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Title page

Impact of psychological stress during COVID 19 pandemic on quality of life of health care workers in mental health hospital in Egypt

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Abstract:

Background: COVID-19 outbreak resulted in negative mental health consequences such as depression, anxiety, and stress, particularly among health-care workers. **Objective:** To evaluate health care worker mental well-being and explore the reasons standing beyond their concerns and fears. **Methods:** From January to June 2021, we recruited 107 health care workers from psychiatric hospitals. The translated Arabic version COVID stress scale was used to assess their level of stress. The WHO Quality of Life - BREF score was used to assess their level of affection for their quality of life. **Results:** The majority of our sample (45.8%) was between the ages of 20 and 30. Females made up 37.8% of the group. The majority of them were infected during the first wave. The COVID Stress Scale (CSS) revealed that 21.5% of participants had no signs or symptoms of depression, while 55.1% had mild symptoms. Only 23.4% of our sample had moderate to severe symptoms. When categorised by domains, the mean CSS score was 12.21 ± 5.62 for danger subscale, 6.18 ± 4.07 for socioeconomic subscale, 8.44 ± 4.58 for xenophobia subscale, 7.99 ± 4.18 for contamination subscale, 5.87 ± 4.32 for traumatic subscale, and 11.13 ± 6.15 for compulsive subscale. The mean scores for the WHO QOL-brief score for physical aspect were 91.51 ± 21.5 , 75.25 ± 12.84 for psychological aspect, 40.42 ± 8.52 for social aspect, and 96.26 ± 17.76 for environmental aspect. **Conclusion:** we discovered that health-care workers experienced high levels of stress, particularly during and after COVID -19 pandemic waves.

Key words: COVID-19, CSS, WHO-QOL, health care, mental health hospital, Stress, Egypt.

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1. Introduction:

The outbreak of a new coronavirus disease (COVID-19, formerly known as nCoV-2019) was first reported in Wuhan, China since late December 2019 [1]. It is an acute fatal disease with progressive fatal respiratory complications that end up with death [2].

In April 2020, there were more than 1 million cases of infected patients all over 60 countries around the world. Wu et al. found that mortality rate reached 2.3% after analysis of 72,314 cases. In addition, 14% of patients were reported to have serious complications and 5% of the patients were critical [2].

Being a newly discovered pandemic, its clinical presentation, epidemiological features, the pattern of transmission, implication on the public health and the preparation of the health facilities to face it were still unclear. That is why this pandemic represented a fear that threatens the psychological health of people; not only healthy people but also at-risk individuals especially the health care workers. These problems range from fear and anxiety to severe depression and burnout [3].

This sense of fear and anxiety was present among healthcare workers (HCW) working not only in hospitals, inpatient and outpatient care, large tertiary care centres, and all isolation units specifically, those HCW who are in direct contact with confirmed and suspected cases. They are prone to both infection risk and mental health problems [4].

With more progression, the need for health care resources increases which may not be compatible with that emergency situation as there is not enough manpower. This

in turn puts the health care workers under pressure as they are afraid of being infected. They began to experience fear, sleep disturbance, anxiety and depressive symptoms and emotional disturbance. Despite that, there was not enough services providing counselling and screening for anxiety, depression and suicidal attempts for physicians during that era [5].

It is expected that health care workers; not only doctors but also paramedics as ambulance workers; are liable to depression, anxiety, burnout syndrome and post-traumatic stress disorder (PTSD) after cessation of that pandemic. Many socioeconomic and psychological factors were reported to be associated with the development of stress, anxiety and depression [6].

The relative deficiency of knowledge in addition to misunderstanding about any new discovered virus among the HCW leads to the rapid spread of infection worldwide which in turn put patients' own lives at risk (Hoffman and Silverberg, 2018). That is why gaining more knowledge about how to deal with the virus greatly affects their attitude towards the new virus. According to their knowledge, many HCW have already modified their attitude or suspended their work to uncertain time [7].

Mental health care workers as other health care workers are prone to the same stressors in addition to other stressors unique to their profession. One of these factors is the multidisciplinary approach required sometimes to treat certain patients. In addition, poor work environment and those patients who commit suicide are considered a source of stress that can lead mental HCWs to PTSD. All of these perspectives make the mental HCWs prone to face a poor quality of life and more stress during pandemics [8].

In 2020, Thakur and Jain performed an international cross-sectional study among 41 countries including UK, USA and China to identify the factors associated with development of post pandemics psychological disturbances. They found that

among 2527 HCWs, lack of personal protective equipment (PPE), mental health support availability and presence of training raising their awareness about the pandemic before deployment were the most common factors associated with depression and anxiety found among HCWs [9].

The World Health Organization (WHO) declared that managing HCW mental health and psychosocial wellbeing during this time is as important as managing their physical health to face the COVID-19 pandemic [10]. To our knowledge, there was a scarce of data concerning the mental health of HCW in Egypt, so we tried to evaluate HCW mental well-being and explore the reasons standing beyond their concerns and fears.

2. Material and Methods:

We interviewed 107 participants who are working in mental health hospital from January 2021 to June 2021 and agree to participate in the study. Participants included (psychiatrist, internal medicine doctors, psychologist, nurses, service workers, security and administrative employee). The purpose of the study was offered to all participants before being enrolled. An interview was made with each participant by an experienced psychiatrist. Each participant was offered 2 scales; CSS (the COVID stress scale) and the WHO QOL – brief (the World health organization quality of life brief) [11].

A pilot study was conducted on the validity and reliability of CSS scale, with sample included 106 of participants who were randomly selected from society. The CSS will be re distributed to the same 106 participants after two weeks to assess the validity coefficient and also the confidence coefficient compared to the impact event scale (gold standard) [12].

The COVID Stress scale (CSS):

It includes 36 items which was developed during the era of COVID – 19 for identifying people who need mental health services. These 36 items were categorized into 5 domains; Danger and contamination fears, fears about economic consequences, xenophobia, compulsive checking and reassurance seeking and traumatic stress symptoms about COVID-19 [13].

Arabic version was used after translation and backtranslation to English was done to ensure accuracy of version used this step was conducted via 35 bilingual experts from psychologist and psychiatric university staff. Experts' recommendations were done to adapt our culture and language [12].

The Arabic version of World health organization quality of life brief scale (WHO-QOL BREF) [14]:

It includes 26 items 24 of which cover 4 QOL domains the first domain; physical health includes 7 items, the second one; psychological health; includes 4 items. The third one; Social relationships; includes 3 items. The fourth one; environment; includes 8 items.

Ethical approval was obtained from the ethical committee of Ain Shams University. Participants had the right to stop at any time of the study. Data were collected anonymously then coded and analysed.

Statistical analysis:

We used statistical package for social sciences (SPSS) version 20 for windows for data analysis. Quantitative data was described in terms of mean and standard deviation if normally distributed. Kolmogorov-Smirnov test was used for assessment of normality of distribution of numerical variables. Chi-square test was used for testing the

association between categorical variables. Independent sample t test was used for testing the difference of a numerical variable between 2 groups. P value less than 0.05 was considered statistically significant.

The proportion of stress problems in HCW during COVID-19 pandemic was reviewed by Maryam Vizheh et al. in 2020 [15] and reported in a systematic review with widely varied prevalence. A sample size of at least 104 produces a two-sided 95% confidence interval with a width equal to 0.199 when the sample proportion is 0.50.

Sample size calculation: We used G power 3.0.01 for windows for calculating the sample size required and found that with power of 95%, α error of 5% and p value 0.5, effect size =0.2 the minimum required sample size for analysis was 104 participants.

3. RESULTS:

The study was conducted on a wide age group ranging from 20 to 60 years. Their mean age was 31.86 ± 5.42 years old. Most of them (47.7%, 51 participants) were between 30 and 45 years old. While only 7 participants (6.5%) were between 45 and 60 years old. 73.8% of them (79 participants) were females. Most participants (99 participants, 92.5%) were living in urban areas.

Most participants (64.5%, 69 participants) were Single. 35 participants (32.7% of participants) were Married. Only 3 participants (2.8%) were divorced. On reviewing their educational status, we found that 52 participants (48.6% of them) were Postgraduates; 54 participants (50.5%) were still students. only One participant (0.9%) was still among secondary school students.

We found that there were 51 participants (47.7%) injured during the 1st wave along with 35 participants (32.7%) injured during the 2nd wave. On the other hand, only 21 participants (19.6%) were recorded during the 3rd wave. On reviewing their job, we

found that 52.3% of participants (56 participants) were of medical personnel as shown in **table 1**.

Table 1: illustrates the sociodemographic characteristics of the included participants (n=107)

Socio-Demographic data	No.
Age (years)	
20-30 years	49 (45.8)
30-45 years	51 (47.7)
45-59 years	7 (6.5)
Gender	
Female	79 (73.8)
Male	28 (26.2)
Marital status	
Single	69 (64.5)
Married	35 (32.7)
Divorced	3 (2.8)
Level of education	
Post graduated	52 (48.6)
University	54 (50.5)
School (till secondary)	1 (0.9)
COVID Wave	
1st	51 (47.7)
2nd	35 (32.7)
3rd	21 (19.6)
Job	
Medical	56 (52.3)
Administrative	21 (19.6)
Security	15 (14)
Service	15 (14)

Current Address	
Urban	99 (92.5)
Rural	8 (7.5)

COVID Stress Scale (CSS) was administrated to all participants and found that 55.1% of participants suffering from mild stress while 23.4% of them (25 participants) were suffering from moderate stress. On the other hand, 21.5% of participants (23 patients) did not suffer any stress according to CSS as shown in **table 2**.

Table 2: illustrates the CSS scores among all participants (n=107)

COVID Stress Scale	Frequency
Absent	23 (21.5)
Mild	59 (55.1)
Moderate	25 (23.4)
Total	107

We found that mean score for COVID stress scale for participants was 51.81 ± 20.83 . for domains; the mean was 12.21 ± 5.62 for danger subscale, 6.18 ± 4.07 for socioeconomic subscale, 8.44 ± 4.58 for xenophobia, 7.99 ± 4.18 for contamination, 5.87 ± 4.32 for traumatic and 11.13 ± 6.15 for compulsive fears.

For WHO quality of life (WHO-QOL) score, we found that mean scores for the physical domain was 91.51 ± 21.5 , for psychological domain was 75.25 ± 12.84 , for social domain was 40.42 ± 8.52 and for environmental status was 96.26 ± 17.76 as shown in **table 3**.

Table 3: illustrates the score for CSS and WHO-QOL sub scales among all participants (n=107).

Domain	Mean \pm SD
COVID stress scale (CSS)	
Danger	12.21 ± 5.62

Socioeconomic	6.18 ± 4.07
Xenophobia	8.44 ± 4.58
Contamination	7.99 ± 4.18
Traumatic	5.87 ± 4.32
Compulsive	11.13 ± 6.15
Total score	51.81 ± 20.83
WHO quality of life scale (WHO-QOL)	
Physical	91.51 ± 21.5
Psychological	75.25 ± 12.84
Social	40.42 ± 8.52
Environmental	96.26 ± 17.76

When studying the association between CSS and the sociodemographic characteristics we found that there was no significant difference between age groups concerning the domains of CSS.

The fear of danger domain was slightly higher among younger group compared to the other groups, but this was statistically insignificant ($p=0.275$). for the socioeconomic fears, the score was higher among older group compared to the others and this was also insignificant ($p=0.366$) as shown in **table 4**.

Xenophobia and fear of contamination scores were higher among older group compared to the others. However, this was insignificant ($p=0.251$, $p=0.755$). Traumatic fear and compulsive disorders were insignificantly more common among younger patients ($p=0.583$, $p=0.644$) respectively as shown in **table 4**.

The gender difference showed no significant association with CSS scores in most domains although males had slightly higher scores concerning socioeconomic fears, fear of contamination, traumatic fears, compulsive disorders compared to females' group ($p=0.163$, $p=0.989$, $p=0.253$, $p=0.663$) respectively. On the other hand, we found that xenophobia scores were significantly higher among males compared to females (0.046) as shown in **table 4**.

Concerning marital status, we found that divorced participants had high danger fearing scores compared to other groups ($p=0.289$). for xenophobia, divorced patients

had less scores compared to other group (p=0.88). however, married participants had higher fear of contamination compared to the others (p=0.949) as shown in **table 4**.

For the level of education, school students had higher scores of fears compared to the others. However, this was statistically insignificant (p=0.205). on the other hand, they had the lowest scores concerning xenophobia and compulsive disorders fears. And this was also insignificant (p=0.773, p=0.548) as shown in **table 4**.

For residence, no significant difference between patients living in urban and rural areas concerning all aspects of CSS (p=0.729, p=0.23, p=0.102, p=0.732, p=0.617, p=0.513) respectively as shown in **table 4**.

Table 4: illustrates the association between CSS and socio demographic characteristics among included participants (n=107).

Variable	COVID stress scale (CSS)					
	Danger	Socio-economic	Xenophobia	Contamination	Traumatic	Compulsive
Age						
20 – 30	13.16	5.57 ±	8.04 ± 4.59	7.8 ± 4.72	6.35 ±	11.73 ±
30 – 45	± 5.73	3.81	8.45 ± 4.6	8.04 ± 3.9	4.19	6.66
45 – 60	11.39	6.65 ±	11.14 ±	9 ± 2.16	5.47 ±	10.57 ±
	± 5.64	4.48	4.49		4.53	5.87
	11.43	7 ± 2.58			5.43 ±	11 ± 5.1
	± 4.65				4.28	
P value	0.275	0.366	0.251	0.775	0.583	0.644
Gender						
Male	11.18	7.11 ±	9.93 ± 4.88	8 ± 4	6.68 ±	11.57 ±
Female	± 5.22	4.82	4.41 ± 3.91	7.99 ± 4.29	4.73	5.99
	12.57	5.85 ±			5.58 ±	10.97 ±
	± 5.78	3.78			4.19	6.27
P value	0.265	0.163	0.046	0.989	0.253	0.663
Marital status						
Single	11.68	6.23 ±	8.3 ± 4.63	7.91 ± 4.14	5.38 ±	11.36 ±
Married	± 5.73	4.42	8.71 ± 4.71	8.17 ± 4.52	4.32	6.02
Divorced	12.91	6.17 ±	8.33 ± 4.16	7.67 ± 1.53	6.6 ± 4.2	10.63 ±
	± 5.45	3.58			8.67 ±	6.59
	16 ±	5 ± 1			6.03	11.67 ±
	5.57				6.43	6.43
P value	0.289	0.880	0.913	0.949	0.211	0.842
Level of education						
Postgraduate	12.33	5.92 ±	8.75 ± 4.76	7.87 ± 4.12	5.54 ±	10.63 ±
ate	± 5.5	3.87	8.17 ± 4.52	8.11 ± 4.35	4.12	5.98
University	11.91	6.43 ±	7	8	6.15 ±	11.69 ± 6.4
	± 5.73	4.35			4.59	7

School	22	6			8	
P value	0.205	0.821	0.773	0.956	0.686	0.548
COVID wave						
1st	13.98	5.39 ±	6.49 ± 4.1	8.47 ± 4.97	5.43 ±	10.69 ±
2nd	± 6.7	4.12	9.11 ± 4	6.4 ± 3.1	4.25	7.52
3rd	10.6 ±	5.71 ±	12.05 ±	9.48 ± 2.82	6.26 ±	11.91 ±
	3.26	3.1	4.36		4.75	4.41
	11.48	8.86 ±			6.29 ±	10.9 ± 5.11
	± 4.71	4.51			3.94	
P value	0.005	0.003	<0.001	0.014	0.613	0.656
Job						
Administrative	9.48 ±	7.67 ±	9.57 ± 4.21	8.1 ± 2.9	2.76 ±	9.57 ± 2.5
	2.8	4.62	12.47 ±	9.07 ± 1.98	2.95	12.07 ± 5.4
Security	12.8 ±	7.67 ±	3.44	6.21 ± 3.93	6.6 ± 4.29	9.04 ± 5.59
Medical	5.85	2.77	7.71 ± 4.75	13.4 ± 3.38	5.25 ±	20.2 ± 4.21
Service	11.14	4.75 ±	5.53 ± 2.07		3.77	
	± 4.92	4.11			11.8 ±	
	19.4 ±	7.93 ±			1.37	
	5.42	2.25				
P value	<0.001	0.002	<0.001	<0.001	<0.001	<0.001
Residence						
Urban	12.15	6.31 ±	8.65 ± 4.58	8.03 ± 4.18	5.93 ±	11.24 ±
Rural	± 5.69	4.13	5.88 ± 4.42	7.5 ± 4.72	4.39	6.19
	12.88	4.5 ±			5.13 ±	9.75 ± 6.27
	± 5.46	3.25			3.87	
P value	0.729	0.23	0.102	0.733	0.617	0.513

On reviewing the quality of life of the health care workers, we found that the psychological and social subscales were significantly different among age groups ($p=0.029$, $p=0.003$). we found that higher age group participants (45 – 60) years old had a higher QOL compared to other groups whether psychologically and socially **as shown in the table 5 below.**

For gender distribution, we found that both males and females had nearly equal QOL scores whether physically, psychologically, socially and environmentally ($p=0.668$, $p=0.987$, $p=0.788$, $p=0.725$) respectively, **as shown in the table 5 below.**

For the marital status, we found that both single and married participants showed a high QOL compared to divorced ones concerning all aspects of QOL score. However, this was statistically insignificant ($p=0.881$, $p=0.892$, $p=0.965$, $p=0.727$) respectively, **as shown in the table 5 below.**

Despite those graduates and student showed a higher QOL compared to others in school as shown in the table below, but this was statistically insignificant for all aspects of QOL ($p=0.166$, $p=0.497$, $p=0.145$, $p=0.120$) respectively, **as shown in the table 5 below.**

On the other hand, we found that the type of COVID wave was a significant predictor for determining the QOL whether physically, socially and environmentally especially those who became infected in the 3rd wave ($p=0.005$, $p=0.005$, $p<0.001$) respectively. However, on the psychological level, we found that the difference was not statistically significant ($p=0.064$), **as shown in the table 5 below.**

We found that the residence was not a significant indicator for predicting the quality of life of HCWs whether physically, psychologically, socially and environmentally ($p=0.089$, $p=0.692$, $p=0.577$, $p=0.455$) respectively, **as shown in the table 5 below.**

Table 5: illustrates the relation between WHO QOL domains and sociodemographic characteristics among selected participants (n=107).

Domain	WHO-QOL BREEF			
	Physical	Psychological	Social	Environmental
Age				
20 – 30	86.37 ± 22.58	72.16 ± 12.19	37.71 ± 8	92.33 ± 18.31
30 – 45	95.14 ± 19.88	77.02 ± 12.75	41.96 ± 8.52	98.51 ± 18.45
45 – 60	101.14 ± 20.88	84 ± 14.24	47.43 ± 5.38	100 ± 18.04
P value	0.059	0.029	0.003	0.204
Gender				
Male	90 ± 19.31	75.29 ± 13.47	40 ± 8.98	94.71 ± 17.72
Female	92.05 ± 22.45	75.24 ± 12.78	40.51 ± 8.41	96.15 ± 18.82
P value	0.668	0.987	0.788	0.725
Marital status				
Single	91.59 ± 19.8	74.84 ± 13.89	40.23 ± 8.11	94.96 ± 17.13
Married	91.89 ± 24.97	76.11 ± 11.52	40.69 ± 9.13	97.71 ± 21.13
Divorced	85.33 ± 27.23	74.67 ± 9.24	40 ± 13.86	92 ± 20
P value	0.881	0.892	0.965	0.727
Level of education				
Postgraduate	94.77 ± 21.7	76.38 ± 12.68	40.85 ± 8.69	98.92 ± 19
University	88.89 ± 21.18	74.37 ± 13.18	40.22 ± 8.2	93.19 ± 17.54
School	64	64	24	72
P value	0.166	0.497	0.145	0.120

COVID wave				
1st	84.71 ± 25.96	72.94 ± 12.41	38.04 ± 8.7	88.78 ± 19.47
2nd	96.11 ± 16.53	75.31 ± 15.63	41.03 ± 8.86	102.06 ± 16.19
3rd	100.38 ± 9.29	80.76 ± 6.02	44.95 ± 5.04	102.29 ± 13.3
P value	0.005	0.064	0.005	<0.001
Job				
Administrative	101.14 ± 14.92	80.95 ± 14.02	42.86 ± 8.5	105.52 ± 14.56
Security	102.13 ± 12.45	81.87 ± 7.84	44.8 ± 5.89	97.07 ± 12.69
Medical	92.36 ± 20.56	71.64 ± 13.8	39.57 ± 8.88	95.21 ± 17.78
Service	64.27 ± 18.48	74.13 ± 4.5	35.47 ± 6.57	82.93 ± 23.54
P value	<0.001	0.005	0.009	0.003
Residence				
Urban	90.51 ± 21.51	75.11 ± 13.19	40.24 ± 8.66	95.39 ± 18.86
Rural	104 ± 19.94	77 ± 9.01	42 ± 6.67	100.5 ± 12.55
P value	0.089	0.692	0.577	0.455

Reliability:

In sample repeatability (test-retest reliability) of the COVID stress and quality of life in health care worker: The scale was tested for repeatability over 61 individuals during a period of 15 days, utilizing a scale testing **as illustrated in table 6.**

Table (6): Mean forces applied with standard deviations to achieve the COVID stress and quality of life in health care worker (n=61).

COVID stress and quality of life in health care worker	Force Means ± Std. Dev.	F-test	p-value	ICC (95% C.I.)
Q1	1.72±0.90	18.30	<0.001**	0.896 (0.833-0.937)
Q2	2.44±1.10	35.52	<0.001**	0.945 (0.910-0.967)
Q3	2.74±1.12	14.16	<0.001**	0.868 (0.789-0.919)
Q4	2.16±1.16	16.86	<0.001**	0.888 (0.820-0.931)
Q5	1.61±1.07	21.85	<0.001**	0.912 (0.858-0.947)
Q6	1.52±1.09	16.80	<0.001**	0.888 (0.820-0.931)
Total Danger Subscale	12.20±4.96	31.79	<0.001**	0.939 (0.900-0.963)
Q7	0.67±0.85	172.27	<0.001**	0.988 (0.981-0.993)
Q8	0.67±0.83	81.89	<0.001**	0.976 (0.960-0.985)
Q9	0.97±1.09	46.96	<0.001**	0.958 (0.931-0.975)
Q10	1.61±1.00	120.11	<0.001**	0.983 (0.973-0.990)
Q11	0.69±0.89	93.16	<0.001**	0.979 (0.965-

				0.987)	
Q12	1.69±1.03	62.08	<0.001**	0.968	(0.948-0.981)
Total Socio-economic Subscale	6.30±4.65	323.67	<0.001**	0.994	(0.990-0.996)
Q13	1.39±1.10	13.69	<0.001**	0.864	(0.783-0.916)
Q14	1.05±1.11	12.46	<0.001**	0.851	(0.764-0.908)
Q15	1.28±0.99	7.96	<0.001**	0.777	(0.654-0.860)
Q16	1.33±1.14	18.36	<0.001**	0.897	(0.834-0.937)
Q17	1.41±1.10	8.72	<0.001**	0.794	(0.679-0.871)
Q18	1.50±1.16	13.14	<0.001**	0.859	(0.775-0.913)
Total Xenophobia Subscale	7.96±5.25	10.66	<0.001**	0.828	(0.729-0.893)
Q19	1.48±1.07	18.78	<0.001**	0.899	(0.837-0.938)
Q20	1.92±1.05	7.32	<0.001**	0.760	(0.629-0.849)
Q21	1.48±0.96	11.27	<0.001**	0.837	(0.742-0.899)
Q22	1.10±0.99	16.28	<0.001**	0.884	(0.814-0.929)
Q23	1.02±1.00	33.06	<0.001**	0.941	(0.904-0.964)
Q24	0.78±1.00	25.94	<0.001**	0.926	(0.879-0.955)
Total Contamination Subscale	7.77±5.04	18.57	<0.001**	0.898	(0.835-0.937)
Q25	1.26±0.95	14.37	<0.001**	0.870	(0.792-0.920)
Q26	1.13±0.97	36.97	<0.001**	0.947	(0.914-0.968)
Q27	0.80±0.96	9.12	<0.001**	0.802	(0.691-0.877)
Q28	1.05±1.01	12.52	<0.001**	0.852	(0.765-0.909)
Q29	0.72±0.99	13.57	<0.001**	0.863	(0.781-0.915)
Q30	0.67±0.91	97.89	<0.001**	0.980	(0.967-0.988)
Total Traumatic Subscale	5.64±4.79	19.82	<0.001**	0.904	(0.845-0.941)
Q31	1.87±1.23	21.74	<0.001**	0.912	(0.858-0.946)
Q32	1.97±1.06	14.10	<0.001**	0.868	(0.789-0.918)
Q33	1.03±1.12	29.37	<0.001**	0.934	(0.893-0.960)
Q34	1.57±1.28	12.19	<0.001**	0.848	(0.759-

				0.906)
Q35	1.11±0.98	7.95	<0.001**	0.777 (0.653-0.860)
Q36	1.33±1.01	5.47	<0.001**	0.691 (0.533-0.802)
Compulsive Checking Subscale	8.89±4.92	11.47	<0.001**	0.840 (0.746-0.901)
Total Covid Stress Index 1st reading	48.75±23.19	15.18	<0.001**	0.876 (0.802-0.924)

Throughout the testing COVID stress and quality of life in health care worker were applied to the samples. The interclass Correlation Coefficient (ICC) with absolute agreement and average measure was utilized to assess repeatability for the data. The ICC was 0.876, 95% C.I. (0.802-0.924), F=15.18, p < 0.001. The results indicated good repeatability of the scale **as shown in table 6.**

Validity:

The results of constructive validity: it shows the results of constructive validity through the correlation coefficient of each dimension with the total degree **as shown in table 7 & figure 1.**

Table (7): Validity of Internal Consistency: For a measure of behaviors related to COVID stress and quality of life in health care worker (n=61).

Items	COVID stress and quality of life in health care worker			
	First Reading		Second Reading	
	<i>r</i>	<i>p-value</i>	<i>r</i>	<i>p-value</i>
Q1	0.624	<0.001**	0.622	<0.001**
Q2	0.693	<0.001**	0.690	<0.001**
Q3	0.484	<0.001**	0.484	<0.001**
Q4	0.599	<0.001**	0.597	<0.001**
Q5	0.750	<0.001**	0.751	<0.001**
Q6	0.644	<0.001**	0.640	<0.001**
Total Danger Subscale	0.819	<0.001**	0.817	<0.001**
Q7	0.586	<0.001**	0.594	<0.001**
Q8	0.593	<0.001**	0.591	<0.001**
Q9	0.666	<0.001**	0.665	<0.001**
Q10	0.578	<0.001**	0.576	<0.001**
Q11	0.438	<0.001**	0.435	<0.001**
Q12	0.559	<0.001**	0.555	<0.001**
Total Socioeconomic Subscale	0.701	<0.001**	0.699	<0.001**
Q13	0.658	<0.001**	0.654	<0.001**
Q14	0.337	0.008*	0.344	0.007*
Q15	0.678	<0.001**	0.677	<0.001**
Q16	0.794	<0.001**	0.797	<0.001**

Q17	0.714	<0.001**	0.700	<0.001**
Q18	0.741	<0.001**	0.737	<0.001**
Total Xenophobia Subscale	0.822	<0.001**	0.819	<0.001**
Q19	0.784	<0.001**	0.786	<0.001**
Q20	0.758	<0.001**	0.758	<0.001**
Q21	0.767	<0.001**	0.768	<0.001**
Q22	0.497	<0.001**	0.498	<0.001**
Q23	0.797	<0.001**	0.792	<0.001**
Q24	0.744	<0.001**	0.751	<0.001**
Total Contamination Subscale	0.875	<0.001**	0.876	<0.001**
Q25	0.660	<0.001**	0.659	<0.001**
Q26	0.658	<0.001**	0.658	<0.001**
Q27	0.638	<0.001**	0.641	<0.001**
Q28	0.614	<0.001**	0.616	<0.001**
Q29	0.696	<0.001**	0.699	<0.001**
Q30	0.464	<0.001**	0.467	<0.001**
Total Traumatic Subscale	0.754	<0.001**	0.756	<0.001**
Q31	0.568	<0.001**	0.568	<0.001**
Q32	0.561	<0.001**	0.562	<0.001**
Q33	0.500	<0.001**	0.498	<0.001**
Q34	0.454	<0.001**	0.455	<0.001**
Q35	0.597	<0.001**	0.600	<0.001**
Q36	0.510	<0.001**	0.510	<0.001**
Compulsive Checking Subscale	0.721	<0.001**	0.721	<0.001**

r-Pearson Correlation Coefficient; **p*-value <0.05 *S*; ***p*-value <0.001 *HS*

It is evident from the previous table that the scale statements of (36) all of results a significant of (<0.001), which indicates a strong internal correlation and consistency in answering the questions of this scale, and this is greatly reflected in the degree of reliability of this scale **as shown in table 7.**

Statistical analysis of these results showed significant agreement between the two readings in the detection. Comparison of first reading and second reading a yielded weighted Kappa =0.642, it was level “substantial agreement”, with *p*-value <0.001 highly significant **as shown in table 7 & figure 1.**

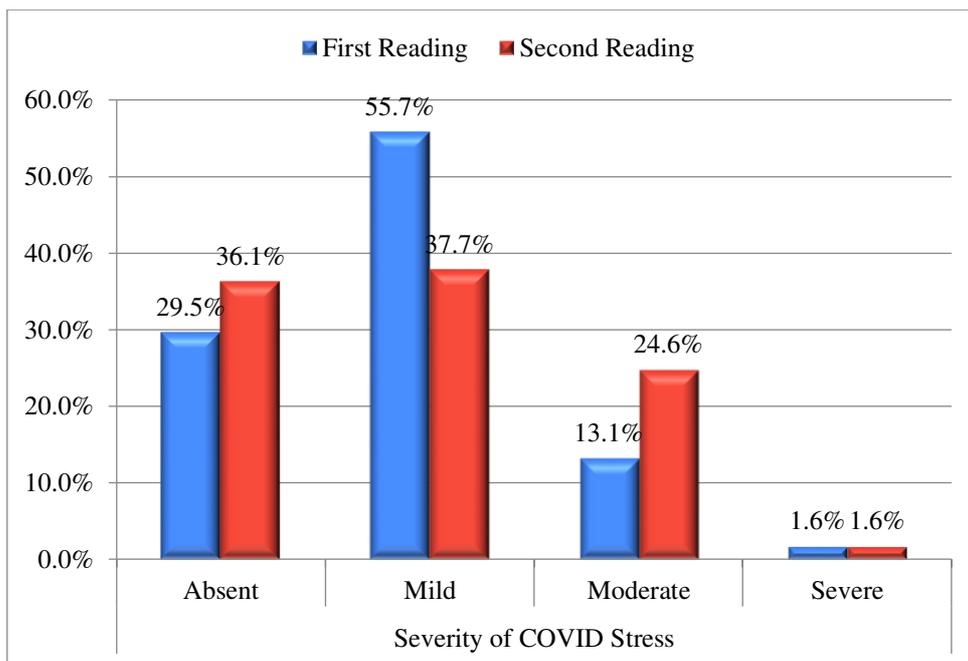


Figure (1). Kappa measure of agreement between the first reading and second reading in severity of COVID stress (n=61).

Validity:

Discriminatory honesty means the comparison between the upper category “the highest quartile” (above 25% of the scores of the individuals with a high degree on the scale) of the sample members and the lower category “the lowest quartile” (less than 25% of the scores of the individuals with a low score on the scale) of the sample members on axes The questionnaire, the total scale, and table 8 illustrate this comparison.

Table (8): Shows the difference between the averages of the highest and lowest quartiles on the total scores of the two scales among the modified scale and the gold standard scale in total score of COVID stress (n=22 from total n=45).

Scales	Groups	No.	Mean	±SD	t-test	p-value
Total score of COVID stress	Lowest value	11	62.09	16.15	10.517	<0.001**
	Highest value	11	174.09	31.41		
Total score of Impact stress event	Lowest value	11	2.73	2.20	21.696	<0.001**
	Highest value	11	29.73	3.50		

It is clear from the previous table that all values of “t-value” are statistically significant at the level of 0.001, which indicates the discriminatory validity of the scale,

and this confirms the validity of the scale for application, and indicates that the scale has one of the psychometric properties of a good measure, which is its ability to discriminate.

Furthermore, it turns out that there is a strong correlation between the modified scale and the gold standard scale (r-value = 0.714 and p-value <0.001 highly significant correlation) (n=45) **as shown in figure 2.**

Statistical analysis of these results showed significant agreement between the two scales in the detection. Comparison of modified scale and gold standard scale a yielded weighted Kappa =0.602, it was level “substantial agreement”, with p-value <0.001 highly significant.

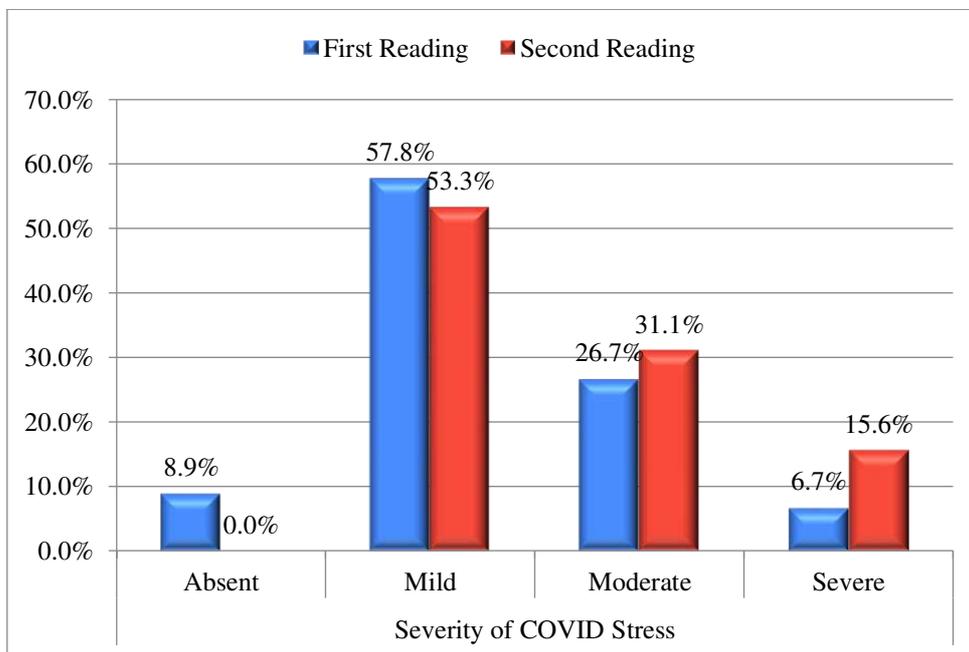


Figure (2). Kappa measure of agreement between the two scales among the modified scale and the gold standard scale in severity of COVID stress (n=45).

4. Discussion:

Severe acute respiratory syndrome corona virus (SARS-COV2) or what is known as COVID 19 is a pandemic started from Wuhan since March 2019 and affected more than 200 million persons around the world. More than 4 million deaths have occurred around the world [16]. This in turn negatively affected the mental health of peoples especially the health care workers who are the first line defence for this spreading pandemic [17].

Psychological disturbances are one of the most common consequences for pandemics among HCWs like; anxiety, depression and post-traumatic stress disorders (PTSD) which were prevalent disorders in the previous outbreak of SARS in 2003 [18]. These symptoms remained for a long period up to one year [19].

In our study, 107 HCWs were recruited from mental health hospital. 26.2% of them were males. Half of them were psychiatrists and internal medicine doctors, nurses or other associated medical personnel. 14% were of the security team while 14% of participants were from services team. We measured their psychological health using COVID stress scale and WHO=QOL scores and found that stress was absent among 21.5% of participants, while positive in 78.5% of participants divided into 55.1% suffering from mild symptoms and 23.4% of them having moderate symptoms.

In Mexico, Fernández et al., 2021 [20] performed a study among 912 nursing students and graduates and found that their average danger of contamination subscale was 39.34 ± 10.01 which was much higher than our results. Fair of socioeconomic consequences, xenophobia and traumatic stress scores were also higher (18.15 ± 6.24 , 17.15 ± 6.35 , 10.16) respectively compared to our findings. On the other hand, the mean compulsive checking was nearly equal between patients in both studies (12.89 ± 4.81 vs

11.13 ± 6.15). This may be explained by the high stress encountered by nursing staff as reported by Johannes et al., compared to other workers [21].

In our study, we found that males were more stressed concerning the pandemic in all subscales. However, this was insignificant except for xenophobia which was significantly evident among males compared to females (9.93 ± 4.88 vs 4.41 ± 3.91, p=0.04). This was in contrary to Fernández et al., who reported that females experienced more stress compared to males [20].

In our study, we found nearly half of the sample were infected through the first wave (47.7%, 51 participants) while 32.7% were infected in the second one. This was not the case among participants in Fernández et al., 2021 in which only 6.6% tested positive and 14.8% reported contact with suspected cases. This may be the reason for the difference in perceived stress and psychological disturbances due to difference in clinical experience dealing with the pandemic.

The quality of life is negatively affected during pandemics due to experienced anxiety, depression and lack of social support at these times. HCWs especially those on the frontline have poorer quality of life compared to others as they must deal with patients despite shortage of PPE and many other factors [22]. In our study, we used the WHO-QOL tool for assessment of the QOL of the health care workers. We found that the highest QOL scores were found in environmental status (96.26 ± 17.76) while the lowest scores were those for social domain which were 40.42 ± 8.51.

Comparing these results to what has been approved in non-pandemic settings among the general population, we found that the psychological QOL for our population was nearly similar to that of the general population which was 70.6 ± 14 despite the presence of external stressors affecting their mental health [23].

In Malaysia, the QOL of health care workers working in university hospitals were assessed using WHOQOL and found that they have poorer physical and environmental quality of life compared to our population. Their mean scores were 74.06 ± 15.32 & 75.48 ± 14.65 respectively. However, their scores regarding psychological QOL were comparable to ours. On the other hand, their social QOL scores were higher compared to our findings (70.87 ± 19.67) [24]. This may be explained by the difference in health care systems and socioeconomic characteristics between the two populations.

In Italy, Buselli et al. studied the quality of life of 265 HCWs working in a hospital in central town but using a different method of assessment; professional quality of life score (PRO-QOL). This tool measures three aspects; compassion satisfaction, secondary traumatization and burn out. Similar to our findings, they found that in general, they experience a poor outcome [25].

In our study, we found that physical quality of life was significantly associated with COVID wave difference and medical job difference were significantly associated with quality-of-life changes ($p=0.005$, $p<0.001$) respectively. However, psychological health was significantly associated with age and medical job differences ($p=0.029$, $p=0.005$) respectively. The social QOL was significantly dependent on age, COVID waves and medical job differences ($p=0.003$, $p=0.005$, $p=0.009$) respectively. However, environmental QOL was found to be associated with COVID wave and job differences ($p<0.001$, $p=0.003$) respectively.

Social support especially from friends and family was found to be associated with higher quality of life [24].

Conclusion:

Health care workers (HCWs) are prone to experience high levels of stress in pandemics as the current one; COVID-19. Despite there are many scales for measuring the degree

of stress, all of them proved that stress and other psychiatric disturbances can occur at the time of pandemic. So, interventions must be made in order not to make HCWs negatively affected which in turn is reflected on the quality of the health system.

List of Abbreviations:

- **Covid-19:** Coronavirus 2019.
- **CSS:** Covid Stress Scale.
- **HCWs:** Healthcare Workers.
- **PPE:** Personal Protective Equipment.
- **Pro-Qol:** Professional Quality of life score.
- **PTSD:** Post Traumatic Stress Disorder.
- **Qol:** Quality of life.
- **Sars-Cov2:** Sever acute respiratory syndrome Corona Virus.
- **SPSS:** Statistical Package for Social Sciences.
- **WHO:** World Health Organization.
- **WHO-Qol:** World Health Organization- Quality of life- Brief score.

Authors Contributions:

MH: study concept, critical revision of the manuscript, and design. **MY and HH:** study concept, and design, and critical revision of the manuscript. **ZE and OA:** recruitment of cases, analysis, interpretation of data, writing and editing the manuscript. **YM:** study concept, analysis, design, interpretation of data, and critical revision of the manuscript.

All authors approved the final version of the manuscript and the manuscript submission to the specific reports.

Ethics declarations:

The nature of the study was discussed with each participant and written informed consent was obtained from all participants before participating in the study. This study was approved by University Hospital Ethics Committee after a very clear statement that provided information on the following points; study rationale, participation in this study was completely free and voluntary, participation in the study had no direct benefit to the participant, although the data obtained could be used for the benefit of other patients, they may be withdrawn at any time without giving any justification and without affecting their care service, and the results of the study may be used for scientific publication but the identities of the patients and would be completely secret.

Human Rights and Animal Rights:

No animal was used in this research. All human research procedures followed were in accordance with the ethical standard of the committee responsible for human experimentation (institutional and national) and with Helsinki Declaration of 1975, as revised in 2008.

Consent For Publication:

Written informed consent was obtained from each participant prior to the study for publication of this research.

Availability of Data and Materials:

Data supporting the findings of the article isn't publicly available as a result of the privacy policies of the health facilities involved in the study, but it can be provided by the corresponding author on reasonable request.

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Competing interests:

The authors report no conflict of interest.

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