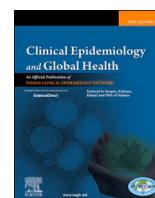ELSEVIER

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A cross sectional study on psychological impact of covid19 on post graduate doctors and Compulsory Rotatory Residential interns in COVID isolation ward of a tertiary care centre, Madurai

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ABSTRACT

Background: COVID-19 pandemic causes major impact on economic, physical, mental well-being of people all over the world. Doctors are working in stressful, unprepared, limited resource setting, and they are under the continuous threat of getting infection. Managing mental health of these warriors is great importance. Hence the present study to estimate the psychological impact of COVID-19* and factors associated with it among doctors in tertiary care hospital, Madurai.

Methods: A Cross-sectional study was conducted during October–November 2020 using a pre-designed semi structured questionnaire and DASS-21 scale which were sent through Google form to doctors who were in their quarantine period after the COVID duty. Totally 292 responses were received. Descriptive statistics done to find frequencies and percentages. Correlation for continuous variables; Univariate and multivariate regression for categorical variables were used to predict the factors influencing the psychological impact.

Results: In our study, 42.1% doctors were depressed, 43.8% were stressed and 50.7% had anxiety. Depression*, anxiety*, stress* scores were positively correlated with number of COVID duties(r^2 0.163,0.138,0.133), number of elderly persons(r^2 0.188,0.169,0.188) in their family and negatively correlated with sleep duration(r^2–0.219,-0.281,-0.239), attitude of study participants(r^2-0.319,-0.274,-0.291). Multiple logistic regression showed that disturbed sleep(odd'sratio = 3.931,2.734,3.420) and poor quality of sleep which affect the next day function (odd'sratio = 3.470,2.968,3.122) were significant predictors for all three psychological impacts.

Conclusion: High prevalence of psychological impact estimated, ensures the requirement of early screening with timely psychological intervention and establishment of guideline policies to support mental health of healthcare workers* for maintaining the functionality of healthcare system.

1. Introduction

There have been many epidemics in the recent past like SARS, Ebola, MERS etc., COVID 19 has quickly gained the attention of the world as it transcended from a WHO declared Public Health Emergency to a "Pandemic" status in the span of couple of months in March 11, 2020.[1] As on Jan. 22, 2021 a total of 96.2 Million infected cases with 2 Million deaths were reported in 222 countries.[2] The status of India as on 22nd Jan., 2021 is, 10.6 Million were infected with 153 thousand deaths, and the State of Tamil Nadu ranks second in the country.[3]

COVID-19 pandemic has caused a world-wide negative health impact among all populations and cross-sections of the society. The front line workers particularly the Health Care workers (HCWs) stand to face the

major impact of such a global disaster. Major challenges that the HCWs face during this pandemic are their work load; increased demand for personal protective equipment(PPE); sparse data availability on the disease biology; disease severity; disease/risk management; fear of infection for self and their family members; stigma; inability to cope with unfounded social media propagandas etc.[4] In addition, HCWs experience increased infection rate and high mortality, for e.g. the mortality rate among HCWs during COVID pandemic is higher than SARS and MERS mortality rates combined.[5] As a result, HCWs develop psychological disorders related to anxiety, depression and stress as reported during SARS outbreak.[6]

Lancee et al., 2008 has reported both short term and long term effects such as burnout, traumatic stress, anxiety and depression among HCWs

and stressed the need for the medical care of HCWs for their mental wellness.[7] 32% of HCWs reported depression during COVID-19 pandemic compared to a mere 10% reported depression among common public.[8] In a study from china stress, anxiety, depression and insomnia were at a rate of 73.4%, 44.7%, 50.7% and 36.1% respectively among HCWs during COVID pandemic.[9] Studies done in India showed alarmingly high number of health care workers experiencing mental overload (>40% prevalence) during this pandemic indicating that healthcare workers are the worst affected by the pandemic.[10–12] So this study was planned to understand the various psychological effects of COVID 19 pandemic in doctors working in tertiary care centre. It will provide the basis for further studies and guide the policy makers to provide guidelines for early screening and implementation of intervention programme for healthcare workers.

2. Objective

1. To estimate the prevalence of various psychological impacts (depression, anxiety, stress) of COVID 19 among Compulsory Rotatory Residential interns (CRRI's) and Postgraduates (PG) working in a tertiary care centre, Madurai
2. To determine the factors associated with these psychological impacts.

3. Materials and methods

A cross-sectional study was conducted among CRRI's and PG's of a tertiary care centre, who had completed their COVID duty. The study was conducted for two months from the month of October 2020 to November 2020. Our Institution is a tertiary care hospital which had received cases from nearby districts and also has admitted all types of COVID cases ranging from asymptomatic to severe cases. PGs and CRRI's who got an exemption from COVID duty; those who were on antidepressants and those who had not responded even after 3 reminders were excluded from the study. Sampling technique was not used. All doctors who performed COVID duty during our study period were included. Out of 368 doctors who have attended COVID duty at least one time during the study period, only 292 responded.

A validated predesigned semi-structured questionnaire was used for data collection. The questionnaire had two parts. The first part had questions to collect data on age, gender, educational qualification (UG/PG), PG speciality, marital status, number of children and elder persons in their family, history of known medical illness, intake of antidepressant, number of COVID duties done so far, time interval between duties, COVID related symptoms after COVID duty, COVID positivity status, sleep disturbances, duration of sleep. It also had questions to assess the attitude like satisfaction with safety precaution, worry about getting infected by COVID, worry about the source of infection. In second section, validated Depression, Anxiety, and Stress Scale 21 (DASS-21) was included.[13-16] DASS-21 questionnaire was designed to measure the emotional states like depression, anxiety, stress over the past 1 week. DASS 21 scales had 3 subscales in which each subscale consists of 7 questions. Each question had 4 point likert scale. The scale of depression assesses feelings of hopelessness, loss of interest and pleasure, dysphoria, self-deprecation, etc. The anxiety scale measures autonomic arousal, subjective, situational aspects of anxiety, etc. The stress scale assesses aspects such as inability to relax, being easily upset or irritated, and being impatient or over reactive. The rating scale was as follows: 0 – Did not apply to me at all, 1 – Applied to me to some degree, or some of the time, 2 – Applied to me to a considerable degree or a good part of time, 3 – applied to me very much or most of the time. The final score for the shorter version was multiplied by two to obtain the cumulative score.

Institute ethical committee approval was obtained for this study. Confidentiality was maintained throughout the period of study. All PGs and CRRIs in our hospital who were quarantined after completing

COVID duty were contacted through the telephone and were informed about the study objectives. After getting consent, questionnaire was sent through Google forms. Reminder messages were sent to all the study participants after one week irrespective of their response and thereafter once in every 3 days. The data collected in Google form was downloaded as excel format and Statistical analysis was done using SPSS version 21 and figures were drawn in Microsoft word. Descriptive statistics was used to find out the frequencies and percentages. To find out the association between two quantitative variables, spearman correlation test was done. To find out the association between two qualitative variables, chi-square test was used. Binary and multiple logistic regressions were used to find out the predictors of mental health outcome through unadjusted and adjusted odd's ratio respectively. For all the comparisons, $p < 0.05$ was considered statistically significant.

4. Results

Fig. 1 shows the distribution of age and gender of study participants. Mean age with standard deviation of study participants was 25.98 ± 4.25 in years. Out of 292 study participants 138 (47.3%) were males, 154 (52.7) were females. Majority 90.8% (n = 265) were under the age of 30.

Fig. 2 shows the distribution of depression, anxiety, and stress among doctors. Among the study participants, 123(42.1%) doctors were depressed, 39(13.4%) had mild and 41(14%), 21(7.2%), 22(7.5%) were had moderate, severe, extremely severe depression respectively. 128 (43.8%) doctors were stressed, 79(27.1%) had mild stress and 29(9.9%) had moderate stress, 13(4.5%) had severe stress, and 7(2.4%) doctors were had very severe stress. Out of the total 292 study participants, 148 (50.7%) were found to have anxiety and 28(9.6%), 64(21.9%), 21 (7.2%), and 35(12%) participants had mild, moderate, severe, and extremely severe anxiety, respectively.

Table 1 Shows association between depression and various factors using chi-square and binary logistic regression. Proportion of depressed was found to be high in females 70(45.5%) than males 53(38.4%). However this was not statistically significant. Compared to undergraduates, proportion of postgraduates depressed was 49.2% which was statistically significant with p-value of <0.001, unadjusted odd's ratio 0.398(0.235–0.673). Postgraduates belonged to clinical speciality, nonclinical speciality had 6 times and 2 times higher risk of developing depression than undergraduates and it was statistically significant. Risk of depression among doctors with chronic medical illness was 2.5 times higher than those without chronic medical illness and it was statistically significant. Out of 292 study participants, 11 did not attend the COVID training. Among them 9(81.8%) had depression symptoms which was comparatively higher than those who attended COVID training (40.6%). Risk of depression among doctors who developed COVID symptoms after their COVID duty was 2.3 times higher than those who did not developed COVID symptoms. Among 292 study participants, 25 doctors
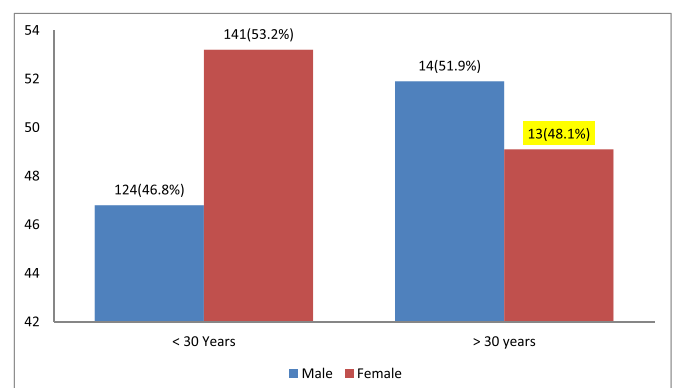

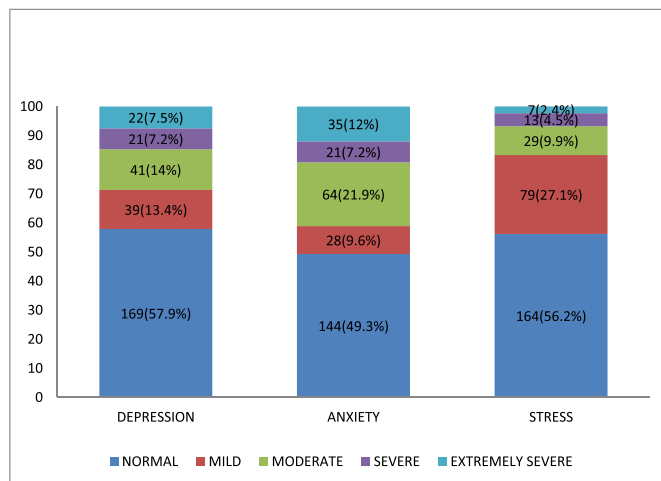**Fig. 1.** Distribution of Age and Gender of respondents (n = 292).

Fig. 2. Distribution of depression, Anxiety, Stress among Doctors (n = 292).

became COVID positive, among which 52% were found to have depression and proportion of depressed among doctors who did not became COVID positive was 41.2%. Doctors with sleep disturbances (63.6%), those who had poor quality of sleep affecting the next day function (51.9%) were predicted to have significantly higher risk of developing depression than their counterpart.

Table 2 shows the association between anxiety and various factors using chi-square and binary logistic regression. Proportion of Doctors with anxiety among females was 54.5% and males was 46.4%, but this was not statistically significant. Postgraduates (54.9%) had significantly

higher risk of developing anxiety than undergraduates (42.3%). Compared to undergraduates, clinical postgraduates had 3.2 times higher risk of developing anxiety which was statistically significant. But nonclinical postgraduates had only 1.56 times higher risk than undergraduates, and it was not significant. Proportion of doctors who developed anxiety among those with chronic medical illness (63.2%), who developed symptoms after COVID duty (59.7%), who had sleep disturbances (63.6%), who had poor quality of sleep affecting the next day function (53.5%) were higher than their counterparts and they were also statistically significant. Even though the proportion of doctors found to have anxiety among those who did not attend COVID training before duty and among those who became positive after their COVID duty were higher than their counterparts, they were not statistically significant.

Table 3 shows the association between stress and various factors using chi-square and binary logistic regression. Out of 292 study participants 148 had stress symptoms. Percentage of females doctors stressed was 54.5% and male doctors were 46.4% which was not statistically significant. Postgraduates had significantly higher risk of developing stress than undergraduates. Clinical postgraduates had 2.7 times higher risk (p value - 0.058), and nonclinical postgraduates had 1.7 times higher risk of developing stress (p value - 0.029) than undergraduates. Doctors who developed symptoms after COVID duty had 2.2 times higher risk of developing stress than those who did not developed symptoms and also doctors with sleep disturbances had 4.4 times higher risk and doctors with poor quality of sleep affecting the next day function had 4.7 times higher risk of developing stress than their counterparts. Factors like marital status, chronic medical illness, COVID training before duty, becoming COVID positive after COVID duty were not significantly associated with stress.

Table 1

Association between Depression and Various Risk factors among study participants (n = 292).

FACTORS	DEPRESSED n = 123 (%)	TOTAL n = 292 (%)	CHI-SQUARE P-VALUE	P- VALUE BY BINARY LOGISTIC REGRESSION	UNADJUSTED ODD'S RATIO (95% CI)
GENDER					
Male[r]	53(38.4)	138(100)			
Female	70(45.5)	154(100)	0.223	0.224	1.336(0.838–2.132)
EDUCATIONAL QUALIFICATION					
Undergraduate[r]	27(27.8)	97(100)			
Postgraduate	96(49.2)	195(100)	0.000*	0.001*	2.514 (1.487–4.251)
TYPE OF SPECIALITY					
Clinical	84(47.2)	166(100)			
Nonclinical	12(70.6)	17(100)		0.002*	6.222(2.002–19.336)
Undergraduates[r]	27(27.8)	97(100)	0.000*	0.002*	2.317(1.360–3.947)
MARITAL STATUS					
Unmarried[r]	100(42.5)	233(100)			
Married	23(39)	59(100)	0.584	0.585	0.850(0.474–1.524)
H/O CHRONIC MEDICAL ILLNESS					
No[r]	111(40.7)	273(100)			
Yes	12(63.2)	19(100)	0.053	0.062	2.502(0.955–6.553)
COVID TRAINING BEFORE DUTY					
Yes[r]	114(40.6)	281(100)			
No	9(81.8)	11(100)	0.007*	0.017*	6.592(1.398–31.076)
DEVELOP SYMPTOMS AFTER COVIDDUTY					
No[r]	87(37.8)	230(100)			
Yes	36(58.1)	62(100)	0.004*	0.005*	2.276(1.286–4.026)
BECAME COVID POSITIVE AFTER COVIDDUTY					
No[r]	110(41.2)	267(100)			
Yes	13(52)	25(100)	0.296	0.299	1.545(0.680–3.516)
SLEEP DISBURBANCES					
No[r]	41(25.2)	163(100)			
Yes	82(63.6)	129(100)	0.000*	0.000*	5.191(3.137–8.591)
FALL ASLEEP IF WAKE UP IN NIGHT					
Yes[r]	84(41)	205(100)			
No	39(44.8)	87(100)	0.542	0.542	1.170(0.706–1.941)
QUALITY OF SLEEP AFFECT THE NEXT FUNCTION					
No[r]	14(17.1)	82(100)			
Yes	109(51.9)	210(100)	0.000*	0.000*	5.242(2.776–9.899)

*- significant p-value (<0.05).
[r] Reference group.

Table 2

Association between Anxiety and Various Risk factors among study participants (n = 292).

FACTORS	ANXIETY n = 148(%)	TOTAL n = 292(%)	CHI-SQUARE P-VALUE	P- VALUE BY BINARY LOGISTIC REGRESSION	UNADJUSTED ODD'S RATIO (95% CI)
GENDER					
Male[r]	64(46.4)	138(100)			
Female	84(54.5)	154(100)	0.163	0.164	1.387(0.875–2.200)
EDUCATIONAL QUALIFICATION					
Undergraduate[r]	41(42.3)	97(100)			
Postgraduate	107(54.9)	195(100)	0.042*	0.043*	1.661 (1.016–2.716)
TYPE OF SPECIALITY					
Clinical	95(53.4)	178(100)			
Nonclinical	12(70.6)	17(100)		0.037*	3.278(1.071–10.030)
Undergraduates[r]	41(42.3)	97(100)	0.051	0.079	1.563(0.949–2.575)
MARITAL STATUS					
Unmarried[r]	115(49.4)	233(100)			
Married	33(55.9)	59(100)	0.367	0.368	1.302(0.733–2.313)
H/O CHRONIC MEDICAL ILLNESS					
No[r]	133(48.7)	273(100)			
Yes	15(78.9)	19(100)	0.011*	0.017*	3.947(1.277–12.197)
COVID TRAINING BEFORE DUTY					
Yes[r]	140(49.8)	281(100)			
No	8(72.7)	11(100)	0.136	0.151	2.686(0.698–10.333)
DEVELOP SYMPTOMS AFTER COVIDDUTY					
No[r]	106(46.1)	230(100)			
Yes	42(67.7)	62(100)	0.002*	0.003*	2.457(1.359–4.442)
BECAME COVID POSITIVE AFTER COVIDDUTY					
No[r]	134(50.2)	267(100)			
Yes	14(56)	25(100)	0.578	0.579	1.263(0.553–2.883)
SLEEP DISTURBANCES					
No[r]	60(36.8)	163(100)			
Yes	88(68.2)	129(100)	0.000*	0.000*	3.685(2.261–6.006)
FALL ASLEEP IF WAKE UP IN NIGHT					
Yes[r]	102(49.8)	205(100)			
No	52(52.9)	87(100)	0.626	0.626	1.133(0.686–1.872)
QUALITY OF SLEEP AFFECT THE NEXT FUNCTION					
No[r]	21(25.6)	82(100)			
Yes	127(60.5)	210(100)	0.000*	0.000*	4.445(2.519–7.842)

*- significant p-value (<0.05).

[r] Reference group.

Table 4 shows that Depression, Anxiety, Stress were positively correlated with the number of COVID duties and number of elder persons present in their family (p value < 0.05). As the number of duties and number of elder persons in the family increased, the depression, anxiety, stress scores were also increased among the doctors. All three parameters were negatively correlated with sleep duration and study participants attitude towards COVID 19 (p value < 0.05). All scores were increased among those who had less duration of sleep and those who had negative attitude towards COVID 19. Stress score was positively correlated with age which was statistically significant.

Table 5 shows multiple logistic regression analysis of various factors associated with depression, anxiety and stress. In binary logistic regression analysis, educational qualification, type of specialty, symptoms developed after COVID duty, sleep disturbances, poor quality of sleep affecting next day function were risk factors predicted to be significantly associated with depression, anxiety and stress. In addition to that factors like not attended training before their COVID duty, doctors with chronic medical illness were predicted to be significantly associated with depression and stress respectively. Factors which were statistically significant in binary logistic regression were analyzed in multivariate logistic regression and adjusted odds ratios were calculated. Risk of developing depression was predicted to be significantly higher among postgraduates both clinical and nonclinical (odd's ratio = 5.432(1.507–19.585), 1.876(1.018–3.457)), among those with sleep disturbances (odd's ratio = 4.005(2.323–6.905)) and those with poor quality of sleep affecting the next day function (odd's ratio = 3.425 (1.705–6.881)) than their counterparts. Risk of developing anxiety, stress were predicted to be significantly higher among those with sleep disturbances (odd's ratio = 2.758(1.636–4.649), 3.246(2.029–5.786)) and those with poor quality of sleep affecting the next day function

(odd's ratio = 2.942(1.608–5.383), 3.043(1.590–5.820)) than those without sleep disturbances and good quality of sleep respectively.

5. Discussion

The present study result revealed that 42.1% of study participants had depression, 43.8% had stress, and 50.7% had anxiety which is high compared to other studies done in India.[8,10,17] This study has been done exclusively among doctors in tertiary care hospital. So the number of severe and sick cases might have been more in the present study setting leading to increase in challenging situations and workload among doctors, justifying the higher prevalence. Females had higher proportion (45.5% of depression, 54.5% of anxiety, and 45.5% of stress) of psychological impact. However this was not statistically significant. Other studies done by Wilson et al. Lai et al., Shaukat et al. Imran N et al. showed statistically significant proportion of psychological morbidity among females.[18–21] Mean age of the study participants was 25.98 yrs. The present study results showed that old age was significantly associated with stress but not with depression and anxiety. This was similar to study done by Liang et al. where no statistically significant association was found between age and depressive symptoms.

In the present study participants, postgraduates had more prevalence of psychological morbidity than undergraduates which was statistically significant. Studies done by Wang et al. Gupta et al. also showed higher prevalence psychological impact among postgraduates.[22,31] This may be because postgraduates might had more responsibility in looking after COVID-19 units, intensive care units, thus perhaps being more exposed to patients leading to more psychological impacts in them than undergraduates.

Risk of anxiety and stress among the married persons was slightly

Table 3
Association between Stress and Various Risk factors among study participants (n = 292).

FACTORS	STRESS n = 128(%)	TOTAL n = 292(%)	CHI-SQUARE P-VALUE	P- VALUE BY BINARY LOGISTIC REGRESSION	UNADJUSTED ODD'S RATIO (95% CI)
GENDER					
Male[r]	58(42)	138(100)			
Female	70(45.5)	154(100)	0.556	0.556	1.149(0.723–1.827)
EDUCATIONAL QUALIFICATION					
Undergraduate[r]	33(34)	97(100)			
Postgraduate	95(48.7)	195(100)	0.017*	0.018*	1.842(1.112–3.054)
TYPE OF SPECIALITY					
Clinical	85(47.8)	178(100)			
Nonclinical	10(58.8)	17(100)		0.058	2.771(0.996–7.943)
Undergraduates[r]	33(34)	97(100)	0.042*	0.029*	1.773(1.061–2.960)
MARITAL STATUS					
Unmarried[r]	102(43.8)	233(100)			
Married	26(44.1)	59(100)	0.968	0.968	1.012(0.569–1.799)
H/O CHRONIC MEDICAL ILLNESS					
No[r]	116(42.5)	273(100)			
Yes	12(63.2)	19(100)	0.079	0.087	2.320(0.886–6.075)
COVID TRAINING BEFORE DUTY					
Yes[r]	120(42.7)	281(100)			
No	8(72.7)	11(100)	0.049*	0.064	3.578(0.930–13.771)
DEVELOP SYMPTOMS AFTER COVIDDUTY					
No[r]	91(39.6)	230(100)			
Yes	37(59.7)	62(100)	0.005*	0.005*	2.261(1.276–4.006)
BECAME COVID POSITIVE AFTER COVIDDUTY					
No[r]	116(43.4)	267(100)			
Yes	12(48)	25(100)	0.661	0.661	1.202(0.529–2.731)
SLEEP DISTURBANCES					
No[r]	46(28.2)	163(100)			
Yes	82(63.6)	129(100)	0.000*	0.000*	4.438(2.705–7.279)
FALL ASLEEP IF WAKE UP IN NIGHT					
Yes[r]	88(42.9)	205(100)			
No	40(46)	87(100)	0.631	0.631	1.132(0.683–1.873)
QUALITY OF SLEEP AFFECT THE NEXT FUNCTION					
No[r]	16(19.5)	82(100)			
Yes	112(53.3)	210(100)	0.000*	0.000*	4.714(2.562–8.674)

*- significant p-value (<0.05).

[r] Reference group.

Table 4
Correlation between continous variables and depression, anxiety, stress scores.

VARIABLE	DEPRESSION		ANXIETY		STRESS	
	R-VAUE	SIG.	R-VAUE	SIG.	R-VAUE	SIG.
AGE	0.106	0.071	0.077	0.187	0.153	0.009*
NUMBER OF COVID DUTIES	0.163	0.005*	0.138	0.018*	0.133	0.023*
DURATION BETWEEN DUTIES	−0.098	0.093	−0.033	0.571	−0.075	0.200
SLEEP DURATION	−0.219	0.000*	−0.281	0.000*	−0.239	0.000*
ATTITUDE SCORE	−0.319	0.000*	−0.274	0.000*	−0.291	0.000*
NO OF CHILDREN	0.082	0.165	0.098	0.095	0.090	0.125
NO OF ELDER PERSONS	0.188	0.001*	0.169	0.004*	0.188	0.001*

*- significant p-value (<0.05).

higher than unmarried persons which were not statistically significant. But Jain et al. and Dai et al. studies showed significant association between marital status and anxiety. Similar to Vaibhav et al. Banerjee et al. studies, the present study also predicted that doctors with pre-existing comorbidities had a statistically significantly higher risk of developing psychological impact (63.2%of depression, 78.9% of anxiety, 63.2% of stress)[12,23] than those without comorbidities. This may be because of their fear of self-infection and disease severity which would have made them susceptible to psychological impact. The present study predicted that presence of elder persons in their family was a significant risk factor for psychological impact but the presence of children in their family was not the risk factor. In contrast to this, study done by Elbay et al. found out that having a child was associated with lower DASS scores.[30] Elderly population are immune compromised and they are more prone for acquisition of any infection, their presence in home might have increased the psychological impacts among doctors due to fear of transmitting infection to them. Number of COVID duties done by doctors are also an important risk factor predicted to increase the psychological impact in our survey. Another study done in India also reported that long working hours further increase the risk of stress among the doctors.[10] Increase in working hours, increases the fear of acquisition of COVID infection due to increase in duration of exposure. It also increases the work load making the doctors more prone for psychological impact.

In the present study, 8.6% of doctors became COVID positive after their COVID duty which is comparatively higher than 2.6% in an another Indian study done by Chatterjee et al.[17] In the present study among those who had sleep disturbances 63.6% were depressed, 68.2% were anxious, and 63.6% were stressed. In an another study done in India among health care workers by Gupta et al. poor quality of sleep was associated with higher anxiety level(p value - <0.001).[22] Another observational study involving 180 medical staff dealing directly with COVID-19 patients also showed the substantial effect of stress and anxiety on the sleep quality.[27]

The present study results predicted that depression and stress was found to be high in those who have not attended COVID training before COVID duty. Naushed et al. study also reported that lack of training was one among the risk factors for developing psychological morbidities.[24,28] Another important finding in this study was that psychological comorbidities were less prevalent in those with positive attitude.[29] Like

Table 5

Factors associated with depression, anxiety, stress using multivariate logistic regression (N = 292).

FACTORS	DEPRESSION			ANXIETY			STRESS		
	p-value	Unadjusted odd's ratio (95% CI)	Adjusted odd's ratio (95% CI)	p-value	Unadjusted odd's ratio (95% CI)	Adjusted odd's ratio (95% CI)	p-value	Unadjusted odd's ratio (95% CI)	Adjusted odd's ratio (95% CI)
Educational qualification									
Undergraduate[r]		2.514	1.876		1.661	1.171		1.842	1.438
Postgraduate	0.044*	(1.487–4.251)	(1.018–3.457)	0.583	(1.016–2.716)	(0.666–2.058)	0.219	(1.112–3.054)	(0.806–2.568)
Speciality									
Undergraduates[r]		6.222	5.432		3.278	2.363		2.771	2.147
Clinical	0.010*	(2.002–19.336)	(1.507–19.585)	0.171	(1.071–10.03)	(0.690–8.087)	0.193	(0.996–7.943)	(0.679–6.795)
Nonclinical	0.044*	2.317	1.876	0.583	1.563	1.171	0.219	1.773	1.438
		(1.360–3.947)	(1.018–3.457)		(0.949–2.575)	(0.666–2.058)		(1.061–2.960)	(0.865–2.568)
Training attended									
Yes[r]		6.592	4.866		2.686	Not significant in Univariate analysis		3.578	Not significant in Univariate analysis
No	0.072	(1.398–31.076)	(0.869–27.248)	0.151	(0.698–10.333)		0.064	(0.930–13.771)	
Chronic Medical Illness									
Absent[r]		2.502	Not significant in Univariate analysis		3.947	1.966		2.320	Not significant in Univariate analysis
Present	0.062	(0.955–6.553)		0.280	(1.277–12.197)	(0.576–6.713)	0.087	(0.886–6.075)	
Developed symptoms after COVID duty									
No[r]		2.276	1.619		2.457	1.852		2.261	1.728
Yes	0.154	(1.286–4.026)	(0.834–3.144)	0.071	(1.359–4.442)	(0.950–3.610)	0.097	(1.276–4.006)	(0.905–3.298)
Sleep disturbances									
Absent[r]		5.191	4.005		3.685	2.758		4.438	3.246
Present	0.000*	(3.317–8.591)	(2.323–6.905)	0.000*	(2.261–6.006)	(1.636–4.649)	0.000*	(2.705–7.279)	(2.029–5.786)
Quality of sleep affect the next day function									
No[r]		5.242	3.425		4.445	2.942		4.714	3.043
Yes	0.001*	(2.776–9.899)	(1.705–6.881)	0.000*	(2.519–7.842)	(1.608–5.383)	0.001*	(2.562–8.674)	(1.590–5.820)

*-Statistically significant.

[r] Reference categories.

other previous studies done during various epidemics such as MERS, our study also found out that significant proportion of doctors had fear of self-infection (74%), possibility of being a source of infection (82.2%), but in contrast to previous studies HCW's in our study were more satisfied about the quality of PPE.[25,26]

Strengths of the present study were use of a validated tool for screening the psychological impact of study participants and it was exclusively done among doctors (undergraduates and postgraduates) who were directly involved in clinical care of the patient.

But however this study was conducted in tertiary care hospital in Madurai, which limits its generalisation to all doctors in community. Some of the responders might not heartfelt in providing information about their psychological problems that might have also affected the study results.

6. Conclusion

Significantly high proportions of doctors were affected psychologically by the COVID-19 crisis. Postgraduates, Doctors with chronic medical illness, elderly persons in their family were more prone to psychological impact. Increased number of COVID duties, sleep disturbances, duration of sleep significantly affected the mental health of doctors. All these necessitates the provision of training regarding recent treatment protocols of COVID 19; donning and doffing techniques and other infection control measures; family support; psychological counselling. Doctors with comorbidities can be considered for exemption from COVID duty to reduce the burden of psychological problems among them. Therefore the present study can provide base for further studies and guide the policy makers to provide guidelines for early screening and implementation of intervention programme for mental wellbeing of HCW's.

Abbreviations

SARS	Severe Acute Respiratory Syndrome
MERS	Middle East Respiratory Syndrome
COVID-19	Corona Virus Disease-19
WHO	World Health Organization
HCW	Health Care Worker
PPE	Personal Protective Equipment
CRRI	Compulsory Rotatory Residential Internship
PG	Post Graduate
UG	Under Graduate
DASS-21	Depression Anxiety Stress Scale-21
SPSS	Statistical Package for the Social Science

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