Factors Associated with the Mental Health of Health Care Workers Exposed to Pandemic-Covid-19

Abstract

Pandemic, COVID is spreading like a wild fire and it has already become a global issue. People all over the world are going through mental trauma due to the current situation of the globe. The most vulnerable situation is of the front line volunteers like doctors, health care workers, social workers who are coming in direct contact with the COVID patients and working in highly risky work environment. Since its inception in December 2019, Novel Corona Virus Disease started spreading rapidly both locally and internationally and looking to the adversity of the disease, World Health Organization (WHO) declared it has pandemic. . The aim of this paper is to explore the determinants associated with the Mental Health of Health Care Workers (HCW) during the pandemic Novel Coronavirus (COVID-19). Questionnaire was developed having both demographic questions and questions related to mental health. Data was collected from 433 HCWs who were the front-line workers, involved directly in handling these patients. Questionnaire was classified into two parts; one included the demographic questions and the second part included questions related mental health and occupational stress. These HCW were the front line works and were more vulnerable and were having the high risk of getting affected. Percentage analysis was used to analyse the demographic data. Exploratory factor analysis was used to explore the dimensions related to mental health and occupational strength. Multi regression model was used to check the impact of emerged factors like increased workload, the continuous contact with COVID-19 patients and emotional aspects to mental health and occupational stress.

Keywords : COVID-19, Health Care Workers (HCW), Mental Health, Occupational Stress, Anxiety, work pressure.

INTRODUCTION

Novel coronavirus disease (COVID-19) has spread rapidly both locally and internationally, since its inception in December 2019 (Li et al, 2020). Throughout the world, Health Care Workers (HCW) were the front line workers who were involved in the screening and further process of treatments. Hence they all were named as COVID-19 warriors. They risked their own life to provide the Nobel service to the affected patients and discharged their responsibilities like true warriors. Under this tremendous crisis situation, these HCW were subjected to mental and physical stress and burnout. They were directly handling these patients and were risking their own life (Cai et al.,2020 ; Tam et al., 2004). The adverse situations where they were working was leading to occupational stress, emotional exhaustion and uncertainty among HCW (Hassan et al.2020). Occupational stress due to COVID-19 was the indicator of mental illness as it may result to anxiety and depression. Infectious nature of the virus and the countless deaths were also having a negative impact on the HCWs (Neto et al. 2020). Working conditions through which these HCWs were going through was showing a negative impact on their job satisfaction. They were also having a fear of getting infected and hence to maintain the morale level was challenge (Kabbash et al. 2020; Semachew et al. 2017). There is a direct connection between working conditions and mental health and occupational stress. Increased workload, risky conditions and long working hours have a negative effect on mental health (Moustaka et al. 2010). Due to the infectious nature of the

virus many were unable to go home and unable to meet their families. This also led to situation of uncertainty and was having a direct impact on their mental health (Bai et al. 2004). COVID-19 was first appeared in Wuhan City, in China, in end of 2019 (Wnag et al.,2020a). It is an International Public Health Emergency and resulted in psychological issues like stress, depression and anxiety among the population (Ornell et al.,2020). Previous epidemic studies have proved that, infectious diseases have not only resulted in the physical damages, but has psychopathological issues (Tam et al.,2004; Lee et al.,2007). In case of SARS in 2003, health care workers have shown the symptoms of acute distress (Tam et al., 2004). MERS outbreak of 2015 resulted in post-traumatic stress disorder (PTSD), which amplified the problem of absenteeism at workplace (Lee et al.,2007). Front line Health Care Workers are more prone to infection as they are in direct contact with the patients. (Liu et al.,2020; Ran et al., 2020).

OBJECTIVES

- *To identify the dimensions of Mental Health of Health Care Workers Exposed to Pandemic-Covid-19.*
- *To identify the most prominent factor out of the emerged factor.*

PRIMARY DATA

Structured Questionnaire was developed to collect the primary data. having 36 questions was used to collect the primary data. The questions are classified into demographic and non-demographic variables.
Number of demographic questions = 5
Number of stress related questions = 28
The survey was conducted on a sample size of 433 Health Care Workers. Responses was measured with 5-point Likert Scale. In order to ensure the reliability of the developed questionnaire, reliability test was conducted and value of Cronbach's alpha obtained was 0.751. As per the available literatures, any value above 0.7, satisfies the reliability test.

Table 1. Reliability test

Cronbach Alpha	No. of items
0.751	33

RESPONSE RATE

In total 450 questionnaires were administered. Out of that 433 was received back. Hence the response rate was as below:

Table 2. questionnaire survey

Total number of questionnaires administered	450
Received back	433
Response Rate	96.22%

STATISTICAL TECHNIQUES USED FOR DATA ANALYSIS

Table 3. Statistical tools used for data analysis

Sr .No.	Statistical Technique	Data Analysis
A	Demographic Analysis	Demographic profiling of the respondents.
B	Factor Analysis	Exploration of Factors related to Mental Health
C	Multiple Regression Model	To derive the predictive model of Mental Health and also to the most influencing factor, out of the derived factors.

The statistical package used for data analysis was SPSS 21.

A DEMOGRAPHIC PROFILING OF THE RESPONDENTS

Percentage Analysis was done to study the demographic profiling of the respondents.

Table 4. **Demographic characteristics of the Respondents**

Variables and categories	N=433	%
Gender		
Male	232	53.58
Female	201	50.47
	433	
Marital Status		
Married	296	68.36
Single	137	31.64
	433	
Kids		
Yes	246	56.81
No	187	43.19
	433	
Both spouses working		
Yes	232	53.58
No	201	46.42
	433	
Staying in Joint Family		
Yes	232	53.58
No	201	46.42
	433	

Demographic variables studied, were gender, martial status, kids, working status of spouse and staying in joint family. 53.58 % were male respondents and 50.47 % were female. 68.36 % were married and 31.64% were single. 56.81% were having kids and 43.19 % were not having kids. 53.58 % were living in joint family and 46.42% were not.

B EXPLORATION OF FACTORS AFFECTING MENTAL HEALTH OF HCW

To find Factors Associated with the Mental Health of Health Care Workers Exposed to Pandemic-Covid-19, researchers used factor analysis. Factors were defined using the Eigen value criterion, which means extracting factors with an Eigen value greater than 1.0. For generating a variable matrix, Principal Component Analysis and Varimax Rotation were used. Kaiser-Meyer-Olkin (KMO) and Bartlett's Test values were also collected to validate the data set's adequacy and sphericity.

Table 5. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.787
Bartlett's Test of Sphericity	Approx. Chi-Square	8487.236
	df	378
	Sig.	.000

Kaiser-Meyer-Olkin(KMO) and Bartlett’s Test value obtained is 0.787. Any value above .5 is acceptable. The value obtained is 0.787, which is above 0.5. Hence factor analysis can be done.

Table 6 Communalities

	Initial	Extraction
VAR00003	1.000	.725
VAR00004	1.000	.829
VAR00005	1.000	.803
VAR00007	1.000	.645
VAR00008	1.000	.552
VAR00009	1.000	.688
VAR00010	1.000	.744
VAR00011	1.000	.571
VAR00012	1.000	.663
VAR00013	1.000	.712
VAR00015	1.000	.454
VAR00016	1.000	.762
VAR00017	1.000	.764
VAR00018	1.000	.746
VAR00019	1.000	.832
VAR00021	1.000	.847
VAR00022	1.000	.719
VAR00023	1.000	.801
VAR00024	1.000	.851
VAR00025	1.000	.842
VAR00026	1.000	.752
VAR00027	1.000	.763
VAR00028	1.000	.635
VAR00001	1.000	.845
VAR00002	1.000	.891
VAR00006	1.000	.673

VAR00014	1.000	.750
VAR00020	1.000	.769

Extraction Method: Principal Component Analysis.

Factor I explained 20.25% of total variance, Factor II explained 14.43%, Factor III explained 9.51 %, Factor IV explained 9.25%, Factor V explained 7.54%, Factor VI explained 6.59 and Factor VI explained 6.11% respectively. Total variance explained by the convergence 28 statements into 7 factors is 73.66 %. These emerged 7 factors were able to explain 73.66% variance. So, there may be the possibility of presence more factors, which will explain the rest of the variance.

Table 7 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.03	25.09	25.09	7.03	25.09	25.09	5.67	20.25	20.25
2	3.87	13.83	38.92	3.87	13.83	38.92	4.04	14.43	34.67
3	2.84	10.15	49.07	2.84	10.15	49.07	2.66	9.51	44.18
4	1.98	7.07	56.14	1.98	7.07	56.14	2.59	9.25	53.43
5	1.86	6.62	62.77	1.86	6.62	62.77	2.11	7.54	60.97
6	1.59	5.71	68.47	1.59	5.71	68.47	1.84	6.59	67.55
7	1.45	5.19	73.66	1.45	5.19	73.66	1.71	6.11	73.66
8	.98	3.52	77.19						
9	.85	3.012	80.20						
10	.75	2.68	82.88						
11	.62	2.23	85.11						
12	.51	1.81	86.92						
13	.41	1.45	88.38						
14	.39	1.42	89.79						
15	.34	1.22	91.01						
16	.32	1.14	92.15						
17	.29	1.02	93.17						
18	.26	.94	94.10						
19	.25	.88	94.98						
20	.21	.75	95.73						
21	.19	.68	96.41						
22	.19	.67	97.08						
23	.17	.62	97.69						
24	.15	.55	98.25						
25	.15	.52	98.76						
26	.13	.45	99.22						

27	.12	.44	99.66						
28	.09	.34	100.00						

Extraction Method: Principal Component Analysis.

28 items got converged into 7 factors and the total variance explained was 73.66 %. This percentage is acceptable. It means the 28 items under study was able to explain 73.66% and still there are other components which contributes to HCW's mental health. Remaining 26.34 % includes the other components, which may be the scope of further study.

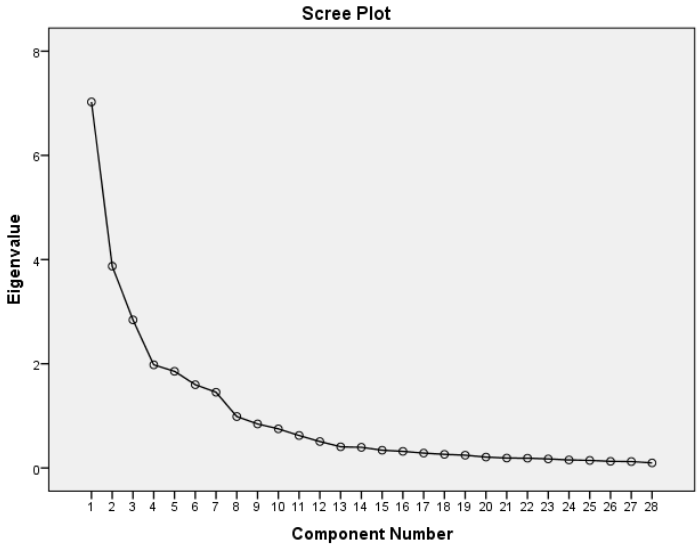


Fig. 1. Eigenvalue graph

Table 8 Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
VAR00010	.827						
VAR00009	.799						
VAR00017	.752						
VAR00012	.745						
VAR00003	.729						
VAR00016	.721						
VAR00018	.694						
VAR00008	.677						
VAR00011	.548						
VAR00019		.840					
VAR00020		.795					
VAR00022		-.755					
VAR00021		-.690					
VAR00004	.	.548					
VAR00023			.842				

VAR00024			.766				
VAR00015			-.603				
VAR00014			.539				
VAR00005				.774			
VAR00006				.729			
VAR00007				.709			
VAR00028				-.509			
VAR00013					.841		
VAR00025					.835		
VAR00001						.906	
VAR00002						.887	
VAR00027							.894
VAR00026							-.652

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Table 9. data statitics

FACTOR: 1: ANXIETY		
VAR010	Increased workload is affecting my personal life	.826
VAR009	I am tensed because of the risk involved working with the COVID patients	.778
VAR017	Dealing with the death and dying daily is making me depressed.	.748
VAR012	Exposure to infection may lead to health hazard.	.729
VAR003	Fear of family getting affected	.710
VAR016	Stigma with respect to the disease	.698
VAR018	Strict precautionary measure	.694
VAR008	Discrimination between doctors and other paramedical staff	.665
VAR011	I am unable to get proper facilities at hospitals	.606
FACTOR: 2: WORK PRESSURE		
VAR019	Long working hours is resulting fatigue in me	.829
VAR020	I am unable to control my anxiety level	.791
VAR021	Casualties at hospital is leading me depression	-.768
VAR022	I am unable to get proper sleep	-.705
VAR004	Unknown fear is gulping me	.583
FACTOR: 3: EMOTIONAL EXHAUSTION		
VAR023	I feel emotionally drained from my work.	.812
VAR024	I do my work under tense circumstances.	.720
VAR015	I feel emotionally drained from my work.	-.627
VAR014	I worry that this job is hardening me emotionally	.537
FACTOR: 4: RISK FACTOR		
VAR006	Inco-operative patients & families	.769
VAR007	Non cooperative peers	.769

VAR005	Hazardous work situations	.763
VAR028	Sometimes I feel very low at workplace	.756
FACTOR: 5: OPTIMISIM		
VAR013	I deal very effectively with the problems of my recipients.	.839
VAR025	I feel I am positively influencing other people's lives through my work	.805
FACTOR: 6: SELF CONTROL		
VAR001	I am sure that we will be achieving victory over this pandemic	.889
VAR002	Gravity of the outbreak will lessen with respect to time.	-.512
FACTOR: 6: DISCOMFORT		
VAR027	I feel very discomfort in handling corona related materials/equipment's.	.894
VAR026	Hospital atmosphere is very threatening & disturbing.	-.652

Table 10. Component Transformation Matrix

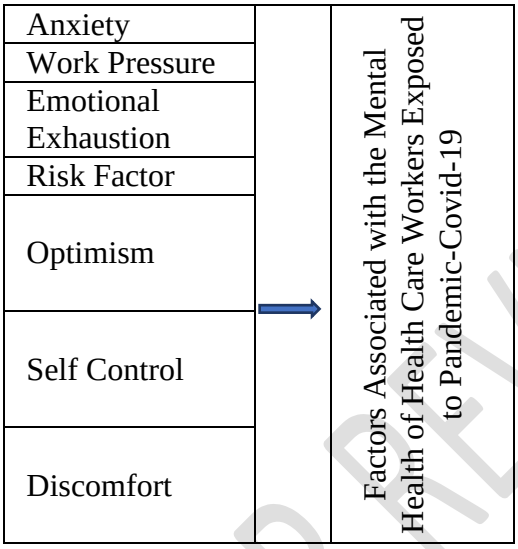
Component	1	2	3	4	5	6	7
1	.794	.558	.027	.232	.039	-.016	-.041
2	-.487	.449	.373	.468	.292	.242	-.244
3	.299	-.478	.756	-.040	.296	-.082	-.123
4	.038	.237	.044	-.743	.180	.545	-.242
5	.065	-.159	-.425	.100	.862	.034	.187
6	.121	-.218	.067	.278	-.189	.748	.510
7	-.151	.360	.319	-.294	.117	-.275	.755

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Factor No.	No. of Items	Factor Name
Factor 1	9	Anxiety
Factor 2	5	Work Pressure
Factor 3	4	Emotional Exhaustion
Factor 4	4	Risk Factor
Factor 5	2	Optimism
Factor 6	2	Self-Control
Factor 7	2	Discomfort

Table 11 Derived Model :



C TO DERIVE THE PREDICTIVE MODEL OF MENTAL HEALTH

Multi regression model was used to derive the predictive model and also to find the most influencing factor out of it.

Table 12 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.778[a]	.605	.600	.50900

a. Predictors: (Constant), Work pressure, optimism ,Risk factor, Emotional Exhaustion , Self-control, Discomfort

Value of R^2 obtained was 0.778, which means, the derived factors namely Work pressure, optimism ,Risk factor, Emotional Exhaustion , Self control, Discomfort were able to explain 77.8 % of the dependent variable 'Mental Health'. All the above factors influence Respondent's Mental Health, as the significant the factors namely work pressure, risk factor and emotional exhaustion are directly proportional to Mental health. Work pressure is the most influencing factor among it. Optimism, self-control and discomfort are inversely proportional to Mental Health of HCW.

Table 13. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	169.943	6	28.324	109.326	.000[b]
	Residual	110.885	428	.259		
	Total	280.827	434			

a. Dependent Variable: Mental Health

b. Predictors: (Constant), Work pressure, optimism ,Risk factor, Emotional Exhaustion , Self-control, Discomfort

Table 14 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.763	.263		-2.906	.004
	Work Pressure	1.136	.054	.764	21.041	.000
	Emotional Exhaustion	.006	.036	.005	.161	.872
	Risk Factor	.088	.045	.072	1.972	.049
	Optimism	-.005	.019	-.008	-.267	.790
	Self Control	-.047	.039	-.038	-1.211	.227
	Discomfort	-.069	.039	-.067	-1.757	.080

a. Mental Health

Mental Health = -0.763 + 1.136(Work Pressure) +0.006 (Emotional Exhaustion)+ 0.088 (Risk Factor) -0.005 (Optimism) – 0.047 (Self Control) – 0.069(Discomfort) + error

CONCLUSION:

Study explored the Factors Associated with the Mental Health of Health Care Workers Exposed to Pandemic-Covid-19. Exploratory Factor Analysis was used, and 28 items converged into 7 factors. The factors thus derived was named as Anxiety, ***Work Pressure, Emotional Exhaustion, Risk Factor, Optimism, Self Control and Discomfort.*** . Derived seven factors together was explained with 73.66 % variance. Multiple Regression Model helped to the predict the influence of the identified factor and also helped to identify the most prominent factor. Most important emerged from this study was 'Work Pressure'. Due to the fast spread of this deadly virus, a war like situation has emerged and Health Care Workers are the most vulnerable people as they are serving the patients directly. They are sacrificing their own physical and mental health and are serving the mankind. These people deserves lots of appreciation and salutations.

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