

# Multi-centric study of psychological disturbances among health care workers in tertiary care centers of western India during the COVID-19 pandemic

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## Abstract

**Introduction:** The world has been facing a pandemic of COVID-19, and while dealing with this pandemic is not easy for anyone, it is especially hard on health care workers (HCWs) as they are the front-line warriors.

**Aim of the study:** To assess the psychological disturbances that the COVID-19 pandemic has inflicted on healthcare workers in India and to assess the correlation between different parameters including socio-demographic variables, job-related variables, personal history and psychological disturbances such as perceived stress, depression and anxiety.

**Material and methods:** Health care workers from a few tertiary care institutes (government as well as private sectors, which are caring for patients with COVID-19) in a western state of India were invited to participate with a self-administered online questionnaire. That questionnaire consisted of self-report scales including Fear of COVID-19 Scale, the Depression, Anxiety and Stress Scale 21 items (DASS 21), and the Perceived Stress Scale with socio-demographic, job-related and personal details.

**Results:** Out of 302 subjects, on the Perceived Stress Scale, 101 (33.44%) reported low, 185 (61.26%) moderate and 16 (5.30%) high levels of stress. On DASS 21, depression was reported by 56 (18.54%) subjects, 60 (19.87%) subjects were found to have anxiety and 50 (16.56%) subjects reported to have stress. Perceived stress score on Perceived Stress Scale (PSS) was significantly correlated with the depression, anxiety and stress score on DASS 21. A few risk factors such as female gender, single marital status, past history of psychiatric illness, working as interns and residents doctors with lesser experience and high risk duty areas such as COVID-19 duties in a particular situation were significantly associated with psychological disturbances such as stress, depression and anxiety.

**Conclusions:** We observed significant psychological impacts of the COVID-19 pandemic on HCWs as well as a few risk factors related to it. Supporting the mental health of HCWs is a critical part of the public health response to maintain an adequate workforce and to maximize the ability of HCWs to face this pandemic.

**Key words:** health care workers, COVID-19, psychological disturbances.

## Introduction

Since December 2019 the world has been facing an outbreak of a novel infectious disease known as coronavirus disease 2019 (COVID-19), that has rapidly spread globally with the number of confirmed cases increasing every day and has now been declared as a pandemic by the World Health Organization (2020). The current outbreak of the novel coronavirus SARS-CoV-2 has

its epicenter in Hubei Province of the People's Republic of China (Velavan and Meyer 2020). COVID-19 is caused by a novel, enveloped single-stranded RNA virus, severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). SARS-CoV-2 is the seventh known coronavirus in humans and belongs to the same phylogenetic family as the 2002 SARS and the 2012 Middle East respiratory syndrome coronavirus (MERS-CoV-2). SARS-CoV-2 is presumed – but not

confirmed – to have originated in bats given a remarkable (89-96%) genomic homology to bat coronaviruses (Andersen *et al.* 2020). Recent data show that there are 11 million cases of COVID-19 worldwide with 524 000 deaths. In India, there have been 262 000 cases of COVID-19 with 18213 deaths due to COVID-19. Gujarat has reported the 5<sup>th</sup> highest number of cases behind the states of Maharashtra, Tamil Nadu, Delhi and Chennai. In Gujarat 33 913 cases of COVID-19 have been reported so far with 1886 deaths (COVID-19 dashboard India on date 3 July 2020).

Dealing with this pandemic is not easy for anyone, but it is especially hard on health care workers (HCWs) as they are the front-line warriors. Some major concerns for HCWs include: worry that they may carry the coronavirus home and infect loved ones; the fear and uncertainty of a heightened risk of infection; a dwindling or inadequate supply of personal protective equipment (PPE); frequently changing recommendations from local leaderships, medical and health experts and political leaders; unusually high and increasing demands to work longer hours as their colleagues become sick or are quarantined; balancing their commitment to help others with an understandable commitment to protect themselves and their loved ones; widespread media coverage, lack of specific drugs and feelings of being inadequately supported. These may all contribute to the mental burden of these health care workers. Previous studies have reported adverse psychological reactions to the 2003 SARS outbreak among health care workers. Studies showed that those HCWs feared contagion and infection of their family, friends and colleagues, felt uncertainty and stigmatization, reported reluctance to work or were contemplating resignation, and reported experiencing high levels of stress, anxiety and depression symptoms, which could have long-term psychological implications. A survey of 1257 nurses and physicians caring for patients with the disease in China found that these providers (41.5% of respondents) had significantly more depression, anxiety, insomnia and distress than providers who did not care directly for patients (Lai *et al.* 2020). Another observational study of 180 HCWs providing direct care for patients with COVID-19 found substantial levels of anxiety and stress that adversely influenced sleep quality and self-efficacy (Xiao *et al.* 2020).

Data derived from previous epidemics, such as SARS in 2003 and the H1N1 influenza in 2009, illustrate that the community suffered

considerable fear and panic, resulting in a significant psychological impact (Chong *et al.* 2004; Goulia *et al.* 2010). Experience from the SARS and H1N1 epidemics underline that the psychological strain on healthcare professionals is significant. Therefore, healthcare professionals dealing with COVID-19 are under increased psychological pressure and experience high rates of psychiatric morbidity, resembling the situation during the SARS and H1N1 epidemics (Chong *et al.* 2004; Brooks *et al.* 2018). A very recent study among healthcare professionals in a tertiary infectious disease hospital for COVID-19 in China revealed a high incidence of anxiety and stress disorders among frontline medical staff, with nurses having a higher incidence of anxiety than doctors. The disruption of routine clinical practice, the sense of loss of control and the subsequent fear of potential destabilization of the health services have provoked ‘overflowing’ anxiety and depression among healthcare professionals, a feature which is not uncommon in epidemics (Brooks *et al.* 2018; Aoyagi *et al.* 2015). However, in light of the increased psychological pressure of frontline healthcare staff, measures for psychological support and interventions to protect their mental health should be adopted promptly, as shown by previous experience (Goulia *et al.* 2010; Brooks *et al.* 2018).

Work-related stress is a potential cause of concern in HCWs and is associated with decreased job satisfaction, days of work, anxiety, depression, sleeplessness, medical errors and near misses. Despite the high prevalence of stress in doctors, and a myriad of physical and mental health consequences, doctors are notoriously reluctant to seek help for themselves. Doctors are also “poor” patients due to maladaptive health behaviors (Adshead 2005; Chambers and Belcher 1992; Forsythe *et al.* 1999).

The COVID-19 pandemic is an unprecedented significant challenge for health care workers; so it is highly important to acknowledge the psychological impact of this mounting threat on healthcare professionals. Our impression is that the increasing knowledge about preventing and dealing with the disease, and the development of more specific procedural and treatment protocols, alongside educational activities, will contribute to improving the morale of healthcare workers dealing with the pandemic. We have assessed the psychological disturbances that the COVID-19 pandemic has inflicted on healthcare professionals in India and have reviewed the literature around the effect of previous epidemics on frontline healthcare staff.

## Material and methods

Participant recruitment procedures in detail: HCWs including physicians/consultants, resident doctors, interns, and nursing staff from a few tertiary care institutes (government as well as private sectors, which are caring for patients with COVID-19) in a western state of India, were invited to participate with a self-administered online questionnaire. Those who consented to participate were given the following self-report scales: a semi-structural Performa containing basic socio-demographic details, job-related details and personal history; the Depression, Anxiety and Stress Scale 21 items (DASS 21), Cohen's Perceived Stress Scale (PSS) and the Fear of COVID-19 Scale. Different psychological parameters such as stress, anxiety and depression were assessed in all HCWs. The online self-reported questionnaire developed by the investigators contained questions from above-mentioned scales. All of the selected institutes were sent online forms through email or a WhatsApp link. We collected data from 7 May 2020 9.00 a.m. to 20 May 2020 12.00 a.m. Comparison between different parameters such as type of work allotted, socio-demographic data, personal history and severity of psychological disturbances was performed.

The Depression, Anxiety and Stress Scale 21 items is a set of three self-report scales designed to measure the emotional states of depression, anxiety and stress (Lovibond and Lovibond 1995). Each of the three DASS-21 scales contains 7 items, divided into subscales with similar content. Each of the questions has a Likert scale of 0 to 3. Scores for depression, anxiety and stress are calculated by summing the scores for the relevant items. Sum scores are computed by adding up the scores on the items per (sub) scale and multiplying them by a factor of 2. Sum scores for the total DASS-total scale thus range between 0 and 120, and those for each of the subscales may range between 0 and 42. Each of the questions has a Likert scale of 0 to 3 with a range of 0 to 21 for each domain. The options are *never* (0), *little* (1), *sometimes* (2) and *always* (3). If the score obtained from the questions of the depression subscale ranges from 0 to 4, the subject will be in the normal range, a score of 5-6 means mild depression, 7-10 suggests moderate depression, 11-13 severe depression, and 14 and over very severe depression. If the score of the anxiety subscale is between 0 and 3, the subject is in the normal range, 4-5 suggests mild anxiety, 6-7 moderate anxiety, 8-9 means

severe anxiety, while 10 and over shows very severe anxiety. Finally, if the score obtained from the questions of the stress subscale ranges between 0 and 7, the subject has a normal state, 8-9 shows a mild stress, 10-12 suggests moderate stress, 13-16 severe stress, and a score of 17 and over signifies a very severe level of stress.

The Perceived Stress Scale is the most widely used psychological instrument for measuring the perception of stress (Cohen *et al.* 1983). The Perceived Stress Scale scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 and 4 = 0) to the four positively stated items (items 4, 5, 7, 8) and then summing across all scale items. Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress. Scores ranging from 0 to 13 would be considered low stress. Scores ranging from 14 to 26 would be considered moderate stress. Scores ranging from 27 to 40 would be considered high perceived stress.

Fear of COVID-19 Scale (Ahorsu *et al.* 2020): the Fear of COVID-19 Scale is a seven-item uni-dimensional scale with robust psychometric properties. Initial psychometric results indicated that the FCV-19S had good properties from different types of testing (i.e., Classical Test Theory [CTT] and Rasch analysis). Moreover, the overall score of the summed-up items scores can indicate the severity of the fear of COVID-19. Higher overall scores on the FCV-19S indicate more severe fear of COVID-19.

All data were converted into categorical variables. Correlation between different parameters such as socio-demographic variants, job-related variants, personal history and psychological disturbances such as perceived stress, depression and anxiety were observed using  $\chi^2$ . *P*-values were assumed to be significant at  $< 0.05$ . SPSS 20.0 version was used for statistical calculations.

## Results

Three hundred and two subjects were included in the study. On PSS, 101 (33.44%) reported low stress, 185 (61.26%) moderate and 16 (5.30%) reported a high level of stress (Table 1). Stress on PSS was significantly correlated with gender as female subjects showed a significantly higher level of stress than males (Table 2).

On DASS 21, depression was reported by 56 (18.54%) subjects of whom 18 (5.96%) had mild, 22 (7.28%) had moderate, 8 (2.65%) had severe and 8 (2.65%) had extremely severe depression. On the DASS 21 scale, 60 (19.87%) subjects were found to have anxiety of whom

11 (3.64%) had mild, 24 (7.95%) moderate, 12 (3.97%) severe and 13 (4.30%) extremely severe anxiety. On DASS 21, 50 subjects reported to have stress, of whom 13 (4.30%) had mild, 5 (1.66%) had moderate, 13 (4.30%) had se-

vere and 4 (1.32%) had extremely severe stress (Table 3). Perceived stress score on PSS was significantly correlated with depression, anxiety and stress score on DASS 21 (Table 4). No significant association observed between stress on PSS and work related factors (Table 5). Depression DASS 21 was significantly correlated with subjects' working post, work experience and history of psychiatric illness (Table 6). Depression was significantly higher in interns and resident doctors and those who had past history of psychiatric illness. Subjects who had longer work experience had lower risk of depression (Tables 6

**Table 1.** Severity of perceived stress

PSS score and stress level	N = 302
Low perceived stress (0-13)	101
Moderate perceived stress (14-26)	185
High perceived stress (27-40)	16

PSS – Perceived Stress Scale

**Table 2.** Association between stress, socio-demographical and personal factors

Socio-demographic and personal factors	Total (N = 302)	PSS			$\chi^2$ and <i>p</i> -value
		Low	Moderate	High	
<b>Age</b>					$\chi^2 = 15.01$ <i>p</i> = 0.058
21-30 years	176	50	114	12	
31-40 years	90	30	57	3	
41-50 years	11	7	3	1	
51-60 years	15	8	7	0	
> 60 years	10	6	4	0	
<b>Gender</b>					$\chi^2 = 7.1$ <i>p</i> = 0.027
male	189	71	112	6	
female	113	30	73	10	
<b>Religion</b>					$\chi^2 = 3.59$ <i>p</i> = 0.73
Hindu	281	96	171	14	
Muslim	15	4	9	2	
Christian	5	1	4	0	
others	1	0	1	0	
<b>Marital status</b>					$\chi^2 = 5.86$ <i>p</i> = 0.44
single	148	45	91	12	
married	150	55	91	4	
divorced/separated	3	1	2	0	
widow/widower	1	0	1	0	
<b>Family types</b>					$\chi^2 = 3.39$ <i>p</i> = 0.18
nuclear	165	51	102	12	
joint	137	50	93	4	
<b>History of physical illnesses</b>					$\chi^2 = 6.78$ <i>p</i> = 0.74
none	237	84	158	13	
cardiac illness	13	6	7	0	
respiratory illnesses	13	3	2	0	
diabetes	5	4	7	2	
cardiac + diabetes	1	4	10	1	
others	15	0	1	0	
<b>Past history of psychiatric illness</b>					$\chi^2 = 3.35$ <i>p</i> = 0.5
yes	13	3	8	2	
no	277	94	170	13	
maybe	12	4	7	1	

PSS – Perceived Stress Scale

and 7). Anxiety score on DASS 21 significantly correlated with marital status, working post and working area of subjects. Anxiety was higher in single than married subjects. Interns and resident doctors had significantly higher anxiety than others. Subjects who had COVID-19 duties had a higher level of anxiety than others (Tables 8 and 9).

On the Fear of COVID-19 Scale, 105 subjects reported that they had fear of coronavirus. 44 subjects also feared losing their life or dying of COVID-19. 14 subjects also reported that they had sleep disturbance because of worrying regarding getting COVID-19 (Table 10).

### Discussion

In our study, out of 302 subjects, 101 (33.44%) reported low stress, 185 (61.26%) moderate stress and 16 (5.30%) reported a high level of stress, on PSS. On DASS 21, 50 subjects reported to have stress, of whom 13 (4.30%) had mild, 5 (1.66%) had moderate, 13 (4.30%) had severe and 4 (1.32%) had extremely severe stress. On DASS 21, depression was reported by 56 (18.54%) subjects, of whom 18 (5.96%) had mild, 22 (7.28%) had moderate, 8 (2.65%) had severe and 8 (2.65%) had extremely severe depression. On the DASS 21 scale, 60 (19.87%) subjects were found to have anxiety, of whom 11 (3.64%) had mild, 24 (7.95%) moderate, 12 (3.97%) severe and 13 (4.30%) extremely severe anxiety. Stress score on PSS was significantly correlated with depression, anxiety and stress score on DASS 21.

Our results are consistent with a few recent studies. A very recent study among healthcare professionals in a tertiary infectious disease hospital for COVID-19 in China revealed a high incidence of anxiety and stress disorders among

Table 3. Presence of depression, stress and anxiety amongst health care workers

Depression	normal (0-9)	246
	mild (10-13)	18
	moderate (14-20)	22
	severe (21-27)	8
	extremely severe (28+)	8
Anxiety	normal (0-7)	242
	mild (8-9)	11
	moderate (10-14)	24
	severe (15-19)	12
	extremely severe (20+)	13
Stress	normal (0-14)	267
	mild (15-18)	13
	moderate (19-25)	5
	severe (26-33)	13
	extremely severe (34+)	4

frontline medical staff (Huang *et al.* 2020). Another study conducted in Singapore showed that out of 500 invited health care workers, 470 (94%) participated in the study; 68 (14.5%) participants screened positive for anxiety, 42 (8.9%) for depression, 31 (6.6%) for stress, and 36 (7.7%) for clinical concern of post-traumatic stress disorder (Tan *et al.* 2020). The study by Zhang *et al.* (2020) showed that medical health workers ( $n = 927$ ) had a higher prevalence of insomnia (38.4% vs. 30.5%,  $p < 0.01$ ), anxiety (13.0% vs. 8.5%,  $p < 0.01$ ), depression (12.2% vs. 9.5%,  $p < 0.04$ ), somatization (1.6% vs. 0.4%,  $p < 0.01$ ), and obsessive-compulsive symptoms (5.3% vs. 2.2%,  $p < 0.01$ ) when compared with non-medical health workers ( $n = 1,255$ ).

A very recent Indian study showed that out of 152 study participants, 34.9% were depressed

Table 4. Correlation between depression, anxiety and stress with perceived stress

DASS 21 scoring	PSS level			$\chi^2$ and $p$ -value
	Low ( $n = 101$ )	Moderate ( $n = 185$ )	High ( $n = 16$ )	
Depression				$\chi^2 = 56.66$ $p < 0.00001$
absent	246	97	146	
present	56	4	39	8
Anxiety				$\chi^2 = 37.64$ $p < 0.00001$
absent	242	95	142	
present	60	6	43	11
Stress				$\chi^2 = 37.91$ $p < 0.0001$
absent	267	101	158	
present	35	0	27	13

DASS 21 – Depression, Anxiety and Stress Scale 21 items, PSS – Perceived Stress Scale

**Table 5.** Association between work-related factors and perceived stress

Work-related details	Total (N = 302)	PSS			$\chi^2$ and p-value
		Low	Moderate	High	
Working post					$\chi^2 = 12.4$ $p = 0.13$
intern doctors	57	16	38	3	
resident doctors	87	27	51	9	
consultants	114	41	70	3	
nursing staff	9	1	8	0	
others	35	16	18	1	
Work experience					$\chi^2 = 10.6$ $p = 0.101$
< 1 year	82	22	53	7	
1-3 years	57	14	39	4	
> 3-10 years	79	28	49	2	
> 10 years	84	37	44	3	
Duty type					$\chi^2 = 1.78$ $p = 0.4$
fixed hours	284	94	176	14	
shift duties	18	7	9	2	
Duty hours/day					$\chi^2 = 10.42$ $p = 0.40$
≤ 5 hours	31	12	18	1	
6-8 hours	197	65	121	11	
> 8-12 hours	61	28	30	3	
> 12-24 hours	13	3	10	0	
Duty hours/week					$\chi^2 = 0.86$ $p = 0.65$
≤ 48 hours	187	65	111	11	
> 48 hours	115	36	74	5	
Working area					$\chi^2 = 3.94$ $p = 0.94$
COVID-19 duties	73	21	47	5	
non-COVID-19 routine consultations	130	43	80	7	
COVID-19 duties + non-COVID-19 routine consultations	21	8	13	0	
emergency duties (ICU, CCU, PICU, NICU, etc.)	62	22	36	4	
lab/paramedics/field duties	9	4	5	0	
administration	7	3	4	0	

PSS – Perceived Stress Scale, ICU – Intensive Care Unit, CCU – Critical Care Unit, PICU – Pediatric Intensive Care Unit, NICU – Neonatal Intensive Care Unit

and 39.5% and 32.9% had anxiety and stress, respectively (Chatterjee *et al.* 2020). Another Indian study by Deblina *et al.* (2020) showed that there are increased worries and apprehensions among the public regarding acquiring the COVID-19 infection. In that study, approximately, half of the population were healthcare professionals.

In our study, we did not find any correlation between stress and other socio-demographic variables such as age, family types and religion. But

stress on PSS was significantly correlated with gender as female subjects showed a significantly higher level of stress than males. Also we observed that depression and anxiety were significantly higher in interns and resident doctors and the depression score was significantly higher in those who had a past history of psychiatric illness. Subjects who had longer work experience had lower risk of depression. Anxiety was higher in single than married subjects. Interns and resident doctors had significantly higher anxiety than

**Table 6.** Association between depression, socio-demographic and personal factors

Socio-demographic and personal factors	Total (N = 302)	DASS Depression		$\chi^2$ and p-value
		Absent	Present	
Age				$\chi^2 = 5.25$ $p = 0.26$
21-30 years	176	137	39	
31-40 years	90	76	14	
41-50 years	11	10	1	
51-60 years	15	13	2	
> 60 years	10	10	0	
Gender				$\chi^2 = 1.18$ $p = 0.28$
male	189	158	31	
female	113	88	25	
Religion				$\chi^2 = 6.8$ $p = 0.07$
Hindu	281	232	49	
Muslim	15	11	4	
Christian	5	2	3	
others	1	1	0	
Marital status				$\chi^2 = 7.37$ $p = 0.06$
single	148	112	36	
married	150	131	19	
divorced/separated	3	2	1	
widow/widower	1	1	0	
Family types				$\chi^2 = 2.12$ $p = 0.14$
nuclear	165	129	36	
joint	137	117	20	
History of physical illnesses				$\chi^2 = 3.02$ $p = 0.69$
none	237	207	48	
cardiac illness	13	9	4	
respiratory illnesses	13	5	0	
diabetes	5	11	2	
cardiac + diabetes	1	13	2	
others	15	1	0	
Past history of psychiatric illness				$\chi^2 = 8.35$ $p = 0.015$
yes	13	8	5	
no	277	231	46	
maybe	12	7	5	

DASS – Depression, Anxiety and Stress Scale

others. Subjects who had COVID-19 duties had a higher level of anxiety than others who were posted for non-COVID-19 duties.

Our results were consistent with some other studies such as the study by Zhang *et al.* (2020), which showed that being female, and being at risk of contact with COVID-19 patients were the most common risk factors for insomnia, anxiety, obsessive-compulsive symptoms, and depression. Another study (Brooks *et al.* 2020) and a study by Kushal *et al.* (2018) showed that total working years as a health care professional

significantly negatively correlated with stress. This may be due to HCWs with more experience having gained various experiences and a strong sense of belonging to the organization; they might experience lesser stress than those with lesser work experience. Also significantly higher anxiety in HCWs with COVID-19 due to many reasons such as the increased workload created by such outbreaks, fears of contagion for themselves and their families, working with new and frequently changing protocols and PPE, caring for patients who are very sick and

**Table 7.** Association between work related factors and depression

Work-related details	Total (N = 302)	DASS Depression		$\chi^2$ and p-value
		Absent	Present	
Working post				$\chi^2 = 10.74$ $p = 0.029$
intern doctors	57	42	15	
resident doctors	87	67	20	
consultants	114	103	11	
nursing staff	9	6	3	
others	35	28	7	
Work experience				$\chi^2 = 8.62$ $p = 0.034$
< 1 year	82	64	18	
1-3 years	57	41	16	
> 3-10 years	79	65	14	
> 10 years	84	76	8	
Duty type				$\chi^2 = 0.010$ $p = 0.91$
fixed hours	284	232	52	
shift duties	18	14	4	
Duty hours/day				$\chi^2 = 2.26$ $p = 0.8$
≤ 5 hours	31	27	4	
6-8 hours	197	157	40	
> 8-12 hours	61	51	8	
> 12-24 hours	13	11	2	
Duty hours/week				$\chi^2 = 0.003$ $p = 0.96$
≤ 48 hours	187	152	35	
> 48 hours	115	94	21	
Working area				$\chi^2 = 9.43$ $p = 0.09$
COVID-19 duties	73	52	21	
non-COVID-19 routine consultations	130	112	18	
COVID-19 duties + non-COVID-19 routine consultations	21	15	6	
emergency duties (ICU, CCU, PICU, NICU, etc.)	62	53	9	
lab/paramedics/field duties	9	8	1	
administration	7	6	1	

DASS – Depression, Anxiety and Stress Scale, ICU – Intensive Care Unit, CCU – Critical Care Unit, PICU – Pediatric Intensive Care Unit, NICU – Neonatal Intensive Care Unit

quickly deteriorating and caring for colleagues who have also fallen ill (Maunder *et al.* 2003; Greenbaum 2020). Decisions have to be made fast, ranging from efficiently triaging and isolating patients with suspicion of infection, to deciding whether to shut down departments and operating theatres when a patient or staff member tests positive, all this whilst being on limited resources. The pressure to act timely and to successfully diagnose, isolate and treat has been overwhelming, especially amid intense public and media scrutiny. This is in concordance with experience in other countries (Koinis *et al.* 2015).

Previous experience from SARS and H1N1 epidemics underlines that the psychological

strain on healthcare professionals, who find themselves at the frontline of attempts to quell the outbreak, is significant (Huang *et al.* 2004; Goulia *et al.* 2010). Research into the psychological effects of infectious disease outbreaks such as SARS and pandemic flu (H1N1) shows consistent patterns of reactions and covers the experiences of staff in work, those in quarantine and those returning to work from time away sick. In the early rapid expansion phase of the SARS outbreak, similar to the current course of the COVID-19 pandemic, healthcare professionals reported feelings of extreme vulnerability, uncertainty and threat to life, alongside somatic and cognitive symptoms of anxiety (Huang *et al.* 2004), whilst during the 2009 H1N1 pan-



**Table 8.** Association between anxiety, socio-demographic and personal factors

Socio-demographic and personal factors	Total (N = 302)	DASS Anxiety		$\chi^2$ and p-value
		Absent	Present	
Age				$\chi^2 = 4.84$ $p = 0.30$
21-30 years	176	135	41	
31-40 years	90	76	14	
41-50 years	11	9	2	
51-60 years	15	12	3	
> 60 years	10	10	0	
Gender				$\chi^2 = 0.0$ $p = 0.98$
male	189	152	37	
female	113	90	23	
Religion				$\chi^2 = 1.99$ $p = 0.57$
Hindu	281	223	58	
Muslim	15	14	1	
Christian	5	4	1	
others	1	1	0	
Marital status				$\chi^2 = 10.06$ $p = 0.018$
single	148	111	37	
married	150	129	21	
divorced/separated	3	2	1	
widow/widower	1	0	1	
Family types				$\chi^2 = 0.14$ $p = 0.71$
nuclear	165	134	31	
joint	137	108	29	
History of physical illnesses				$\chi^2 = 3.07$ $p = 0.69$
none	237	203	52	
cardiac illness	13	9	4	
respiratory illnesses	13	5	0	
diabetes	5	11	2	
cardiac + diabetes	1	13	2	
others	15	1	0	
Past history of psychiatric illness				$\chi^2 = 3.84$ $p = 0.14$
yes	13	11	2	
no	277	224	53	
maybe	12	7	5	

DASS – Depression, Anxiety and Stress Scale

demographic more than half of healthcare workers in a Greek tertiary hospital reported moderately high anxiety and subsequent psychological distress (Goulia *et al.* 2010).

It has been seen in a previous study that health professionals often have better awareness, positive attitudes towards epidemics/pandemics and they often experience low levels of anxiety (Mishra *et al.* 2016). However, a study from Ethiopia reported poor knowledge and erroneous beliefs of healthcare professionals, during the Ebola virus outbreak in 2015,

and it urged for intense training of healthcare professionals (Abebe *et al.* 2016). Health care workers at a hospital with intense liaison psychiatric services felt less psychological impact. Health care workers at a hospital that provided staff with less frequent information about the pandemic, felt unprotected. Workers in work environments that had a high risk of infection felt more anxious and more exhausted. In the fight against the 2019 novel coronavirus, medical workers have been facing enormous pressure, including a high risk of infection and

**Table 9.** Association between work-related factors and anxiety

Work-related details	Total (N = 302)	DASS Anxiety		$\chi^2$ and p-value
		Absent	Present	
Working post				$\chi^2 = 10.53$ $p = 0.032$
intern doctors	57	43	14	
resident doctors	87	66	21	
consultants	114	101	13	
nursing staff	9	5	4	
others	35	27	8	
Work experience				$\chi^2 = 3.60$ $p = 0.31$
< 1 year	82	61	21	
1-3 years	57	44	13	
> 3-10 years	79	66	13	
> 10 years	84	71	13	
Duty type				$\chi^2 = 0.002$ $p = 0.96$
fixed hours	284	228	56	
shift duties	18	14	4	
Duty hours/day				$\chi^2 = 2.58$ $p = 0.76$
≤ 5 hours	31	28	3	
6-8 hours	197	156	41	
> 8-12 hours	61	50	11	
> 12-24 hours	13	11	2	
Duty hours/week				$\chi^2 = 1.90$ $p = 0.167$
≤ 48 hours	187	155	32	
> 48 hours	115	87	28	
Working area				$\chi^2 = 16.65$ $p = 0.0052$
COVID-19 duties	73	47	26	
non-COVID-19 routine consultations	130	110	20	
COVID-19 duties + non-COVID-19 routine consultations	21	16	5	
emergency duties (ICU, CCU, PICU, NICU, etc.)	62	55	7	
lab/paramedics/field duties	9	8	1	
administration	7	6	1	

DASS – Depression, Anxiety and Stress Scale, ICU – Intensive Care Unit, CCU – Critical Care Unit, PICU – Pediatric Intensive Care Unit, NICU – Neonatal Intensive Care Unit

**Table 10.** Fear of COVID-19 Scale

Answers	Questions						
	1	2	3	4	5	6	7
Strongly disagree	47	57	127	118	84	151	140
Disagree	95	113	130	101	115	119	115
Can't say	55	37	30	39	23	18	23
Agree	94	88	11	37	71	12	19
Strongly agree	11	7	4	7	9	2	5

inadequate protection from contamination, overwork, frustration, discrimination, isolation, patients with negative emotions, and a lack of contact with their families, and exhaustion. The severe situation is causing mental health problems such as stress, anxiety, depressive

symptoms, insomnia, denial, anger, and fear. These mental health problems not only affect the medical workers' attention, understanding, and decision making ability, which might hinder the fight against COVID-19, but could also have a lasting effect on their overall well-

being. Protecting the mental health of these medical workers is thus important for control of the epidemic and their own long-term health. On January 27, 2020, the National Health Commission of China published a national guideline of psychological crisis intervention for 2019 – nCoV (National Health Commission of the People's Republic of China, 2020). A few recent reports have shown that provision of adequate resources (e.g., medical supplies) and mental health support will bolster individual self-efficacy and confidence (Peter *et al.* 2020; Greenberg *et al.* 2020).

## Conclusions

We observed significant psychological impacts of the COVID-19 pandemic on HCWs. A few risk factors such as female gender, single marital status, past history of psychiatric illness, working as interns and residents doctors with lesser experience and high risk duty areas such as COVID-19 duties in a particular situation were significantly associated with psychological disturbances such as stress, depression and anxiety. So supporting the mental health of HCWs is a critical part of the public health response to maintain an adequate workforce and to maximize the ability of HCWs to face this pandemic. Also they need to be assessed periodically for the physical and psychological impact of this crisis and need to receive help in those areas which are disturbed.

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This is a cross sectional study with convenience sampling, so the results cannot be generalized. Forms were distributed via email, WhatsApp messages and Messenger, so the exact response rate cannot be determined. As self-reported scales were used, subjective bias may exist.

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