

M.J. Khan¹,
B. Jamil²,
M.Z. Haroon^{1*}

PSYCHOLOGICAL IMPACT OF COVID-19 PANDEMIC ON HEALTH CARE WORKERS OF TERTIARY CARE HOSPITALS

Ayub Medical College¹

Abbottabad, Khyber Pakhtunkhwa, Pakistan

e-mail: junaidkhan@ayubmed.edu.pk

*e-mail: zeeshanharoon@yahoo.com

Khyber Medical University²

Institute of Health Professions Education and Research

Peshawar, Khyber Pakhtunkhwa, Pakistan

e-mail: drbrekhna.iph@kmu.edu.pk

Медичний коледж Аюб¹

Абботтабад, Хайбер-Пахтунхва, Пакистан

Хайберський медичний коледж²

Інститут освіти та досліджень у галузі охорони здоров'я

Пешавар, Хайбер-Пахтунхва, Пакистан

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Abstract. Psychological impact of COVID-19 pandemic on health care workers of tertiary care hospitals.

Khan M.J., Jamil B., Haroon M.Z. Healthcare workers (HCWs) are at increased risk of mental health issues when faced with the challenges associated with pandemics. This study was conducted to assess the psychological impact of pandemic on HCWs working in tertiary care hospitals of Khyber-Pakhtunkhwa province of Pakistan. This cross-sectional study was conducted between April & June 2020. By convenience sampling an electronic form of Goldberg General Health Questionnaire was distributed among HCWs of the private sector and public tertiary care hospitals. Data were analyzed using SPSS version 22. Inferential analysis was done. The significant level was considered at $p < 0.05$. Total of 186 HCWs among which 105 (56.5%) males and 81 (43.5%) females participated in the survey, a mean age of 37.6 ± 9.28 years. The highest prevalence was found for social dysfunction 184 (97.8%) followed by somatization, 169 (92.8%). Significance of difference was found between age group and anxiety ($p = 0.018$), specialty of HCWs with somatization and social dysfunction ($p = 0.041$ and 0.037 respectively). Pandemic poses a significant risk for the mental health of HCWs. During pandemics at its peak, proper mental health support program, personal and family protection assurance is highly recommended for provision of quality care by HCWs.

Реферат. Психологічний вплив пандемії COVID-19 на медичних працівників лікарень третинного рівня.

Хан М.Дж., Джаміль Б., Харун М.З. Медичні працівники наражаються на підвищений ризик виникнення проблем з психічним здоров'ям, коли стикаються з проблемами, пов'язаними з пандемією. Це дослідження було проведено для оцінки психологічного впливу пандемії на медичних працівників, які працюють у лікарнях третинної медичної допомоги в провінції Хайбер-Пахтунхва в Пакистані. Це перехресне дослідження проводилося в період з квітня до червня 2020 року. За допомогою адаптованої вибірки електронна форма опитувальника загального стану здоров'я Голдберга була поширена серед медичних працівників приватного сектору та державних лікарень третинного рівня. Дані були проаналізовані за допомогою SPSS версії 22. Проведено аналіз результатів. Достовірною відмінність важали при $p < 0,05$. Усього в опитуванні взяли участь 186 медпрацівників, серед яких 105 (56,5%) чоловіків і 81 (43,5%) жінка, середній вік $37,6 \pm 9,28$ року. Було виявлено найвищу поширеність соціальної дисфункції – 184 (97,8%), потім – соматизації 169 (92,8%). Виявлено достовірну відмінність залежності між віковою групою та тривожністю ($p = 0,018$), спеціальністю медичних працівників і соматизацією та соціальною дисфункцією ($p = 0,041$ та $0,037$ відповідно). Пандемія становить значний ризик для психічного здоров'я медичних працівників. Під час піку пандемії, для надання якісної допомоги медичними працівниками, їм наполегливо рекомендується належна програма підтримки психічного здоров'я, особистого та сімейного захисту.

Healthcare workers (HCWs) are at increased risk of mental health issues when faced with the challenges associated with the disease outbreak and pandemic [1]. They are the frontline force in combating any epidemic especially at times when the exact pathogenesis and treatment of the disease has not been discovered. Moreover, the sudden influx of patients contributes to tremendous amount of anxiety and stress in HCWs. The literature has documented that perceived risk levels related to an event are affected by the unfamiliarity and perceived uncontrollability of the hazards involved, and that these perceptions in turn affect HCWs likelihood for developing psychological distress [2]. Furthermore, healthcare workforces play a crucial role in successfully responding to a pandemic situation. In this sense, potential psychological negative consequences are not only detrimental to HCWs' well-being but also reduce their ability to address effectively the health emergency [3].

Previous pandemics, such as Spanish flu (1918), resulted in high levels of psychological distress and mental health issues among HCW. In 2003 SARS outbreak, 18-57% of HCWs suffered serious emotional and psychiatric symptoms [4]. Similarly, during MERS outbreak in South Korea (2015), 28.1% of doctors exhibited depressive and post-traumatic stress disorder (PTSD) symptoms [5]. In December 2019, an outbreak of a novel coronavirus pneumonia, coronavirus disease 19 (COVID-19), hit Wuhan (Hubei, China). During the following weeks, other significant outbreaks of COVID-19 were reported across the world and the World Health Organization (WHO) declared the COVID-19 outbreak a global pandemic on 11 March 2020 [3]. During an ongoing pandemic, HCWs are at higher risk of exposure to infectious pathogens. This may worry them of being infected and transmitting infection to family members [6]. So, regardless of era, pandemic has increased the susceptibility of HCWs psychological state.

The worldwide spread of COVID-19 is challenging the response capacity of healthcare systems, and policymakers need evidence to address the issue of psychological distress and mental health of HCWs, given their role in responding to the situation [7]. The ever-increasing number of COVID-19 cases, overwhelming workload, depletion of personal protection equipment, lack of specific drugs, and feelings of being inadequately supported contribute to the mental burden of HCWs [8]. Keeping this in mind, in Spain, a nationwide population-based study estimated high (10.2%) seroprevalence of SARS-CoV-2 infection in HCWs than in other occupational groups [9].

Moreover, findings from China and Singapore showed that HCWs experienced symptoms of depression, anxiety, insomnia and distress. Liu CY conducted a cross-sectional survey among HCWs and found 12.5% prevalence of anxiety since the outbreak of COVID-19 [9]. Lai et al. reported from 34 hospitals in China, that 3/4^{ths} of the 1257 HCWs were in distress, half reported symptoms of depression and a third of them had insomnia, 2/5th of them reported anxiety symptoms [8]. In Canada, 47% of HCWs have reported a need for psychological support [1]. In Karachi, Pakistan, 72.3% of HCWs of COVID-19 isolation ward reported moderate to severe depression and 85.7% from moderate to severe anxiety [10]. A study of nurses and physicians involved in the treatment of COVID-19 found a high incidence of stress, anxiety and PTSD, with higher levels of anxiety in women and nurses compared to men and physicians respectively. This can be explained by the fact that nurses have longer work shifts and closer contact with patients, which can easily lead to fatigue and tension [11].

A review of Mental health problems faced by HCWs due to the COVID-19 pandemic showed that being a woman and possessing an intermediate professional title was associated with higher anxiety, depression, and distress [8]. Liang et al, 2020 also suggested that persons <30 years and females HCWs are more prone to psychological distress. However, same author did not find any significant relation of self-rated depression and/or anxiety among HCWs of different places of duties (departments) [12]. Older staff reported increased stress due to exhaustion or prolonged work hours and lack of personal protective equipment. Irrespective of the age, the safety of colleagues and the lack of treatment for COVID19 were perceived as factors that induced stress in all HCWs [1].

During pandemic time, accessing mental health status of HCWs was a challenging task. Therefore, General Health Questionnaire (GHQ-28), a psychological risk assessment tool, developed by Goldberg (1978) [13] was used via online survey. Its validation and reliability have been investigated somewhere else [14]. It accesses the respondent current mental state and looks at variation from unusual conditions. It detects four mental conditions, namely, somatic symptoms (fatigue, generalized malaise, tiredness and headache), anxiety and insomnia (irritability, difficulty falling asleep, tension headache and frequent arousal), social dysfunction (inability to perform proper routine work or poor judgmental ability which worsen the daily work) and severe depression (loss of concentration, disturbed

sleeping, other mood changes including suicidal thoughts) [15]. It has a three scoring system and in the current study, Likert scoring system (0, 1, 2, 3) was adopted as it is recommended for survey and keeps a high value against the more usual GHQ (0, 0, 1, 1) and has advantage over traditional scoring method [16, 17].

HCWs who are dealing with infectious disease need proper psychological assessment and monitoring. So, timely psychological support can be provided. Otherwise, not only their-own health but also their abilities to treat the patients are compromised. Therefore, the purpose of this study is to find the impact of COVID-19 pandemic on HCWs' mental status. Also, the comparison of mental health status of HCWs with their gender, age, designation, specialty and duty hours will show the details of psychological condition of HCWs. This is the first study conducted in tertiary care hospitals of Khyber-Pakhtunkhwa (K.P). The recommendation will help them to cope with such disorders.

MATERIALS AND METHODS OF RESEARCH

This cross-sectional study was conducted among HCWs working in both public and private sector hospitals of Khyber-Pakhtunkhwa from April-May 2020. A total of 186 HCWs participated in this study. Ethical approval was granted from Ayub Medical College, Abbottabad. The study was conducted in accordance with the requirement of the International Committee of Medical Journal Editors.

Goldberg General Health Questionnaire (GHQ-28): The questionnaire consists of two parts; the first part includes demographic information and the second part consisted of 28 items of GHQ-28 [13]. The GHQ-28 questionnaire was used to evaluate the psychological state of the participants. It was first introduced by Goldberg in 1972 and has been translated into 38 different languages [16]. This 28-items questionnaire consists of four subcategories: somatization symptoms, anxiety and insomnia, social dysfunction and severe depression. There are seven items in each subcategory. The validity and reliability of GHQ-28 have been proved in various studies [14, 18]. The scoring system used in this study is similar to original scoring system which is a four-points' Likert scale: 0 better than usual, 1 same as usual, 2 worse than usual and 4 much worse than usual [17]. A cut of score <2 for subscale and ≤22 for total score of the questionnaire were considered for normal psychological state while the higher scores were considered for greater susceptibility of psychological disorders [19].

Data Collection: An online Google form was developed, incorporating the demographic variab-

les such as gender, age, specialty, designation and duty hours per week and items of GHQ-28. Convenience sampling technique was used. The questionnaire was shared through email and social networks (e.g. WhatsApp, Twitter and Facebook groups). The participants were also contacted through individual contacts to ensure maximum participation of the HCWs. A written informed consent was obtained from every participant before filling up of questionnaire. The anonymity and confidentiality of the HCWs were maintained.

Data Analysis: Data were analyzed using SPSS version 22. Descriptive statistics for means and frequencies. Data is presented in tables and graph. Pearson's chi-square was used for finding the differences between independent grouping and test variables. For non-parametric data, association of continuous (dependent) variable and gender was found with Mann-Whitney U test while variables with more than two level were computed with Kruskal Wallis test. The significant level was considered at $p < 0.05$.

RESULTS AND DISCUSSION

Total 186 (100%) HCWs with mean age of 37.6 ± 9.280 years with 105 (56.5%) males and 81 (43.5%) females participated in the survey. Their approximate duty hours per week were 42.03 ± 12.69 . Majority of them were medical officers or post graduate trainees 88 (47.3) and belonged to medicine and allied specialty 117 (62.9%) (Table 1).

Results of descriptive statistics of subscale scores showed that social dysfunction is highest 40 (21.5%), followed by anxiety 13 (7.0%). Somatization and depression have lowest scores i.e. 26 (14.0%) and 22 (11.8%) respectively. Among total, it appeared that highest prevalence among HCWs was for social dysfunction 184 (97.8%) followed by somatization, 169 (92.8%) (Table 2).

Significance of difference was found between age group and anxiety ($p = 0.018$) with younger age group 77 (52.7%) having the highest percentage of anxiety. Specialty of HCWs had significant difference with somatization and social dysfunction ($p = 0.041$ and 0.037 respectively) in which medicine and allied had maximum frequency of somatic symptoms, i.e. 103 (60.9%). All subscales and total GHQ scores were higher in males than in females. Medical officers, trainees and lecturers had highest prevalence of all subscales and total scores of GHQ-28. Those with less than 40 duty hours per week were more prone to psychological disorders (Table 3).

Table 1

Descriptive statistics of participants demographic (group) variables

Variables	n	%	
Gender	Male	105	56.5
	Female	81	43.5
Age group	25-35 years	96	51.6
	36-45 years	46	24.7
	46-55 years	36	19.4
	56-65 years	8	4.3
Place of duty	Medicine and Allied	117	62.9
	Surgery and Allied	69	37.1
Designation	MO/TMO	88	47.3
	SR/AP	57	30.6
	Associate Professor	25	13.4
	Professor	16	8.6
Duty hours	< 40 hours	112	60.2
	41-60 hours	57	30.6
	>61 hours	17	9.1
	Total	186	100.0

Notes: n=frequencies, %=percentages

While comparing total GHQ-28 scores with independent variables, more than half of the HCWs 96 (51.6%) had scored greater than 22. The mean of total sample was 24.00 ± 12.4956 (22.194-25.88). However, none of p-value was significant except for gender (Table 4).

Sound mental health of HCWs, especially when they are combating a pandemic in tertiary care is very imperative [20]. Despite preparedness and mitigation response, it is the timely and accurate treatment of patients under the circumstances of an outbreak. With proper resources, infrastructure and equipment, it is the sole responsibility of HCWs to treat the acutely ill population. This is only possible when HCWs are psychopathologically healthy. HCWs are exposed to a challenging situation, therefore, their risk of developing psychological problems also increases. The current study is aimed to find the psychological co-morbidity of HCWs

residing in different tertiary care hospital of K.P.K province. Being the pioneer study, it draws the attention of health authorities towards a very alarming prevalence of poor mental health of the aforementioned personal i.e. 51.6%.

This is the highest occurrence of poor mental health among Pakistani's HCWs. Previous studies based on GHQ-28 survey show contradicting results. During an outbreak, the prevalence rate among HCWs ranged from 17.3% to 75.3%. Taghinejad H et al in Iran used the same Likert scoring method of GHQ-28, found 43.2% caseness among clinical nurses [21]. However, Farahangiz S et al concluded abnormal mental status among medical students – 54.4% [19]. This high rate is probably due to stressful educational environment and overburdened learning system. Other studies resulted in 36.8% and 32.3% of HCWs susceptible to psychological distress [3]. It is worth to mention that

none of the above studies were conducted during any pandemic. Whereas, in Singapore, 2002, during SARS outbreak, author used GHQ-28 and found 28% to 35% prevalence of psychiatric disorders

among doctors and nurses [22]. The crux is COVID-19 pandemic has worst and alarming impact over HCW's mental health.

Table 2

Score of GHQ-28 subscales (<2 healthy otherwise, higher the score, greater the degree of participants susceptibility to psychological disorders)

Score	Somatization n(%)	Anxiety n(%)	Social dysfunction n(%)	Depression n(%)
<2	17 (7.2)	40 (21.5)	4 (2.2)	80 (43.0)
2	26 (14.0)	8 (4.3)	3 (1.6)	22 (11.8)
3	21 (11.3)	8 (4.3)	5 (2.7)	17 (9.1)
4	19 (10.2)	13 (7.0)	12 (6.5)	14 (7.5)
5	13 (7.0)	12 (6.5)	17 (9.1)	16 (8.6)
6	17 (9.1)	12 (6.5)	23 (12.4)	6 (3.2)
7	9 (4.8)	12 (6.5)	40 (21.5)	6 (3.2)
8	17 (9.1)	9 (4.8)	15 (8.1)	6 (3.2)
9	9 (4.8)	7 (3.8)	16 (8.6)	4 (2.2)
10	9 (4.8)	12 (6.5)	18 (9.7)	6 (3.2)
11	7 (3.8)	11 (5.9)	7 (3.8)	1 (0.5)
12	6 (3.2)	8 (4.3)	10 (5.4)	2 (1.1)
13	4 (2.2)	9 (4.8)	6 (3.2)	3 (1.6)
14	3 (1.6)	10 (5.4)	6 (3.2)	3 (1.6)
15	4 (2.2)	5 (2.7)	4 (2.2)	
16	2 (1.1)	4 (2.2)		
17	3 (1.6)	6 (3.2)		
Total	169 (92.8)	146 (78.5)	184 (97.8)	106 (57)

Notes: n=frequencies, %=percentages

Although, statically insignificant, yet male HCWs had highest scores of GHQ-28 subscales. This is in accordance with other studies [19, 21]. However, Momeni M et al. found higher scores of somatization among females HCW's [23]. Liang Y. et al also found more cases of depression among females but his study protocol was not based on GHQ-28 survey [12]. The possible explanation behind the higher number of males HCWs can be

due to fear and hesitation as they are the sole earner of families. Qualitative study is suggested to dig deeper into the hypothesis. Moreover, younger aged newly recruited HCWs showed increased risk of psychological morbidities. Again, this is also contradicting with other literature. Cai H. et al found older staff with prolonged duty hours and Taghinejad H et al mentioned aged nurses working in burn unit and intensive care unit are more prone to



poor mental health [21, 24]. A study supported our result with the argument that HCWs at their early career less familiar with the environment and have

maladaptive coping skills to handle such situation [25]. Therefore, it is imperative to find them as at increased risk of poor mental status.

Table 3

Crosstabulation of grouping and test variables of participants (≥2 unhealthy or susceptibility to psychological disorders)

Grouping Variables		Test variables (GHQ-28 subscales)							
		somatization		anxiety		social dysfunction		depression	
		≥2 n (%)	p-value	≥2 n (%)	p-value	≥2 n (%)	p-value	≥2 n (%)	p-value
Sex	Male	96 (56.8)	0.759	82 (56.2)	0.880	102 (56.5)	0.449	59 (55.7)	0.802
	Female	73 (43.2)		64 (43.8)		80 (44.0)		81 (43.5)	
Age group	25-35 years	88 (52.1)	0.673	77 (52.7)	0.018*	92 (50.5)	0.280	60 (56.6)	0.187
	36-45 years	43 (25.4)		41 (28.1)		46 (25.3)		27 (25.5)	
	46-55 years	31 (18.3)		24 (16.4)		36 (19.8)		16 (15.1)	
	56-65 years	7 (4.1)		4 (2.7)		8 (4.4)		3 (2.8)	
Specialty	Medicine and Allied	103 (60.9)	0.041*	90 (61.6)	0.108	105 (57.7)	0.037*	66 (62.3)	0.161
	Surgery and Allied	66 (39.1)		56 (38.4)		77 (42.3)		40 (37.7)	
Designation	MO/TMO	80 (47.3)	0.546	72 (49.3)	0.265	85 (46.7)	0.445	56 (52.8)	0.214
	SR/AP	53 (31.4)		46 (31.5)		57 (31.3)		31 (29.2)	
	Associate Professor	23 (13.6)		16 (11.0)		24 (13.2)		13 (13.3)	
	Professor	13 (7.7)		12 (8.2)		16 (8.8)		6 (5.7)	
Duty hours	<40 hours	99 (58.6)	0.242	85 (58.2)	0.569	109 (59.9)	0.754	64 (60.4)	0.751
	41-60 hours	53 (31.4)		47 (32.2)		56 (30.8)		31 (29.2)	
	>61 hours	17 (10.1)		14 (9.6)		17 (9.3)		11 (10.4)	
Total		169 (100)		146 (100)		182 (100)		106 (100)	

Note: *p-value significance at <0.05

Regarding subscales of GHQ-28, current study found that more HCWs of K.P.K province were unable to function normally because social dysfunction (21.5%) appeared the highest followed by somatic symptoms (14.0%), severe depression (11.8%) and anxiety (7.0%). Even though, the total percent distribution of these subscales followed the same sequence. To the best knowledge of the author, literature lack any supporting data from Pakistan in

which GHQ-28 tool is used among HCWs. This makes the current study as pioneer for finding the psychological morbidity of Pakistani HCWs during COVID-19 pandemic. However, instead of GHQ-28, another author used depression anxiety stress scale (DASS-21). He conducted a cross-sectional study among health care professionals and found moderate to extremely severe severity of stress, anxiety and depression as 90.1%, 85.7%, 72.3% respectively

[10]. From both of these studies, there is a gradual increase from social dysfunction or stress, somatic symptoms, anxiety and then the depression. It is the understanding of the author that worsening of stress or social dysfunction and somatic symptoms

lead to anxiety and then to severe depression. Hence, in the middle of a pandemic, a mental health support program or counselling session for HCWs ought to be practised.

Table 4

Mann Whitney and Kruskal Wallis U test of grouping variables with total GHQ-28 scores (≥22 unhealthy or susceptibility to psychological disorders), n=96

Grouping Variables	GHQ-28		p-value
	≥22 n(%)		
Gender	Male	55(57.3)	0.046*
	Female	41(42.7)	
Age group	25-35 years	57(59.4)	0.068**
	36-45 years	23(20.0)	
	46-55 years	14(14.6)	
	56-65 years	2(2.1)	
Specialty	Medicine and Allied	62(64.6)	0.276*
	Surgery and Allied	34(35.4)	
Designation	MO/TMO	52(54.2)	0.609**
	SR/AP	28(29.2)	
	Associate Professor	9(9.4)	
	Professor	7(7.3)	
Duty hours	<40 hours	53(55.2)	0.255**
	41-60 hours	35(36.5)	
	>61 hours	8(8.3)	
Total		96(100)	

Notes: *p-value significance at <0.05, Mann-Whitney U test; ** – Kruskal Wallis H Test

The main limitation of the study is lack of literature for comparison. To the best effort of the author, not a single study was found which use GHQ-28 too for assessing the susceptible healthcare professionals of Pakistan during ongoing COVID-19 outbreak. Similarly, very little data is available worldwide. A better approach could have been made via regression analysis but the quantitative data distribution was non-linear. Moreover, a better insight of psychological susceptibility of frontline professionals, nurses and auxiliary staff could have

been made while conducting face to face interview. but due to gross lockdown, only electronically data collection was possible.

CONCLUSION

Pandemic or disease outbreak has significant risk for mental health of health care workers. As half of the healthcare workers are susceptible to psychological disorder and this is very alarming. Males, younger age group or freshly recruited doctors related to medicine and allied and those with least duty hours per week are more prone to psychological



disorders. Majority of health care workers are socially dysfunctional followed by somatization. when a pandemic is at its peak, proper mental health support program, personal and family protection assurance is highly recommended.

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