

Original Research Article

Stress and Resilience in Health Care Workers Managing Corona Virus Disease- 2019 Patients in A dedicated COVID-19 Hospital in Mewat region of North India

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Abstract

Objective: Pandemics are known to impact the mental health of the health care workers (HCWs). Impact of COVID-19 on mental health of HCWs is not yet understood completely. We studied stress and resilience among HCWs during the COVID-19 pandemic, and observed level of stress and resilience among different job profile of HCWs in North India. **Methods:** We conducted a hospital based cross sectional study at a designated COVID-19 tertiary care center in rural district of North India from April 2020 to June 2020. A total of 587 HCWs were included for study. The information was collected using Semi-structured proforma and pre-validated questionnaire, Perceived stress scale (PSS) for perceived stress and Brief resilient coping scale (BRCS24) for resilience. The statistical analysis was done using statistical package for social sciences (SPSS), version 24. **Results:** Maximum number of participants (72.2%) reported with moderate to high level of perceived stress. 76.5% specialists were reported moderate stress followed by paramedical staff (65.7%) and junior residents (63.9%). Around 70% of junior residents have high resilient coping skills followed by specialists (53.7%) and paramedical medical staff (51.8%). Significant difference (p value = <0.000) between the PSS score and BRCS scores were found among all three job categories. No correlation was found between PSS and BRCS (p value >0.05). **Conclusions:** Our study indicated highest level of perceived stress and resilience in junior residents among all the three job categories, however no relationship could be observed between perceived stress and resilience in HCWs. Higher age, female gender, specialist and COVID care duty in ICU, isolation, flu OPD, triage were predictors of perceived stress. These findings should be taken into consideration for the development and implementation of interventions to mitigate the impact of sustained psychological distress among HCWs.

Key-words: COVID 19, Stress, Resilience, Health care workers.

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Introduction

Corona Virus Disease-2019 (COVID-19) was started in December 2019, as viral outbreak in China[1,2] which was declared as pandemic by world health organization (WHO) on 11th march 2020[3]. Mankind has faced multiple pandemics in past too for example SARS, Ebola, Spanish flu etc. Literature reveals that pandemics were known to cause mental health problems along with physical morbidities; for example insomnia, anxiety, depression, stress-related disorders in the infected as well as in the non- infected people[4,5]. As health care workers (HCW's) are the central figures involved in the management of pandemics including COVID-19 hence they are amongst the high-risk group of acquiring the infection[6] and also they are not spared from psychological consequences of pandemic[7]. Various reasons of mental health issues are excessive workload, disproportionate working hours, lack of personal protective equipment, over-enthusiastic media news, feeling insufficiently

supported[8]. This situation is further complicated by the misinformation across the social media causing stigma against HCWs which may lead to many incidences of violence against them[9]. In China more than 50% HCWs reported depression and more than 70% reported distress during the COVID-19 pandemic[10]. Large numbers of HCWs reported moderate (42%) to severe (26%) psychological distress[11]. Similar results were found during past epidemics showing high stress levels in HCWs[12]. Different socio-demographic variables led to varied stress level among the HCWs. Females showed higher levels of distress than males[13]. Those who had children reported lower levels of perceived stress than their colleagues without children[14]. While some other studies suggested that HCWs having children reported higher rates of anxiety, depression and distress. No difference in stress levels was observed according to the socio-economic status and marital status[14]. High stress may lead to avoidant coping strategies and absenteeism at the workplace, which would adversely affect an organization's performance[15]. HCWs suffer from a role conflict between their role as health professionals and the role as a parent or family personnel. They frequently fear of being a contagion for their family members[16]. The relationship between stress and coping strategies has been a topic of previous studies, individual responses vary according to different coping

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strategies[17]. Coping strategies refer to behavioral and cognitive efforts that help to reduce the pressure of a stressful situation[18]. The use of coping strategies leads to lower levels of stress [19]. Commonly used strategies by clinicians during stressful situations were maintaining a normal life, thinking about solutions, maintaining situational control and information seeking[20]. Among the resources, religion and social support have been suggested to represent adaptive coping strategies[21]. While positive attitude was found to be strongest protective factors against distress; higher the positive attitude led to lower distress levels[14]. A few Italian studies considered a positive attitude and problem solving as functional coping styles, while avoidance strategies as negative coping styles which are associated increased level of emotional distress[22].

The rapid spread, novelty and uncertainty of this illness lead to varied psychological response from the HCWs which further increases with limited healthcare resources. To the best of our knowledge, no previous study has analyzed stress and resilience in Indian healthcare workers during the COVID-19 pandemic in a dedicated COVID hospital in rural district. So, we conducted a study to evaluate stress and their resilience in front line healthcare workers managing COVID-19 patients of tertiary care hospital (designated as COVID-19 hospital).

Materials and Methods

Ethical approval was obtained from the Institutional Review Board (IRB) vide letter no. SHKM/IEC/2020/33 dated 24th April 2020 and informed written consent was taken from all participants. A hospital based self reported, cross sectional study was conducted at a designated COVID-19 tertiary care center in rural district of North India from April 2020 to June 2020. The study population was comprised of health care workers involved in COVID-19 care. Purposive sampling was done. HCWs of following three categories: Specialists, junior residents (PG and Non-PG) and Paramedical Staff (nursing staff and lab technicians) who were engaged in COVID-19 care were included. All the health care workers performing duties as per roster for care of COVID-19 patients, who gave their informed consent, were approached. The duty roster of HCWs for COVID clinical care was made for 2 weeks at a stretch and then a quarantine period of 2 weeks was given before the next duty in COVID/ Non-COVID patient care as per guidelines of COVID Nodal Officer, appointed by the Institute, to prevent the COVID-19 spread during initial phase of pandemic. A total of 612 HCWs were contacted. Among them, 8 denied for consent due to personal reasons and 17 were taking treatment for psychiatric illness. Those subjects who denied consent and were on treatment psychiatric illness were excluded. A total of 587 subjects were included in the study. Subjects who were not quarantined were approached directly, while those who

were quarantined were approached telephonically and importance of study was discussed. After their willingness, questionnaires along with informed consent proforma required for study purpose were sent through email. All the protective measures against COVID-19 were taken during course of study as per recommended guidelines. A self-designed semi-structured proforma was used to record socio demographic variables. Perceived stress scale (PSS)[23] was used to assess the degree to which people perceive their lives as stressful. Subjects indicate how often they have found their lives unpredictable, uncontrollable, and overloaded in the last month. There are total 10 items in the scale, which are scored as 0 = Never; 1 = Almost Never; 2 = Sometimes; 3 = Fairly often; 4 = Very often. Alpha value of the scale is 0.78. The PSS can range from 0 to 40 with higher scores indicating higher perceived stress. Scores ranging from 0-13, 14-26 and 27 to 40 would be considered low stress, moderate stress and high perceived stress respectively. Brief resilient coping scale(BRCS)[24] captures tendencies to cope with stress adaptively. The scale measures the tendency to effectively use coping strategies in flexible, committed ways to actively solve problems despite stressful circumstances. Number of items in the scale are 4. The BRCS has adequate internal consistency ($\alpha=.76$) and test-retest reliability ($r=.71$). Resilient coping is conceptualized as to cope with stress in a highly adaptive manner, using a 5-point Likert scale "from '1' = describes me not at all to '5' = describes me very well". The sum score varies between 4(minimum) to 20(maximum). A score of 4-13 points shows low resilience, 14-16 is for moderate resilience and 17-20 shows high resilience. After compilation of data, data analysis was done using statistical package for social sciences (SPSS), version 24 (IBM, Chicago, USA). Percentage and Descriptive statistics was used for analysis categorical and continuous variables respectively. Chi square test is used to find significance between different categorical variables. Univariate and multivariate linear regression was used to find out independent significant factors affecting PSS and BRCS total score. The significance level was set at p-value less than 0.05.

Results

The sample comprised of total 587 HCWs; 24.7% specialists; 25.0% junior residents and 50.3% paramedical staff. Almost half of them (52.3%) were males and rest half (47.7%) were females. Mean age of study sample was 31.32 ± 6.9 years. Among them 58.9% had children and 47.8% had elderly in their family. 62.9% of the participants were married and 74.1% had nuclear family. 10.4% of HCWs had done duties for more than 2 weeks till the completion of study period. Majority were involved with isolation ward duty (56.4%), followed by flu OPD (17.1%), triage duty (13.1%), ICU duty (10.2%) and administrative duty (9.5%). (Table 1)

Table 1: Socio-demographic characteristics of study sample, N=587

Sample characteristics	N (%)
Job category	
Specialist	145 (24.7%)
JR	147 (25.0%)
Paramedical staff	295 (50.3%)
Age	
21-30	317 (54%)
31-40	200 (34.1%)
>40	70 (11.9%)
Gender	
Male	307 (52.3%)
Female	280 (47.7%)
Marital status	
Married	369 (62.9%)
Unmarried	212 (36.1%)
Others	6 (1.0%)
Covid care duty type	
ICU	60 (10.2%)
Isolation	331(56.4%)
Flu OPD	100 (17.1%)
Triage	77(13.1%)
None of the above	19(3.2%)

Administrative duties for COVID Care	56 (9.5%)
Clinical duties for COVID Care	531 (90.5%)
Number of duties	
Up to 2 weeks	526 (89.6%)
More than 2 weeks	61 (10.4%)
Family type	
Joint	152 (25.9%)
Nuclear	435 (74.1%)
Children in family	
No	241(41.0%)
Yes	346 (58.9%)
Elderly in family	
No	306 (52.1%)
Yes	281 (47.8%)

Maximum number of participants (72.2%) was reported with moderate to high level of perceived stress. Among all the participants 4.3% have high stress, 67.9% have moderate and 27.8% have low stress. 76.6% specialists were reported moderate stress followed by paramedical staff (65.8%) and junior residents (63.9%). 8.9% of specialists showed high level of stress followed by 3.4% of junior residents and 2.4% of paramedical staff. The mean PSS score of specialist (18.66± 5.33) was significantly (p value = <0.000) higher as compared to paramedical staff (16.37 ± 5.8) followed by junior residents (16.18±6.08). The difference between the PSS score was

found to be significant among all job categories (p value = <0.000). About half (56.2%) of the study population has showed high resilient coping skills. Around 70% of junior residents have high resilient coping skills followed by specialists (53.7%) and paramedical medical staff (51.8%). The mean BRCS score of junior residents (17.57 ± 2.56) was significantly (p value = <0.000) higher as compared to specialist (16.77 ± 3.29) followed by paramedical staff (15.73 ± 4.31). (Table 2) No correlation was found between PSS with BRCS (p value >0.05).

Table 2: comparison of PSS and BRCS between job category

PSS/BRCS	Specialist (n=145)	Junior resident (n=147)	Paramedical staff (n=295)	Total
Low stress	21 (14.5%)	48 (32.7%)	94 (31.8%)	163 (27.8%)
Moderate stress	111 (76.6%)	94 (63.9%)	194 (65.8%)	399 (67.9%)
High perceived stress	13 (8.9%)	5 (3.4%)	7 (2.4%)	25 (4.3%)

(P value=<0.0001, Chi square test=24.655)

Coping skills	Specialist (n=145)	Junior resident (n=147)	Paramedical staff (n=295)	Total
Low resilient coping skills	29 (20%)	11 (7.4%)	74 (25.1%)	114 (19.4%)
Medium resilient coping skills	38 (26.2%)	37 (25.2%)	68 (23.1%)	143 (24.4%)
High resilient coping skills	78 (53.8%)	99 (67.4%)	153 (51.8%)	330 (56.2%)

(P value <0.0004, Chi square test = 20.52)

Various factors like higher age, female gender, job category as specialist, COVID care duty in ICU, isolation, flu OPD, triage and administrative duty significantly (p < 0.05) affect PSS and led to higher PSS score. Multivariate linear regression revealed female gender, job category as specialist, COVID care duty in ICU, isolation, flu OPD and triage were independent factors significantly (p-value <0.05) affecting PSS total score) (Table 3)

Table: 3 Univariate and multivariate linear regression to find out significant factors affecting PSS total score.

Variable	Univariate linear regression						Multivariate linear regression						
	Crude's Beta coefficient	Standard error	P value	Lower bound (95%)	Upper bound (95%)	R ²	Adjusted Beta coefficient	Standard error	P value	Lower bound (95%)	Upper bound (95%)	R ²	
Age(years)	0.072	0.035	0.041	0.003	0.140	0.72%	-0.008	0.045	0.853	-0.097	0.080	7.08 %	
Gender													
Male	Reference						Reference						
Female	1.759	0.477	0.0003	0.821	2.696	2.27%	1.665	0.480	0.0006	0.723	2.607		
Marital Status													
Unmarried	Reference						-	-	-	-	-		
Married	0.622	0.503	0.217	-0.367	1.610	0.32%	-	-	-	-	-		
Others	1.852	2.418	0.444	-2.896	6.601	-	-	-	-	-	-		
Covid Care Duty													
None of the above	Reference						Reference						
ICU	3.087	1.513	0.042	0.115	6.059	3.77%	3.684	1.530	0.016	0.679	6.689		
Isolation	4.960	1.356	0.0003	2.297	7.624		4.876	1.386	0.0005	2.154	7.597		
LU OPD	4.247	1.439	0.003	1.421	7.072		3.769	1.452	0.010	0.917	6.620		
Triage	6.036	1.472	<0.0001	3.144	8.928		5.665	1.472	0.0001	2.773	8.558		
Number of duties													
Single duty	Reference						-	-	-	-	-		
Two or more than two	1.256	0.789	0.112	-0.293	2.805	0.43%	-	-	-	-	-		

duties											
Family Type											
Nuclear	Reference					0.19%	-	-	-	-	-
Joint	0.582	0.550	0.290	-0.498	1.663		-	-	-	-	-
Administrative Duty	2.134	0.816	0.009	0.531	3.738	1.15%	0.736	0.901	0.414	-1.033	2.505
Children in Family	0.808	0.489	0.099	-0.153	1.768	0.46%	0.382	0.392	0.330	-0.388	1.152
Elderly in Family	-0.071	0.483	0.884	-1.019	0.878	0.00%	-	-	-	-	-
Job Category											
Paramedical staff	Reference					3.04%	Reference				
Specialist	2.289	0.584	<0.0001	1.142	3.437		1.889	0.696	0.007	0.523	3.256
Junior resident	-0.189	0.582	0.745	-1.331	0.953		-0.536	0.614	0.383	-1.743	0.671

COVID care duty in ICU, isolation and triage, children in family, job category as specialist and junior resident are the significant (p <0.05) factors affecting BRCS score. Participants with COVID care duty in ICU, isolation and triage, job category as specialist and junior resident had higher BRCS total score on the otherhand, family with children had lower BRCS total score. Multivariate linear regression showed, COVID care duty in ICU and job category as specialist and junior resident were the significant (p<0.05) factors affecting BRCS scores (Table 4)

Table 4:- Univariate and multivariate linear regression to find out significant factors affecting BRCS total score

Variable	Univariate linear regression						Multivariate linear regression					R ²
	Crude's Beta coefficient	Standard error	P value	Lower bound (95%)	Upper bound (95%)	R ²	Adjusted Beta coefficient	Standard error	P value	Lower bound (95%)	Upper bound (95%)	
Age(years)	-0.018	0.023	0.435	-0.062	0.027	0.10%	-	-	-	-	-	4.50
Gender												
Male	Reference					0.47%	-	-	-	-	-	
Female	0.516	0.311	0.098	-0.095	1.127		-	-	-	-	-	
Marital Status												
Unmarried	Reference					0.22%	-	-	-	-	-	
Married	-0.309	0.325	0.342	-0.948	0.329		-	-	-	-	-	
Others	-1.151	1.562	0.461	-4.219	1.917		-	-	-	-	-	
Covid Care Duty												
None of the above	Reference					2.07%	Reference					
ICU	3.089	0.986	0.002	1.154	5.025		2.412	0.988	0.015	0.472	4.353	
Isolation	2.379	0.883	0.0073	0.644	4.113		1.718	0.887	0.0531	0.023	3.460	
LU OPD	1.719	0.937	0.067	-0.121	3.560		1.106	0.938	0.239	0.736	2.948	
Triage	2.166	0.959	0.024	0.282	4.050		1.601	0.956	0.095	0.277	3.479	
Number of duties												
Single duty	Reference					0.01%	-	-	-	-	-	
Two or more than two duties	-0.130	0.510	0.799	-1.133	0.872		-	-	-	-	-	
Family Type												
Nuclear	Reference					0.00%	-	-	-	-	-	
Joint	0.004	0.356	0.992	-0.695	0.702		-	-	-	-	-	
Administrative Duty	0.239	0.530	0.652	-0.802	1.280	0.03%	-	-	-	-		
Children in	-0.661	0.315	0.03	-1.280	-0.041	0.7	0.382	0.392	0.33	-	1.1	

Family			7			4%			0	0.388	52
Elderly in Family	-0.566	0.311	0.069	-1.177	0.044	0.56%	-	-	-	-	-
Job Category											
Paramedical staff	Reference					4.25%	Reference				
Specialist	1.040	0.375	0.006	0.304	1.776		1.046	0.382	0.006	0.295	1.796
Junior resident	1.846	0.373	<0.0001	1.113	2.579		1.912	0.461	<0.0001	1.007	2.817

Discussion

This study was aimed to analyze the impact of COVID-19 on mental health of HCWs, their relationship with socio-demographic factors and resilience. Specifically, we studied the role of age, job category, gender, marital status, family type, children and elderly in the family, type of COVID-19 duties on stress levels and resilience score.

Our findings suggest majority of HCWs have faced moderate level of stress which is in concordance with study done by Mrklas et al and public survey done in Canada[25]. While during the past epidemics (SARS and MERS), healthcare workers reported high stress levels[26]. Junior residents had reported significantly high level of perceived stress among all the three job categories. It might be due to reason that junior residents were directly engaged in diagnosis, treatment, prognosis, care of patients and do spend more time with COVID-19 patients as compared to specialists. Our findings are in contrary with study done in Ethiopia which that showed participants who were master's and above in their qualification were likely to have more perceived stress during COVID-19[27]. This might be due to the fact that specialists have more knowledge about the COVID-19 as compared to other categories because specialists have conducted different types of scientific researches or do explore about the virulence of the COVID-19 pandemic and their outcome. Some of the studies revealed that nurses were more likely to have increased perceived stress during COVID-19 as compared to doctors[28]. More than half of HCWs had high level of resilient coping skills and highest resilience was found in junior residents. Our study results were in concordance with the study carried out in Australia where HCWs had moderate to high level of resilience coping[29]. While study done in Egypt showed that only 17.1% of HCWs had high resilient coping[30]. We didn't find any relationship between perceived stress and resilience. Our study findings are not in line with the previous literature which suggests the use of coping strategies resulted to be related with lower levels of stress[31,32]. There could be various possible reasons. One reason might be that this is a novel illness with too much stress and uncertainty. Most of the HCWs have not experienced it earlier. Their coping mechanisms might not be effective enough to handle the stress. We have studied various socio-demographic variables affecting PSS score and BRCS score. It was found that perceived stress was higher in old age, females and specialists. All kind of COVID care duties (COVID ICU, isolation, flu OPD, triage and administrative duty) showed higher level of stress. Only the job category, specialist was the significant independent factor affecting PSS score. Our study findings are in contrary with previous studies, Rahman et al and a Chinese studies also showed that young adults (aged 18–30 years) exhibited the highest level of psychological distress[29,33]. Perceived distress was increased in any kind of COVID care duty i.e. providing care to known or suspected case of COVID-19 and having higher level of psychological distress[29]. Our study was in consistency with studies from China, Italy and the USA suggesting that female gender was a consistent predictor for psychological distress[29,31-32]. The reason can be female serve larger proportion of caregiving role towards patients and major caregiver of home, so, working in the COVID situation can add to the stress level in females. Participants who were posted in isolation wards, triage area and with job category as specialists and junior residents had higher resilience and on other hand family with children had lower resilience. On multivariate

regression it was found that specialist, junior residents and those who were duty in COVID ICU had higher resilience.

This study has many limitations which need to be taken into account as the findings are not generalizable to other professional groups and situations different from the current COVID-19 pandemic as the study population was narrowly identified from a single center, including mixed group of frontline HCWs and had a mechanistic account of coping process. Cross sectional study precludes study of long term effects of variables under study and hence longitudinal study is recommended. We have not studied the various coping strategies used by the health care workers and their impact on stress. It is a self-report study, participants most of the times provide what they are comfortable with, in spite of the assurance related to the anonymity of data. We are planning to identify different coping strategies used by HCWs and their impact to relieve the stress among HCWs, so that specific intervention can be planned in timely manner.

Conclusion

We surveyed HCWs treating patients with COVID-19 in tertiary care center of North India. We quantified level of stress and coping skills in 3 categories of health care workers. Various socio-demographic variables were studied affecting distress and coping skills. These findings should be taken into consideration for the development and implementation of interventions to mitigate the impact of sustained psychological distress among healthcare workers. The lessons learned from the COVID-19 pandemic should help decision-makers to promote readiness to provide better services as we pass through this and public health crises in future. Public education about coping strategies, utilization of effective methods of coping, and resources of practical help are expected to be useful. This is likely to be a long-term process that needs to be started during and be continued following the pandemic. We hope that these findings will influence policies at other institutions that face a rapid rise in patients with COVID-19 in the future.

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