressive disorders among the participants. A pre-designed questionnaire consisted of two sections; the first section included seventeen questions about the social and behavioral characteristics of the participants, while the second section includedPHQ-9 for screening of depressive disorders in PHC settings.

OPERATIONAL DESIGN

Literature Review

Review of the recent and past literature related to the depressive disorders, especially among health care workers including PHC physicians, was done using the clinically available published research by Google searching.

Preparation of the Questionnaire

The questionnaire was designed by the authors. It included: gender, age, marital status, paternal status, smoking status, residency either urban or rural, educational level, occupational level, monthly income level, number of working hours per week, living condition, occupational experience, job satisfaction, average daily number of patients seen by the participant, and finally; the PHQ-9 for screening of depression in PHC settings.

Scores of 0-4 in PHQ-9 indicate no depression, scores of 5-9 indicate mild depression, scores of 10-14 indicate moderate depression, scores of 15-19 indicate moderately severe depression, and scores of 20-27 indicate severe depression. Participants with a PHQ-9 score ≥5 were defined as depressed in our study

Pilot Study

Before starting data collection, a pilot study was conducted including 40 participants who were not included in the study, in order to evaluate the adequacy of the questionnaire and simplicity of the questions to the participants. Certain questions were omitted and others were modified for simplicity and to achieve more participants who can complete answering full questionnaire.

Data Collection

The pre-designed questionnaire was sent to all participants via email with Google form and they resent the questionnaires after answering them

Statistical Design

Data were tabulated and statistically analyzed using an IBM compatible personal computer with Statistical Package for the Social Sciences (SPSS) version 23. Qualitative data were expressed in: Number (N) and percentage (%).Chi-square test (χ^2) was used to study association between qualitative variables. Whenever any of the expected cells were less than five, Fischer's Exact test was used.

RESULTS

This study was conducted over 194 PHC physicians working in Shebin El-kom PHC units & centers. Majority of them (71.6%) were females. Age group 25-34 years old included 183 physicians (94.3%). According to PHQ-9; 166 physicians (85.6%) had depression (Figure 1).

Depression was subsequently classified into different grades using PHQ-9 score; mild (5-9), moderate (10-14), moderately severe (15-19) and severe (20-27), these grades included 58 (29.9%), 65 (33.5%), 40 (20.6%) and 3 (1.5%) physicians, respectively (Figure 2).

Statistically; there was highly significant difference between depression and no-depression groups regarding gender, monthly income and weekly working hours ($p<0.001$). Depression was higher in females (77.1%), physicians with monthly income less than 4000 LE (89.2%) and working >48 hours/ week (72.9%) (Table 1).

There was significant difference between depression and no-depression groups regarding age group, marital status, paternal status, and previous COVID-19 infection ($p>0.05$). Depression was higher in age group 25-34 years (96.4%), married physicians (62.7%) having ≥ 1 child. Depression was higher in physicians who were previously infected with COVID-19 (50 physicians) than others who weren't previously infected (Table 1).

Physicians with monthly income less than 4000 LE were 9.14 folds riskier than others for depression (OR= 9.14, 95% CI= 3.51-23.8). Furthermore, physicians with age group 25-34 years old were 5.3 folds riskier than other age groups for depression (OR= 5.3, 95% CI= 1.24-22.7). Female gender (OR= 4.9), weekly working hours more than 48 hours (OR= 4.7), previous history of COVID-19 infection (OR= 3.59) and married participants (OR= 2.4) were significant predictors (risk factors) for depression (Table 3).

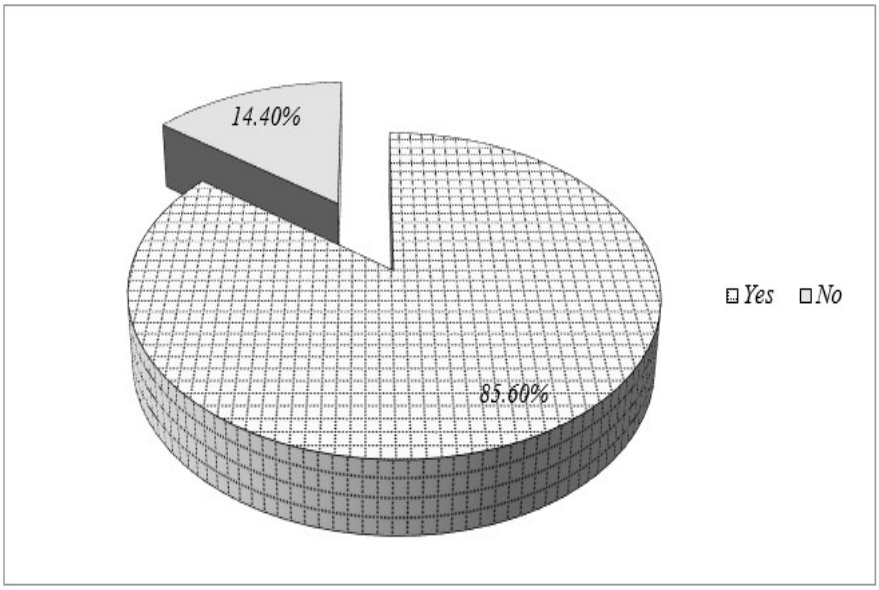

Figure 1: Prevalence of Depression among Studied Group.

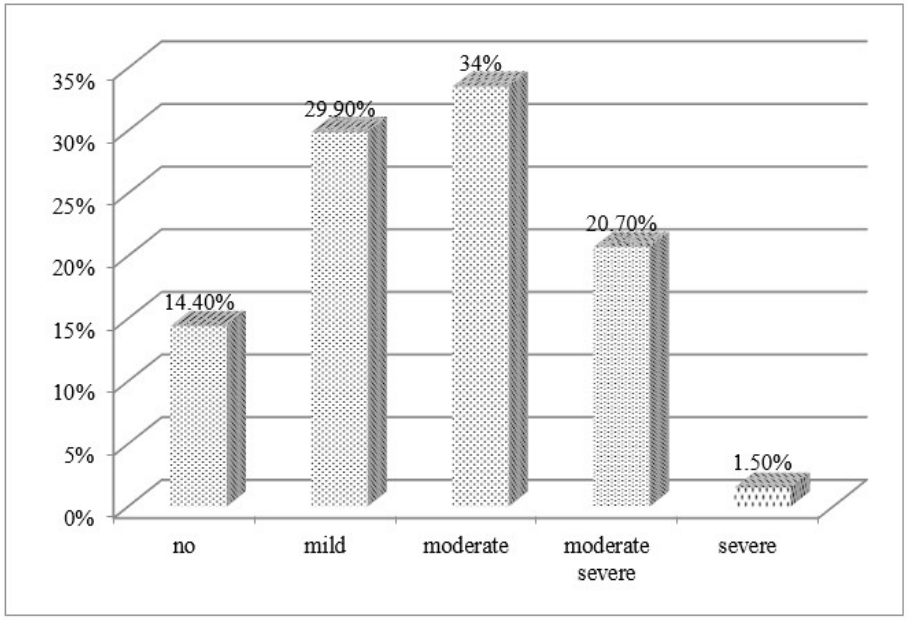

Figure 2: Grades of Depression in Studied Group.

Table 1: Relation between Socio-Behavioural Characteristics and Depression in Studied Group (N=194)

Socio-Behavioural Characteristics		Depression				X^2	P-value
		Yes (N=166)		No (N=28)			
		N	%	N	%		
Gender	Female	128	77.1	11	39.3	16.87	<0.001**
	Male	38	22.9	17	60.7		
Age group	25-34 y	160	96.4	23	82.1	FE= 9.09	0.01*
	35-44 y	6	3.6	5	17.9		
Marital status	Single	60	36.1	20	71.4	12.39	0.002*
	Married	104	62.7	8	28.6		
	Divorced	2	1.2	0	0		
Paternal status	I haven't any children	81	48.8	22	78.6	8.53	0.003*
	I have ≥ 1 child	85	51.2	6	21.4		
Smoking status	Smoker	4	2.4	0	0	FE= 0.69	1
	Non-smoker	162	97.6	28	100		
Residency	Rural area	100	60.2	18	64.3	0.16	0.69
	Urban	66	39.8	10	35.7		
Educational level	MBBCH	141	84.9	19	67.9	6.1	0.1
	Master	20	12	8	28.6		
	Membership	2	1.2	0	0		
	Diploma	3	1.8	1	3.6		
Occupational level	Trainee (internship year)	29	17.5	5	17.9	6.97	0.07
	General practitioner	92	55.4	9	32.1		
	Resident	32	19.3	9	32.1		
	Specialist	13	7.8	5	17.9		
Monthly income	Less than 4000 LE	148	89.2	14	50	FE= 26.67	<0.001**
	More than 4000 LE	18	10.8	14	50		
Weekly working hours	≤ 48 hours/ week	45	27.1	17	60.7	12.4	<0.001**
	>48 hours/ week	121	72.9	11	39.3		
Occupational experience	1-5 years	119	71.7	20	71.4	0.37	0.9
	5-10 years	5	3	1	3.6		
	Less than 1 year	40	24.1	7	25		
	More than 10 years	2	1.2	0	0		
Living condition during COVID 19 pandemic	-Living with my family at the same home	122	73.5	28	100	9.6	0.002*
	-Living at another place due to COVID 19 epidemic	44	26.5	0	0		
Sport activities	-Regular sport participation (3.5 hours per week or 0.5 hour per day)	15	9	1	3.6	FE= 0.95	0.33
	-No regular sport participation regularly	151	91	27	96.4		
Daily average number of patients attending to health care	-Less than 30 patients	99	59.6	21	75	2.99	0.22
	-30-60 patients	57	34.3	5	17.9		
	-More than 60 patients	10	6	2	7.1		
Overall job satisfaction	Neutral	79	47.6	13	46.4	3.6	0.17
	not satisfied	71	42.8	9	32.1		
	satisfied	16	9.6	6	21.4		
Presence of chronic disease	Yes	15	9	1	3.6	FE= 0.95	0.33
	No	151	91	27	96.4		
Previous COVID-19 infection	Yes	50	30.1	3	10.7	4.54	0.03*
	No	116	69.9	25	89.3		

X^2: Chi square test, FE: fischer's Exact test, * significant (P-value <0.05), **Highly significant (P-value<0.001)

Table 2: Patient Health Questionnaire (PHQ9)

PHQ-9 Items	Not At All		Several Days		More Than Half The Days		Nearly Every Day	
	N	%	N	%	N	%	N	%
Little interest or pleasure in doing things	60	30.9	87	44.8	34	17.6	13	6.7
Feeling down, depressed, or hopeless	18	9.3	103	53.1	39	20.1	34	17.5
Trouble falling or staying asleep, or sleeping too much	44	22.7	94	48.5	33	17	23	11.9
Feeling tired or having little energy	16	8.2	84	43.3	35	18	59	30.5
Poor appetite or overeating	62	32	72	37.1	31	16	29	14.9
Feeling bad about yourself	40	20.6	75	38.7	42	21.6	37	19.1
Trouble concentrating on things	58	29.9	68	35.1	41	21.1	27	13.9
Moving or speaking so slowly or rapidly that other people could have noticed	109	56.2	48	24.7	29	14.9	8	4.1
Thoughts that you would be better off dead, or hurting yourself in some way	130	67	42	21.6	14	7.2	8	4.1

Table 3:. Logistic Regression for Prediction of Depression Risk Factors among PHC Physicians

Risk Factors (Predictors)	Odds [Exp (B)]	Significance	95% CI (Confidence Interval)	
			Lower	Upper
Monthly income: Less than 4000 LE	9.14	<0.001	3.51	23.8
Age group:25-34 y	5.3	0.03	1.24	22.7
Female gender	4.9	<0.001	2.07	11.8
Weekly working hours:>48 hours/ week	4.7	0.001	1.86	11.8
Previous COVID-19 infection	3.59	0.04	1.04	12.45
Marital status: Married	2.4	0.04	1.05	5.31
Paternal status: having ≥ 1 child	2.22	0.06	0.95	5.18
Living with my family at the same home	1.01	0.9	0.36	2.8

DISCUSSIONS

Prevalence of Depressive Disorders among PHC Physicians

Previous studies, before COVID-19 pandemic,revealed that the prevalence of depressive symptoms among physicians in developed countries ranged from 10% to 15% in the US, Britain, Norway, and Japan [11]. In 2012, a Dutch study concluded that depressive symptoms were prevalent in 29% of physicians [18]. In China, one study showed that the prevalence of depressive symptoms among physicians were 31.7%, while in another study the prevalence of depressive symptoms reached 65.3% [11].In Shebin El-kom, a study done among PHC providers, in 2018, showed that the prevalence of depressive symptoms among PHC providers was 71.4%[19].

Our study showed that 85.6% of the studied physicians had symptoms of depression (PHQ score ≥5) with 20.6% of them had moderately-severe depression (PHQ-9 score of 15-19) and 1.5% of them had severe depression (PHQ-9 score > 19).

A recent study during COVID 19 pandemic in China showed that more than half (50.4%) of the health care workers reported symptoms of depression and 71.5% reported distress [20]. The results of multinomial regression analyses after SARS epidemic showed that; health care workers who exposed to SARS outbreak were more vulnerable to depression [21]. A study from Turkey reported that 77.6% of health care workers exhibited symptoms of depression during COVID-19 pandemic [22]. Another Turkish study revealed that 64.7% of the investigated physicians had symptoms of depression

during COVID-19 pandemic [23]. Rossi et al. reported that 24.73% of Italian health care workers had moderately-severe and severe depression (PHQ score >15) during the COVID-19 pandemic [24].

Our study reported higher prevalence of depression than previous studies. This could be attributed to the fact that COVID-19 pandemic put all health care workers worldwide, including Egyptian physicians in a unique exceptional stressful event which they did not face like it before. According to Gupta et al. the differences in studies for the prevalence of depression in different countries during COVID-19 pandemic could be explained by the social and cultural differences in the population, different scales used for diagnosis, and the different stages of pandemic at which the study conducted [25]. According to Pappa et al., the use of different evaluation tools, methodologies, classifications even if the same scale was employed in the study, leads to very different figures being reported for the prevalence of mental disorders [26].

Associated Socio-Behavioural Factors of Depressive Disorders among PHC Physicians

According to Marchand et al., physicians mental health condition is a result of a complex and simultaneous interaction of individual constrains, individual resources and social and environmental factors [27]. Our study showed that monthly income less than 4000 LE, age group 2534 years, female gender, working hours > 48 hours/week, previous COVID-19 infection and marriage were significant predictors (risk factor) for depressive disorders.

According to Kuehner, depression and anxiety related disorders are found to be more common among females[32]. Our study showed that female PHC physicians had greater risk of developing depressive disorders than male physicians. According to Felmingham et al. women usually show more reactivity than men in neural networks associated with fear and arousal responses [28]. Similar to our study results, Singh et al. found that female physicians had greater risk for developing depressive disorder compared to male physicians as this study result showed increased odds of depression among females (OR=1.5; 95%CI=1.08-2.09; p=.02) [29].With regards to depressive symptoms requiring treatment among healthcare workers managing COVID-19 pandemic in India, female gender was found to be a significant predictor (OR=2.023; 95% CI=1.021-4.010;p 0.044) [30]. Rossi et al. concluded that female sex was associated with depression in a study conducted among 1379 healthcare workers in Italy during COVID-19 pandemic [24]. Additionally, our finding is in line with the results reported by Lai et al., where women are at increased odds of developing depression (OR:1.45; p=0.003) [20]. In a cross-sectional study which included 156 resident doctors in Turkey, Demir et al. found that the rate of depression was significantly higher among women compared to me (OR:5.16, 95% CI:1.51-17.68, p<0.01) [31].

Our study showed that age group 25-34 years had greater risk of developing depressive disorders compared to older one. According to, Jorm et al. psychological distress generally declined across the age range 20-64 years and this was not attributable to measurement bias[33]. A study done in a general population sample of 2725 persons aged 18 to 79 years, showed a decline in depression symptoms in both men and women [34]. During COVID-19 epidemic in China, Zhou et al. found that age was negatively associated with depression, anxiety, and insomnia among frontline medical staff who managing COVID-19 positive cases[35].

Our study showed that low income doctors had greater risk of developing depressive disorders. A cross-sectional study included 10,800 individuals aged ≥18 from Finland, Poland, and Spain, found a significant association between depression and socioeconomic status as the odds of depression were significantly decreases for every unit increase in socioeconomic status index [36]. A seven-year longitudinal population based study conducted by Lorant et al. showed a clear relationship between worsening socioeconomic circumstances and depression [37]. Akhtar-Danesh and Landeen

found that there was an inverse relation between income and the prevalence of depression ($p<0.0001$) [38]. According to Que et al. high annual household income was independently associated with lower risk of depression [39]. Ettman et al. found that lower income was associated with higher risk of depression during COVID-19 pandemic (OR: 2.37 and 95% CI: 1.26-4.43) [40].

Our study showed that weekly working hours more than 48 hours is a risk factor for developing depressive disorders. In a study conducted among frontline medical staff in China during COVID-19 pandemic, Zhou et al. found that daily working hours is a risk factor for all measured psychological disturbances which included depression, anxiety, somatization symptoms, insomnia and suicide risk (all $p<0.01$) [35]. Ford and Jin, found that the workload is most strongly associated with depressive symptoms to extent that is exceeds occupational norms for time pressure [41].

Finally, our study showed that previous COVID-19 infection is a risk factor for developing depressive disorders in the studied group. A cross-sectional study conducted on 40,469 patients diagnosed as COVID-19 positive found that 22.5% of them had neuropsychiatric manifestations [42]. A meta-analysis of pooled data from studies that estimated the incidence of psychiatric disorders after the severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) epidemic suggested that coronavirus infection can lead to depression, anxiety, poor memory and manic symptoms [43]. Samrah et al. found that 44% of patients infected with COVID-19 reported symptoms of depression, with 21% were at high risk of major depressive disorder [44].

CONCLUSIONS AND RECOMMENDATIONS

The development of psychological support programs for health care workers during the outbreak of infectious diseases is of significant importance as they considered the first line defense army of different communities during the infectious diseases' epidemics. Vulnerable groups of physicians as female doctors, young early graduated physicians, physicians with low income, physicians with overwhelmed work load should be a part of the post-COVID 19 plan for mental health rehabilitation.

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ETHICS STATEMENT

All the participants received the purpose statement of the study, the research procedures were explained to them, their data remained confidential and each participant provided with a web-based informed consent before participating in this research.

CONFLICTS OF INTEREST

No authors of this research have any conflicts of interest.

LIMITATIONS

This study adopted a cross-sectional design and used online based self-report questionnaire.

REFERENCES

1. Anderson, K.G., Rambaut, A., Lipkin, W.I. (2020). The proximal origin of SARS-CoV-2. Nat Med 26 (4): 450-452.
2. Nishiura, H. (2020). The extent of transmission of novel coronavirus in Wuhan, China, J. Clin. Med, 9,330-339.
3. Bao, Y., Sun, Y., Meng, S., Shi, J., Lu, L. (2020). 2019-nCOV epidemic: address mental health care to empower society, Lancet., 22 (395), e37-e38.
4. Cujyan, Wang., Riyu, Pan., Xiaoyang, Wan., Yilin, Tan., Lin Kang, Xu., Roger, S. McIntyre., Faith. N. Choo., Bach, Tran., Roger, Ho., Vijay, K. Sharma., Cyrus, Ho. (2020). A longitudinal study on the mental health of general population during COVID-19 epidemic in China, Brain, Behavior, and Immunity, 87, 40-48.
5. Sedeghi, MD., Navidi, M., Sedeghi, AE. (2007). Depression among residential doctors in Tehran, Iran. Iran Journal of Psychiatry, 2, 50-52.
6. Aguocha, Gu., Onyeama, GM., Bakare, MO., Igwe, MN. (2015). Prevalence of depression among resident doctors in a teaching hospital, south east Nigeria. International Journal of Clinical Psychiatry., 3 (1), 1-5.
7. Kapungwe, A., Cooper, S., Mayeya, J., Mwanza, J., Mwape, L., Slikwese, A., Lund, C., and the mental health and poverty research program and consortium. (2011). Attitudes of primary care providers towards people with mental illness: evidence from two districts in Zambia. Afr J Psychiatry., 14(4), 290-297.
8. Constance, Guille., Elena, Frank., Zhou, Zhao., David, A, Kalmbach., Paul, J, Nietert., Douglas, A, Mata., Srijan, San. (2017). Work-family conflict and sex difference in depression among training physicians. JAMA Intern Med., 177(12), 1766-1772.
9. Kroenke, K., Spitzer, RL., Williams, JB. (2001). The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med., 16(9), 606-613.
10. Spitzer, RL., Kroenke, K., Williams, JB. (1999). Validation and utility of a self-report version of PRIME-MD: the PHQ-9 primary care study. JAMA., 282(18), 1737-1744.
11. Gong, Y., Han, T., Chen, W., Dib, HH., Guoan, Y., Zhuang, R., Chen, Y., Tong, X., Yin, X., Lu, Z. (2014). Prevalence of anxiety and depressive symptoms and related risk factors among physicians in China: A cross-sectional study. PLoS ONE 9(7): e103242.doi: 10.1371/journal.pone.0103242.
12. Devis, S. (2011): Doctors in distress. Lancet 377: 1829-1837.
13. James, G. Adams., Ron, M.Walls. (2020). Supporting the Health Care Workforce During the COVID-19 Global Epidemic. JAMA, 323 (15): 1439-1440.
14. Hassan, TM., Sikander, S., Mazhar, N., Munshi, T., Galbraith, N., Groll, D. (2013). Canadian psychiatrics' attitudes to becoming mentally ill. Br J Med Pract, 6 (3): a619.
15. 15-Felipe, Ornell., Silvia, Chwartzmann, Halpern., Felix, Henrique, Paim, Kessler., Joana, Correa, de Magalhaes, Narvaez. (2020). The impact of the COVID-19 pandemic on the mental health of heath care professionals. Cad Saude Publica, 36(4): e00063520.

16. *Kang, L., Li, Y., Hu, S., et al (2020). The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. Lancet Psychiatry, 7 (3): e14.*
17. *Carlo, Lazzari., Ahmed, Shoka., Addul, Nusair., Marco, Robottini. (2020). Psychiatry In Time of COVID-19 Pandemic. Psychiatria Danubina, 32(2): 229-235.*
18. *Ruitenburg, MM., Fring-Dresen, MH., Sluiter, JK. (2012). The prevalence of common mental disorders among hospital physicians and their association with self-reported work ability: A cross-sectional study. BMC Health Res 12: 292-298.*
19. *El-Hamrawya, LG., Hegazy, NN., El-Halwany, SM. (2018). Prevalence of depressive symptoms among healthcare providers in Shebin El-Kom City in Menoufia governorate. Menoufia Med J, 31: 708-715.*
20. *Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., Hu, S. (2020). Factors associated with mental health outcomes among healthcare workers exposed to coronavirus disease 2019. JAMA Network Open 3 (3), e203976-e203976.*
21. *Liu, X., Kakade, M., Fuller, GJ., Fan, B., Fang, Y., Kong, J., Guan, Z and Wu, P. (2012). Depression after exposure to stressful events: lessons learned from the severe acute respiratory syndrome epidemic. Compr Psychiatry; 53 (1), 15-23.*
22. *Sahi, MK., Aker, S., Sahin, G and Karabekiroglu, A. (2020). Prevalence of depression, anxiety, distress and insomnia and related factors in healthcare workers during COVID-19 pandemic in Turkey. Journal of Community Health., 45, 1168-1177.*
23. *Elbay, RY., Kurtulmus, AS., Arpacioglu, S and Karadere, E. (2020). Depression, anxiety, stress levels of physicians and associated factors in COVID-19 pandemic. Psychiatry Research., 290, 113130.*
24. *Rossi, R., Socci, V., Pacitti, F., Di Lorenzo, G., Di Marco, A., Siracusano, A., Rossi, A. (2020). Mental health outcomes among frontline and second line healthcare workers during the coronavirus disease (COVID-19) pandemic in Italy. JAMA Network Open Journal, 3 (5), e2010185.*
25. *Gupta, S., Kohil, K., Padmakumari, P., Dixit, PK., Parasad, AS., Chakravarthy, BS., Shukla, R., Ghana, P., Mahapatra, D., Varadaraj, G (2020). Psychological Health Among Armed Forces Doctors During COVID-19 pandemic in India. Indian Journal of Psychological Medicine 42 (4): 374-378.*
26. *Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, VG., Papoutsi, E., Katsaounou, P (2020). Prevalence of depression, anxiety and insomnia among health care workers during the COVID-19 pandemic: A systematic review and meta-analysis. Brain, Behavior and Immunity 88: 901-907.*
27. *Marchand, A., Durand, P., Haines, V and Steve, H. (2015). The multilevel determinants of workers' mental health: results from the SALVEO study. Soc Psychiatry Epidemiol 50, 445-459.*
28. *Felmingham, K., Williams, LM., Kemp, AH., Liddell, B., Falconer, E., Peduto, A and Bryant, R. (2010). Neural responses to masked fear faces: sex differences and trauma exposure in post-traumatic stress disorder. J Abnorm Psychol., 119 (1), 241-247.*

29. Singh, M., Nada, K.M., Baig, M., Malik, S., Hsu, E.S., Seashore, J and Nishi, S.P. (2020). Prevalence and factors associated with depression and anxiety among healthcare personnel in the United States during coronavirus disease 2019 (COVID-19) pandemic. Clinical Medicine Research., 9(6), 123-131.
30. Wilson, W., Raj, J.P., Rao, S., Ghiya, M., Nedungalaparambil, N.M., Mundra, H and Mathew, R. (2020). Prevalence and predictors of stress, anxiety, and depression among healthcare workers managing COVID-19 pandemic in India: a nationwide observation study. Indian J Psychol Med., 42 (4), 353-358.
31. Demir, F., Ay, P., Erbas, M., Ozdii, M and Yasar, E. (2007). The prevalence of depression and its associated factors among resident doctors working in a training hospital in Istanbul. Turk Psikiyatri Dergisi., 18 (1), 31.
32. Kuehner, C. (2017). Why is depression more common among women than among men? Lancet Psychiatry; 4 (2), 146-158.
33. Jorm, A.F., Windsor, T.D., Dear, K.B.G., Anstey, K.J., Christensen, H and Bodgers, B. (2005). Age group differences in psychological distress: the role of psychosocial risk factors that vary with age. Psychological Medicine., 35 (9), 1253-1263.
34. Handerson, A.S., Jorm, A.F., Korten, A.E., Jacomb, P., Christensen, H and Rodgres, B. (1998). Symptoms of depression and anxiety during adult life: evidence for a decline in prevalence with age. Psychological Medicine., 28 (6), 1321-1328.
35. Zhou, Y., Wang, W., Sun, Y., Qian, W., Liu, Z., Wang, R., Qi, L., Yang, J., Song, X., Zhou, X., Zeng, L., Liu, T., Li, Z and Zhang, X. (2020). The prevalence and risk factors of psychological disturbances of frontline medical staff in China under the COVID-19 epidemic: workload should be concerned. Journal of Affective Disorders., 277, 510-514.
36. Freeman, A., Tyrovolas, S., Koyanagi, A., Chatterji, S., Leonardi, M., Ayuso-Mateos, J.L., Tobiasz-Adamczyk, B., Koskinen, S., Rummel-Kluge, C and Haro, J.M. (2016). The role of socio-economic status in depression: results from the COURAGE (Aging Survey in Europe). BMC Public Health., 16 (1), 1098.
37. Lorant, V., Croux, C., Weich, S., Deliege, D., Mackenbach, J and Ansseau, M. (2007). Depression and socioeconomic risk factors: 7 years' longitudinal population study. The British Journal of Psychiatry., 190 (4), 293-298.
38. Akhtar-Danesh, N and Landeen, J. (2007). Relation between depression and socio-demographic factors. Int J Ment Health Syst., 1, 4.
39. Que, J., Shil, L., Deng, J., Liu, J., Zhang, L., Wu, U., Gong, Y., Huang, W., Yuan, K., Yan, W., Sun, Y., Ran, M., Bao, Y and Lu, L. (2020). Psychological impact of the COVID-19 pandemic on healthcare workers: a cross sectional studt in China. General Psychiatry., 33, e100259.
40. Ettman, C.K., Abdalla, S.M., Cohen, G.H., Sampson, L., Vivier, P.M and Galea,, S. (2020). Prevalence of depression symptoms in US adults before and during the COVID-19 pandemic. JAMA Network Open., 3 (9), e2019686.
41. Ford, M.T and Jin, J. (2015). Incongruence between workload and occupational norms for time pressure predicts depressive symptoms. European Journal of Work and Organizational Psychology., 24 (1), 88-100.

42. *Nalleballe, K., Reddy Onteddu, S., Sharm, R., Dandu, V., Brown, A., Jasti, M., Yadala, S., Veerapaneni, K., Siddamredy, S., Avula, A., Kapoor, N., Mudassar, K and Kovvuru, S. (2020). Spectrum of neuropsychiatric manifestations in COVID-19. Brain, Behavior and Immunity., 88, 71-74.*

43. *Rogers, J.P., Chesney, E., Oliver, P., Pollak, T.A., McGuire, P., Fusar-Poil, P., Zandi, M.S., Lewis, G and David, A.S. (2020). Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections: a systematic review and meta-analysis with comparison to the COVID-19 pandemic. Lancet Psychiatry., 7, 611-627.*

44. *Smrah, S.M., Al-Mistarehi, A.H., Aleshawi, A.J., Khasawneh, A.G., Momans, S.M., Momany, B.S., Abu Zanouneh, F.J., Keelani, T., Alshorman, A and Khassawneh, B.Y. (2020). Depression and coping among COVID-19 infected individuals after 10 days of mandatory in-hospital quarantine, Irbid, Jordan. Psychology Research and Behavior Management., 13, 823-830.*

APPENDICES

A Questionnaire for Screening of Depressive Disorders and Socio-behavioural Factors Associated with Depressive Disorders Among PHC Physicians, in Shebin El-Kom District, During COVID 19 Pandemic

Section A (Socio-Behavioural Questions)

1. Gender:

Female	Male

2. Age group:

25-34 years	35-44 years	45-54 years	55-65 years

3. Marital status:

Single	Married	Divorced	Widow

4. Paternal status:

I have at least one child	I haven't any children

5. Smoking status:

Smoker	Non-smoker

6. Place of residency:

Rural area	Urban area

7. Educational level:

MBBCH	Diploma	Master	Membership	Doctorate

8. Occupational level:

Trainee (internship year)	House officer	General practitioner	Resident	Specialist	Consultant

9. Monthly income:

Less than 4000 LE	More than 4000 LE

10. Weekly working hours:

less than 48 hours a week	More than 48 hours a week

11. Occupational experience:

Less than 1 year	1-5 years	5-10 years	10-15 years	More than 15 years

12. Living condition during COVID 19 pandemic:

I am living with my family at the same home during COVID 19 pandemic	I am living at another place due to COVID 19 epidemic

13. Sport activities:

I participated sport regularly (3.5 hours per week or 0.5 hour per day)	I did not participate sport regularly

14. Average number of patients that you provide care for them in daily base (approximately):

Less than 30 patients per day	30-60 patients per day	More than 60 patients per day

15. Job satisfaction:

I am feeling that I am satisfied in my job	I am feeling that I am not satisfied in my job

16. Do you have any chronic disease?

Yes	No

17. Did you get infected with COVID 19 during this epidemic?

Yes	No

Section B (Patient Health Questionnaire 9)

1. little interest or pleasure in doing things

not at all	several days	more than half the days	nearly every day

2. Feeling down, depressed, or hopeless

not at all	several days	more than half the days	nearly every day

3. Trouble falling or staying asleep, or sleeping too much

not at all	several days	more than half the days	nearly every day

4. Feeling tired or having little energy

not at all	several days	more than half the days	nearly every day

5. poor appetite or overeating

not at all	several days	more than half the days	nearly every day

6. Feeling bad about yourself or that you are a failure or have let yourself or your family down

not at all	several days	more than half the days	nearly every day

7. Trouble concentrating on things, such as reading the newspaper or watching television

not at all	several days	more than half the days	nearly every day

8. Moving or speaking so slowly that other people could have noticed. Or the opposite-being so fidgety or restless that you have been moving around a lot more than usual

not at all	several days	more than half the days	nearly every day

9. Thoughts that you would be better off dead, or hurting yourself in some way

not at all	several days	more than half the days	nearly every day