Original Research Article

Assessment of physical and mental health status of doctors working in COVID-19 pandemic

Dimple Sahni[1]*, Rajwant Kaur[1], Girish Sahni[2], Sanjeev Bhagat[1], Pawan Kumar[3], Niraj Mittal[4]

[1]Department of Otorhinolaryngology, Government medical College and hospital, Patiala, Punjab, India
[2]Department of Orthopaedics, government medical College and hospital, Patiala, Punjab, India
[3]Department of Orthopaedics, AP Trauma centre and hospital, Patiala, Punjab, India
[4]Department of Psychiatry, Government Medical College, Patiala, Punjab, India

*Correspondence:
Dr. Dimple Sahni,
E-mail: dimplesahnidr@gmail.com

ABSTRACT

Background: The objective of this study was to assess physical and mental health hazards among doctors working in COVID-19 pandemic.
Methods: Online questionnaire sent to approximately 2500 doctors across India, 1214 responded back. Questionnaires comprised demographic variables, marital status, any associated comorbidities, educational level, geographic area according to red, green and orange zone; workplace characteristics (frontline or second-line), place of posting, change in appetite or sleep, whether sampled for COVID-19, and if positive kind of symptoms. Mental health was assessed using four scales like, 7 item insomnia severity index, 7 items generalized anxiety disorder, 9-item patient health questionnaire, and 22 items impact of event scale-revised, to evaluate severity of symptoms anxiety, depression, insomnia, and distress, respectively. Data analysed using IBM SPSS statistical software version 22. Four scale taken as interquartile and median. Kruskal-Wallis test and person chi square were used for comparison. Multinomial logistic regression model used.
Results: 1214 respondents 25% had headache, 8% anosmia, 7% throat pain or cough, and skin allergy 5%, overall anxiety, depression, insomnia and distress found 38%, 36%, 27%, and 18% respectively.
Conclusions: Study evaluated that doctors working in pandemic are under physical and mental stress.

Keywords: Corona virus, Frontline worker, COVID-19, Anxiety, Depression, Containment zones

INTRODUCTION

COVID-19 pandemic has directly impacted the lives and well-being of millions of the people throughout the world. The highly infectious disease caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2). In India the first confirmed index case of COVID-19, was a migrant from China, noticed in Thrissur Kerala on 30 January 2020.[1] Currently India maintained top global ranking with caseload mounted to 66, 85,083 with the death toll climbed to 1, 03,569, and 9, 19,023 active cases while as many as 56, 62,491 people have recovered

according to Ministry of Health and Family Welfare updated data.[2]

In this critical situation, as the number of cases are increasing at a rapid pace which ultimately imposes a binding constraint on the healthcare sector mainly the doctors. Doctors working as frontline (directly involved in diagnosis, treatment, testing of the COVID-19 patient) and second line (doing OPD, emergency and private practices) healthcare providers are all at high risk of developing health issues both physical as well as mental. So, with increasing number of cases India is near the peak with maximum consumption of healthcare system.

Indian Government had announced nation-wide lockdown from 25 march 2020, with expectation to slow down the disease transmission and providing much needed breathing space to health system (which has limited resources) to deal with rising number of cases.

That gave promising optimistic result, but situation started worsening when un-lock down was started. And the pressure on the doctors continued to intensify. That was mainly of two type; firstly, the potential overwhelming burden of illness that already break the back bone of our health system, and the lack of fully trained manpower and specific treatment of infection. Extensive media coverage, feeling of being unsupported, lack of proper training, worry for treating serious patient are enough to overburden the medicos. Secondly due to shortage of the required staff (as a doctor take approximately 6-12 years to acquire the necessary qualification), the total requirement of medicos cannot be full filled in a short run, to overcome this the already trained staff have to work for 8 hours or even more for uninterrupted medical facilities. Even many of them were lacking in required experience, knowledge and, even proper donning and doffing of PPE.

So, this extreme fatigue and psychological stress challenging their immune system and but also increasing susceptibility for the virus. Right from dealing with the risk of contracting this virus, working for long hours, and experiencing occupational distress, to enduring physical violence as well as social stigma, doctors are not breathing easy. In China by Feb 2020, 1716 medicos were infected by this virus, 1502 were from Wuhan and unfortunately six died because of it.[3] More than 260 doctors have succumbed to COVID-19 across the country till 21 August 2020 due to COVID-19 related complication, 4 deaths were pandemic related violent deaths, including 3 road accidents and one suicide. Majority of the them were below 60 years and were general practitioners this data definitely was making them anxious.[4]

Doctors are also concerned about the transmission of this pathogen to their family members especially who are, immunocompromised, elderly or having comorbidities. Due to this impending fear majority of them are residing away from their family and rest who are going home had created safe physical distance from their loved one.

All these factors collectively increase the unprecedented stress among the doctors to take hasty action in less time to prepare for this pandemic, and which directly or indirectly effecting their physical and mental health.

The aim and objective of this study was to evaluate the health hazards and mental health outcomes among Indian doctors working in COVID-19 pandemic by quantifying the magnitude of symptoms of anxiety, depression, insomnia, and distress, and to analyze the potential risk factors associated with these symptoms.

METHODS

Study design

Cross sectional study, the national data was collected using predesigned online questionnaire and the results was interpreted accordingly. The survey was anonymous and during data collection outmost confidentiality was maintained throughout.

Procedure

The present study is a web based cross sectional study and data collected over period of one-month from 15 August to 15 September 2020 when India was facing its pandemic peak with maximum utilization of healthcare. Institutional ethical committee approval was obtained. The online questionnaire was sent to approx. 2500 doctors working in COVID-19 pandemic across the nation via online link using social media like email, whats app, and facebook. 1214 responded and their consent for participation was obtained. These doctors were working in COVID-19 pandemic both in government and private health system. Questionaries' comprised 32 different questions and four scales. Initial questions were related to demographic data i.e. sex, age, marital status, if married number of kids, family status (nuclear or joint) or residing with family or away, and if joint any elderly member above 50 years, geographic location state wise and COVID-19 zone. The zones were divided on the basis of areas: red zone where number of COVID-19 infection was high, orange zone had fewer cases and green zone with no active case during the last 21 days. Zone were further divided into micro level as containment and non-containment zone.[5] Question about their education (graduate or postgraduate), designation (medical officer, junior or senior resident, consultant, and private practitioner), type of hospital (primary, secondary, tertiary health care centre or private practice) were asked. Leading question were asked about their health care role as frontline (directly working in COVID-19 area, sampling, testing lab) and second line worker (working in flu corner/ patient screening, OPD, and emergency). Related questions about their duty hours and relaxation time, personal protective gears provided, workload (no. of patients/day) were also asked. To assess the physical health doctors were asked about any kind of body discomfort, change in their appetite and sleeping patterns while working in COVID-19 pandemic. The additional questions about their recreational activities were asked to know how they were relaxing in their free hours or quarantine period.

For the assessment of mental health 4 scale were used. The 7-item insomnia severity index; with range of 0-28), the 7-items generalized anxiety disorder (GAD-7 with range 0-21), the 9-item patient health questionnaire (PHQ-9 with range of 0-27), and the 22 items impact of event scale-revised (IES-R; range, 0-88), were used to evaluate the severity of symptoms of anxiety, depression, insomnia, and distress, respectively. The obtained scores was

interpreted as follows; normal, mild, moderate, and severe.[7-10] The IES-R is quite helping tool for measuring the effect of routine life stress, everyday traumas and acute stress.

Statistical analysis

Data was analyzed using IBM SPSS statistical software version 22, the significance level was set at $p<0.05$. The four main score (GAD-7, PHQ-9, ISI, and IES-R) were taken as interquartile and median (as not normally distributed). Kruskal-Wallis test and Person Chi Square were used for comparison of each symptom between the groups. Multinomial logistic regression model was used, to explore the association between risk factors and outcome manifested and odds ratio (OR) and 95% CIs for the confounding factors was taken into consideration.

RESULTS

Among the 1214 participants, the age ranged from 21-69 years with mean $\pm$SD 36.68$\pm$9.51, maximum participants were of 31-40 years (34.60%). Majority of the doctors were females comprising 53.21% and 46.79% were male. 64.66% medicos were married and 33.69% were unmarried. 34% were working in red zone, 40% in orange zone, and rest 26% in the green zone. And those who were married 55.6 % of them were having kids (Table 1). 522 doctors had joint family setup with 93.49% had elderly above 50 living with them. 21% of the doctors had comorbidities, hypertension was most common followed by diabetes mellitus, hypothyroidism and bronchial asthma. 70.68% medicos were postgraduate with majority of them were MD Medicine (16.90%), followed by Otorhinolaryngology (16.67%) and MD Anesthesia (10.84%). About 32.62% doctors were working as medical officers, 22.90% as junior residents, consultants 18.29% followed by senior residents 13.18% and rest were private practitioners (Figure 1).
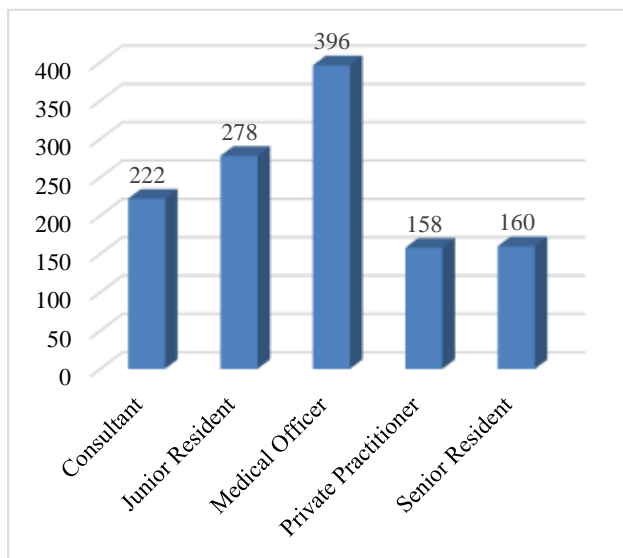

Figure 1: Designation of doctors.

Maximum participants were working at tertiary care centre (45.14%) and 21.25% were doing private practice. Almost 412 doctors were working as frontline and rest 802 as second line (Figure 2).
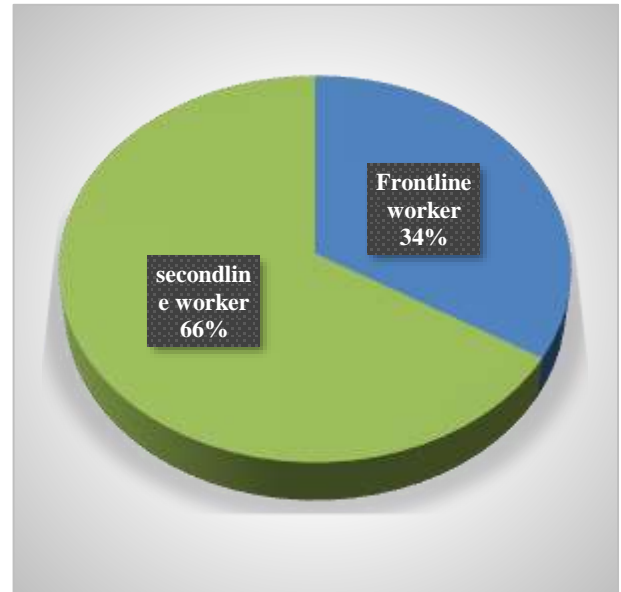

Figure 2: Doctors working on frontline and second line.

Majority of them (36.66%) were doing 12 hours duty, and 33.33% were working for 8 hours, and 13.26% of the doctors worked for 24 hours. 72% of the medicos had 12 hours relaxation time after their duties hours, 23% had only 6 hours of relaxation. When we asked them about their workload (number of patients/day) then we had a mean of 46.81$\pm$78.56 with the range of 1-500 patients daily. Inspite of their heavy working hours, 65% of the doctors didn't complaint of any kind of body discomfort. But 25% of them had headache, followed by anosmia (8%), throat pain or cough (7%) and skin allergy (5%) due PPE kit and profuse sweating. Dehydration and fatigue were some of the other major issues that were negatively impacting doctor's efficiency (Figure 3).

Sleep disturbance was seen among 419 of the doctors (38% were female and 31% were male), and unfortunately 13% among them were forced to take sleep inducing pills (Figure 4).

63% had noticed no change in their appetite, but 22% noticed that their appetite was decreased and rest 15% had increased appetite (14.7% were female and 15.1% were male). About any accidental exposure during their duties as frontline or second line, only 48% were confidently denied about any kind of exposure. 22% were in dilemma to accept any accidental exposure. Only 5% were assured for accidental exposure while others didn't respond to it. 80% of doctors were sampled for COVID-19, and those who were tested only 148 were found to be positive.129 doctors had symptoms like high grade fever, body aches, sore throat, anosmia, loss of taste, and few had breathing

difficulties, and other 19 were totally asymptomatic. All positive doctors were provided with quarantine medical leave and all essential medical facilities.
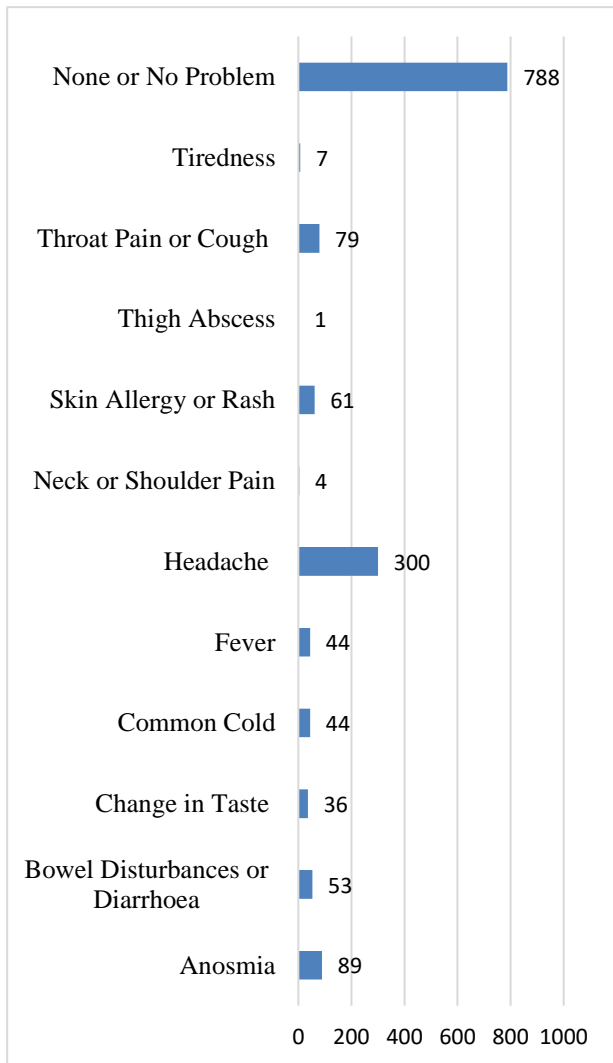

Figure 3: Body discomfort among doctors.

In addition to this excessive work load, our doctors were unfortunately facing one most inhuman event of public ire. 14% of them faced it, in form of verbal abuse, or physical harm. This was the most unbearable and unethical offence that doctors were facing during this pandemic that added to their mental stress.

Severe anxiety reported among male as compared to female was; 23(57.5%) vs 17(17.5%) (p=0.001), whereas married and young people were having more severe anxiety as compared to unmarried people; 33(88.5%) vs 7 (17.5%) respectively with p=0.084. Medical officer 24(60%) experienced severe anxiety as compared to senior and junior doctors 6(15%) each and only 4(10%) among the consultant (p= 0.001), whereas frontline worker 23(57.5%) had severe anxiety followed by second line worker 17 (42.5%) (p=0.001).

Severe depression among male as compared to female; 27(58.7%) and 19(41.3%) respectively with p=0.014 was noted. Private practitioner were experiencing severe depression 20(43.5%), followed by primary health care medico 16(34.8%), secondary health care doctors 6(13%) and tertiary health care doctors 4(8.7%) respectively with p=0.001. Severe depression among medical officer 18(39.1%), consultant 9(19.6 %), private practitioner 8(17.4%), junior resident 6(13%) and senior resident 5(10.9%) respectively with p=0.001. Second line worker (63%) were facing approx. twice more severe depression than front line worker (37%) with p=0.039 (Table 2-3).

But severe degree of insomnia was not that significant among medicos. However moderate insomnia was seen among 43 females and 17 males. 28 married doctors had moderate insomnia whereas 15 unmarried had moderate insomnia. When comparing postgraduate with graduate moderate insomnia was 23(54%), and 20(47%) respectively with p=0.001. Moderate insomnia among private practitioner, doctors at primary health care centre, secondary health care centre, and tertiary health care centre, was 10(23%), 6(14%), 18(42%), 9(21%) with p=0.013. Senior resident, consultant, medical officer, and private practitioner, had moderate insomnia 6(14%), 1(2.3%), 26(61%), and 10(23.3%) respectively with p=0.001. Moderate insomnia among frontline as compared to second line worker was 12(28%) vs 31(72%) with p=0.002.

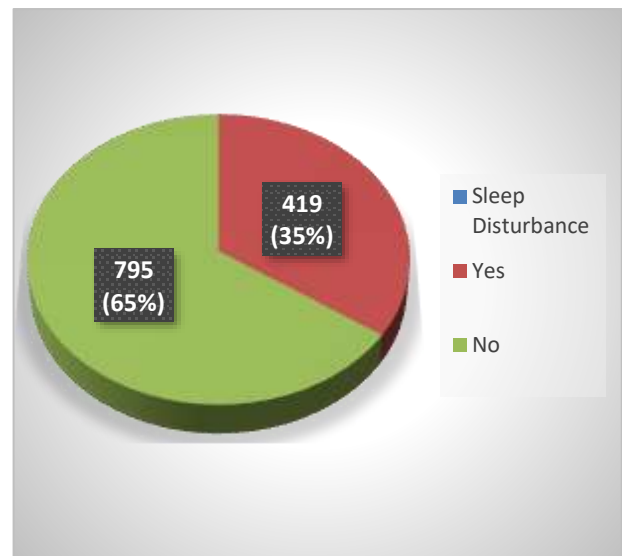**Figure 4: Sleep disturbance present among doctors.**

However severe level of distress among male doctors 47(57.3%) vs female 35(42.7%) with p=0.001, government doctors vs private practitioner was 54(66%) vs 28(34%) respectively with p=0.001 was observed. Medical officer had experienced maximum severe distress 46(56.1%), whereas second line worker faced 63(76.8%) vs. frontline worker 19(23.2%) with p=0.082 (Table 4).

Table 1: Sample characteristics of participants according to geographical area*.

Variables		Total (n=1214)	Red (n=412)	Orange (n=489)	Green (n=313)
		N (%)	N (%)	N (%)	N (%)
Gender	Female	646 (53.21)	198 (48.06)	274 (56.03)	174 (55.59)
	Male	568 (46.79)	214 (51.94)	215 (43.97)	139 (44.41)
Age	Mean±SD	36.68±9.51	36.89±9.81	36.61±9.30	36.50±9.45
Marital status	Married	805 (66.31)	277 (67.23)	331 (67.69)	197 (62.94)
	Unmarried	409 (33.69)	135 (32.77)	158 (32.31)	116 (37.06)
Education level	Graduate	356 (29.32)	102 (24.76)	137 (28.02)	117 (37.38)
	Postgraduate	858 (70.68)	310 (75.24)	352 (71.98)	196 (62.62)
Place of posting	Primary healthcare centre	172 (14.17)	60 (14.56)	52 (10.63)	60 (19.17)
	Secondary healthcare centre	236 (19.44)	50 (12.14)	103 (21.06)	83 (26.52)
	Tertiary healthcare centre	548 (45.14)	235 (57.04)	207 (42.33)	106 (33.87)
	Private practice	258 (21.25)	67 (16.26)	127 (25.97)	64 (20.45)
Designation	Junior resident	278 (22.90)	107 (25.97)	104 (21.27)	67 (21.41)
	Senior resident	160 (13.18)	50 (12.14)	64 (13.09)	46 (14.70)
	Consultant	222 (18.29)	84 (20.39)	84 (17.18)	54 (17.25)
	Medical officer	396 (32.62)	134 (32.52)	148 (30.27)	114 (36.42)
	Private practitioner	158 (13.01)	37 (8.98)	89 (18.20)	32 (10.22)
Health care role	Frontline	410 (33.77)	210 (50.97)	129 (26.38)	71 (22.68)
	Second-line	804 (66.23)	202 (49.03)	360 (73.62)	242 (77.32)
GAD-7 score	Median (IQR)	3 (0-7)	3 (1-7)	3 (0-7)	1 (0-5)
PHQ-9 score	Median (IQR)	3 (0-7)	4 (1-7)	3 (0-6)	1 (0-4)
ISI score	Median (IQR)	4 (1-8)	6 (2-9)	4 (1-8)	2 (1-6)
IES-R score	Median (IQR)	11 (2-22)	14 (5-23)	11 (2-22)	6 (0-18)

*Zone are divided by Indian Ministry of Health during lockdown period divided the district in these zones at macro level and containment zone at micro level. Abbreviation 7 item Insomnia Severity Index (ISI); the 7 items Generalized Anxiety Disorder (GAD-7), 9-item Patient Health Questionnaire (PHQ-9), and the 22 items Impact of Event Scale-Revised (IES-R). IQR (interquartile range).

Table 2: According to severity of anxiety, depression, insomnia and distress measurements in total cohorts and subgroups using Person chi square test and Kruskal-Wallis test.

Person Chi Square test Severity category	Total N (%)	Gender Female	Male	P value	Marital Married	Unmarried	P value	Education Graduate	Postgraduate	P value	Place Primary healthcare centre	Secondary healthcare centre	Tertiary healthcare	Private practice	P value	Designation Junior resident	Senior resident	Consultant	Medical officer	Private practitioner	P value	Health care role Frontline	Second-line	P value
GAD-7 Anxiety																								
Normal	754 (62.1)	380 (50.4)	374 (49.6)	0.001 (19.968)	488 (64.7)	266 (35.3)	0.084 (6.657)	193 (25.6)	561 (74.4)	0.001 (29.021)	110 (14.6)	137 (18.2)	351 (46.6)	156 (20.7)	0.001 (58.078)	192 (25.5)	106 (14.1)	138 (18.3)	212 (28.1)	106 (14.1)	0.001 (36.999)	270 (35.8)	484 (64.2)	0.001 (37.753)
Mild	332 (27.3)	184 (55.4)	148 (44.6)		228 (68.7)	104 (31.3)		112 (33.7)	220 (66.3)		34 (10.2)	66 (19.9)	164 (49.4)	68 (20.5)		68 (20.5)	41 (12.3)	62 (18.7)	123 (37)	38 (11.4)		110 (33.1)	222 (66.9)	
Moderate	88 (7.2)	65 (73.9)	23 (26.1)		56 (63.6)	32 (36.4)		44 (50)	44 (50)		10 (11.4)	21 (23.9)	27 (30.7)	30 (34.1)		12 (13.6)	7 (8)	18 (20.5)	37 (42)	14 (15.9)		7 (8)	81 (92)	
Sever	40 (3.3)	17 (42.5)	23 (57.5)		33 (82.5)	7 (17.5)		7 (17.5)	33 (82.5)		18 (45)	12 (30)	6 (15)	4 (10)		6 (15)	6 (15)	4 (10)	24 (60)	0 (0.0)		23 (57.5)	17 (42.5)	
PHQ-9 depression symptoms																								
Normal	774 (63.8)	386 (49.9)	388 (50.1)	0.014 (10.545)	528 (68.2)	246 (31.8)	0.015 (10.521)	202 (26.1)	572 (73.9)	0.015 (10.521)	116 (15)	134 (17.3)	340 (43.9)	184 (23.8)	0.001 (69.935)	189 (24.4)	93 (12)	161 (20.8)	209 (27)	122 (15.8)	0.001 (93.516)	260 (33.6)	514 (66.4)	0.039 (8.365)
Mild	316 (26.0)	183 (57.9)	133 (42.1)		192 (60.8)	124 (39.2)		93 (29.4)	223 (70.6)		32 (10.1)	80 (25.3)	158 (50)	46 (14.6)		70 (22.2)	60 (19)	50 (15.8)	114 (36.1)	22 (7)		117 (37)	199 (63)	
Moderate	78 (6.4)	50 (64.1)	28 (35.9)		48 (61.5)	30 (38.5)		47 (60.3)	31 (39.7)		8 (10.3)	16 (20.5)	46 (59.)	8 (10.3)		13 (16.7)	2 (2.6)	2 (2.6)	55 (70.5)	6 (7.7)		16 (20.5)	62 (79.5)	
Sever	46 (3.8)	27 (58.7)	19 (41.3)		37 (80.4)	9 (19.6)		14 (30.4)	32 (69.6)		16 (34.8)	6 (13)	4 (8.7)	20 (43.5)		6 (13)	5 (10.9)	9 (19.6)	18 (39.1)	8 (17.4)		17 (37)	29 (63)	
ISI insomnia symptoms																								
Absence	882 (72.7)	445 (50.5)	437 (49.5)	0.001 (20.767)	599 (67.9)	283 (32.1)	0.013 (10.811)	236 (26.8)	646 (73.2)	0.001 (21.188)	124 (14.1)	179 (20.3)	383 (43.4)	196 (22.2)	0.001 (46.256)	194 (22)	115 (13)	181 (20.5)	274 (31.1)	118 (13.4)	0.001 (62.770)	277 (31.4)	605 (68.6)	0.002 (14.518)
Subthreshold	285 (23.5)	180 (63.2)	105 (36.8)		178 (62.5)	107 (37.5)		96 (33.7)	189 (66.3)		42 (14.7)	39 (13.7)	156 (54.7)	48 (16.8)		84 (29.5)	39 (13.7)	36 (12.6)	96 (33.7)	30 (10.5)		121 (42.5)	164 (57.5)	
Moderate	43 (3.5)	17 (39.5)	26 (60.5)		28 (65.1)	15 (34.9)		20 (46.5)	23 (53.5)		6 (14)	18 (41.9)	9 (20.9)	10 (23.3)		0 (0)	6 (14)	1 (2.3)	26 (60.5)	10 (23.3)		12 (27.9)	31 (72.1)	
Sever	4 (0.3)	4 (100)	0 (0)		0 (0)	4 (100)		4 (100)	0 (0)		0 (0)	0 (0)	0 (0)	4 (100)		0 (0)	0 (0)	4 (100)	0 (0)	0 (0)		0 (0)	4 (100)	

Continued.

Kruskal-Wallis test Severity category	Total N (%)	Gender Female	Male	P value	Marital status Married	Unmarried	P value	Education level Graduate	Postgraduate	P value	Place of posting Primary healthcare centre	Secondary healthcare centre	Tertiary healthcare	Private practice	P value	Designation Junior resident	Senior resident	Consultant	Medical officer	Private practitione	P value	Health care role Frontline	Second-line	P value
GAD-7 Anxiety																								
Normal	754 (62.1)	380 (50.4)	374 (49.6)		488 (64.7)	266 (35.3)		193 (25.6)	561 (74.4)		110 (14.6)	137 (18.2)	351 (46.6)	156 (20.7)		192 (25.5)	106 (14.1)	138 (18.3)	212 (28.1)	106 (14.1)		270 (35.8)	484 (64.2)	
Mild	332 (27.3)	184 (55.4)	148 (44.6)		228 (68.7)	104 (31.3)		112 (33.7)	220 (66.3)		34 (10.2)	66 (19.9)	164 (49.4)	68 (20.5)		68 (20.5)	41 (12.3)	62 (18.7)	123 (37)	38 (11.4)		110 (33.1)	222 (66.9)	
Moderate	88 (7.2)	65 (73.9)	23 (26.1)	0.001 (19.951)	56 (63.6)	32 (36.4)	0.084 (6.652)	44 (50)	44 (50)	0.001 (28.997)	10 (11.4)	21 (23.9)	27 (30.7)	30 (34.1)	0.001 (29.963)	12 (13.6)	7 (8)	18 (20.5)	37 (42)	14 (15.9)	0.015 (10.529)	7 (8)	81 (92)	0.001 (37.722)
Sever	40 (3.3)	17 (42.5)	23 (57.5)		33 (82.5)	7 (17.5)		7 (17.5)	33 (82.5)		18 (45)	12 (30)	6 (15)	4 (10)		6 (15)	6 (15)	4 (10)	24 (60)	0 (0.0)		23 (57.5)	17 (42.5)	
PHQ-9 depression symptoms																								
Normal	774 (63.8)	386 (49.9)	388 (50.1)		528 (68.2)	246 (31.8)		202 (26.1)	572 (73.9)		116 (15)	134 (17.3)	340 (43.9)	184 (23.8)		189 (24.4)	93 (12)	161 (20.8)	209 (27)	122 (15.8)		260 (33.6)	514 (66.4)	
Mild	316 (26.0)	183 (57.9)	133 (42.1)		192 (60.8)	124 (39.2)		93 (29.4)	223 (70.6)		32 (10.1)	80 (25.3)	158 (50)	46 (14.6)		70 (22.2)	60 (19)	50 (15.8)	114 (36.1)	22 (7)		117 (37)	199 (63)	
Moderate	78 (6.4)	50 (64.1)	28 (35.9)	0.015 (10.536)	48 (61.5)	30 (38.5)	0.015 (10.512)	47 (60.3)	31 (39.7)	0.001 (39.892)	8 (10.3)	16 (20.5)	46 (59)	8 (10.3)	0.029 (7.433)	13 (16.7)	2 (2.6)	2 (2.6)	55 (70.5)	6 (7.7)	0.001 (18.061)	16 (20.5)	62 (79.5)	0.049 (7.840)
Sever	46 (3.8)	27 (58.7)	19 (41.3)		37 (80.4)	9 (19.6)		14 (30.4)	32 (69.6)		16 (34.8)	6 (13)	4 (8.7)	20 (43.5)		6 (13)	5 (10.9)	9 (19.6)	18 (39.1)	8 (17.4)		17 (37)	29 (63)	
ISI insomnia symptoms																								
Absence	882 (72.7)	445 (50.5)	437 (49.5)	0.001 (20.750)	599 (67.9)	283 (32.1)	0.013 (10.802)	236 (26.8)	646 (73.2)	0.001 (21.170)	124 (14.1)	179 (20.3)	383 (43.4)	196 (22.2)	0.013 (10.817)	194 (22)	115 (13)	181 (20.5)	274 (31.1)	118 (13.4)	0.001 (25.014)	277 (31.4)	605 (68.6)	0.002 (14.506)
Subthreshold	285 (23.5)	180 (63.2)	105 (36.8)		178 (62.5)	107 (37.5)		96 (33.7)	189 (66.3)		42 (14.7)	39 (13.7)	156 (54.7)	48 (16.8)		84 (29.5)	39 (13.7)	36 (12.6)	96 (33.7)	30 (10.5)		121 (42.5)	164 (57.5)	

	Total	Gender		Marital status		Education level		Place of posting				Designation					Health care role	
Moderate	43 (3.5)	17 (39.5)	26 (60.5)	28 (65.1)	15 (34.9)	20 (46.5)	23 (53.5)	6 (14)	18 (41.9)	9 (20.9)	10 (23.3)	0 (0)	6 (14)	1 (2.3)	26 (60.5)	10 (23.3)	12 (27.9)	31 (72.1)
Sever	4 (0.3)	4 (100)	0 (0)	0 (0)	4 (100)	4 (100)	0 (0)	0 (0)	0 (0)	0 (0)	4 (100)	0 (0)	0 (0)	4 (100)	0 (0)	0 (0)	0 (0)	4 (100)
IES-R distress symptoms																		
Normal	986 (81.2)	513 (52)	473 (48)	657 (66.6)	329 (33.4)	261 (26.5)	725 (73.5)	140 (14.2)	190 (19.3)	446 (45.2)	210 (21.3)	239 (24.2)	140 (14.2)	190 (19.3)	285 (28.9)	132 (13.4)	343 (34.8)	643 (65.2)
Mild	85 (7.0)	39 (45.9)	46 (54.1)	58 (68.2)	27 (31.8)	35 (41.2)	50 (58.8)	8 (9.4)	8 (9.4)	59 (69.4)	10 (11.8)	26 (30.6)	14 (16.5)	12 (14.1)	25 (29.4)	8 (9.4)	32 (37.6)	53 (62.4)
Moderate	61 (5.0)	47 (77)	14 (23)	35 (57.4)	26 (42.6)	24 (39.3)	37 (60.7)	4 (6.6)	20 (32.8)	27 (44.3)	10 (16.4)	7 (11.5)	0 (0)	12 (19.7)	40 (65.6)	2 (3.3)	16 (26.2)	45 (73.8)
Sever	82 (6.8)	47 (57.3)	35 (42.7)	55 (67.1)	27 (32.9)	36 (43.9)	46 (56.1)	20 (24.4)	18 (22)	16 (19.5)	28 (34.1)	6 (7.3)	6 (7.3)	8 (9.8)	46 (56.1)	16 (19.5)	19 (23.2)	63 (76.8)
P value (χ²)		0.001 (16.852)		0.496 (2.385)		0.001 (20.982)		0.072 (1.337)				0.001 (37.445)					0.082 (6.691)	

Table 3: Multinomial logistic regression analysis for identification of mental health risk factors.

		GAD-7 (Anxiety)		PHQ-9 (Depression)		ISI (Insomnia)		IES-R (Distress)	
		OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Gender	Male	1 (Reference)	NA	1 (Reference)	NA	1 (Reference)	NA	1 (Reference)	NA
	Female	0.74 (0.59-94)	0.012	0.69 (0.54-0.87)	0.002	0.66 (0.51-0.86)	0.002	0.78 (0.58-1.04)	0.086
Marital status	Married	1 (Reference)	NA	1 (Reference)	NA	1 (Reference)	NA	1 (Reference)	NA
	Unmarried	1.21 (0.94-1.55)	0.134	0.79 (0.62-1.01)	0.062	0.77 (0.59-1.01)	0.054	0.93 (0.69-1.25)	0.620
Education level	Postgraduate	1 (Reference)	NA	1 (Reference)	NA	1 (Reference)	NA	1 (Reference)	NA
	Graduate	0.63 (0.49-0.81)	0.001	0.66 (0.51-0.85)	0.001	0.65 (0.49-0.85)	0.001	0.50 (0.37-0.68)	0.001
Place of posting	Private practice	1 (Reference)	NA	1 (Reference)	NA	1 (Reference)	NA	1 (Reference)	NA
	Primary healthcare centre	1.16 (0.78-1.73)	0.466	0.83 (0.55-1.26)	0.392	0.82 (0.53-1.27)	0.367	1.00 (0.61-1.64)	1.000
	Secondary healthcare centre	0.91 (0.63-1.29)	0.585	0.53 (0.36-0.77)	0.001	0.99 (0.66-1.50)	0.975	0.94 (0.60-1.48)	0.802
	Tertiary healthcare centre	1.16 (0.86-1.58)	0.326	0.66 (0.48-0.91)	0.001	0.73 (0.52-1.03)	0.074	0.99 (0.68-1.46)	0.998
Designation	Private practitioner	1 (Reference)	NA	1 (Reference)	NA	1 (Reference)	NA	1 (Reference)	NA
	Junior resident	1.09 (0.72-1.66)	0.670	0.63 (0.40-0.98)	0.041	0.78 (0.50-1.22)	0.276	1.21 (0.70-2.07)	0.494
	Senior resident	0.96 (0.60-1.54)	0.874	0.41 (0.25-0.67)	0.001	0.87 (0.53-1.42)	0.572	1.38 (0.74-2.59)	0.317
	Consultant	0.81 (0.52-1.24)	0.324	0.78 (0.49-1.25)	0.302	1.50 (0.91-2.45)	0.109	1.17 (0.67-2.05)	0.586
	Medical officer	0.56 (0.38-0.83)	0.004	0.33 (0.22-0.50)	0.001	0.76 (0.50-1.16)	0.200	0.51 (0.32-0.81)	0.005
Health care role	Second-line	1 (Reference)	NA	1 (Reference)	NA	1 (Reference)	NA	1 (Reference)	NA
	Frontline	1.27 (0.99-1.63)	0.055	0.98 (0.76-1.25)	0.860	0.69 (0.53-0.89)	0.005	1.28 (0.94-1.75)	0.121

DISCUSSION

In the present study mental health status of doctors was assessed for overall anxiety, depression, insomnia and distress; and were found to be 38%, 36%, 27%, and 18% respectively. So, the results of the present study were very much in line with the Chinese study for the assessment of mental health i.e. depression 50.4%, anxiety 44.6%, insomnia 34.0% and distress 71.5%. Distress and insomnia were more prevalent among Chinese healthcare workers. Another study by Rosi et al reported posttraumatic stress disorder of 24.73%, anxiety 8.27%, depression 19.80%, and high perceived stress 21.90%.[11,12]

More than 50% participant were female doctors (54%) and young adult of age group 31-40 years (35%), 2/3rd of them were married and unfortunately 21% of them were having comorbidities. Young age, female gender were more prone to anxiety, depression, stress and insomnia. As female were overburden by additional household works, so they were more stressed out. Less working experience, dealing with new type of disease was definitely the main cause of stress among youngsters. 35% of the doctors experienced decreased sleep, and 13% of them were taking sleeping pills for it. A cross sectional study by Bernert et al, indicated that people with sleeping problems were more prone to psychological disorders such as depression, anxiety disorder, and suicide attempts.[13]

Majority respondents were from red zone area, which was highly infectious. So, the doctors working in these area were more anxious, depressive, and stressed. As working in red zone increases the likelihood of exposure among them. Our frontline doctors faced severe anxiety (23 doctors) than second line workers. Their anxiety was justifiable as they were directly in contact with COVID positive patients for longer time. But surprisingly second line workers reported more severe symptoms of depression and stress. The reason would be being not provided with adequate protective gears, and been directly exposed to asymptomatic carriers (in emergency and OPD). In a new study of over 300 COVID-19 positive patients in South Korea, researchers have found that those with and without symptoms are equally transmitting the SAR-CoV-2 coronavirus. They found roughly same viral load in the asymptomatic patients as in symptomatic having cough and fever.[14]

Majority of the participant were medical officer, working in the field (mostly rural area i.e. primary health care centre or secondary health centre) as a general physician irrespective for their specialization were feeling maximum level of severe stress (11.6%) and anxiety (6.1%). The possible reason would be their long working hours with less relaxation time, more workload (no. of patients/doctor), and shortage of adequate protective gears. Doctors working in private setup were under more severe depression (5.1%) as OPD and elective procedures decreased drastically due to lockdown and limited unlock phase. Secondly as more of the asymptomatic affluent class was approaching to the private setup, these factors were sufficient to increases depression and stress among them because this disease started from developed nations affecting the rich people who are not sufficiently immune to the outbreaks of this infectious disease.[15]

Consultant group had experienced maximum severe insomnia (1.7%). As most of our consultant were above 40 years and suffering from one or the other comorbidities, and being the experienced one they had additional responsibility of training the juniors. So, these factors cumulatively intensified their fear to get infected were the main reason of severe insomnia among them. This group was followed by resident doctors (junior and senior) who were also experiencing severe anxiety, depression, and stress. As working in the tertiary care hospital (main referral centre) treating the serious and sick patients, complicated their psychological response for this deadly disease. Reason for the anxiety and stress may be lack of required experience, the feeling of vulnerability, lack of concern about their own health, negative thought for the family members, drastic change in their working condition, workplace violence, the crude reality of losing their colleagues, and the negativity generated by isolation.[16] Similar study by Cai et al also suggested that concerns for personal safety, about their families, limited resources, and about patient mortality; all these factors collectively form distressing ethical dilemmas for doctors and increase potential for moral injury. This moral injury arise when one has to take decision under compulsion and that decision are against their ethical and moral valuves.[17,18]

Doctors were trying to manage this stressful condition at their individual level by devising recreational activities that posed challenge to these negative thoughts and so as to promote desired value by encouraging positive behavioral attitude. 50% of them enjoyed watching television, their favorite shows. Most of them either learned cooking or improved their cooking skill, 28% doctors tried to be fit and healthy by doing home gym and yoga activities. 19% medicos rejoiced their singing and dancing hobbies. They were noticed on social media flaunting their hidden skills, 16% did gardening. Many others tried to explore their hidden talents like painting, sculpture making etc.

Limitation of the study were (a) firstly the small sample size; (b) preexisting mental health issues was not asked from the participants; (c) response bias existed as many of them didn't respond.

CONCLUSION

This present study, reported the physical and mental health outcomes and associated risk factors among doctors in India during this pandemic, to our knowledge this is one of the first Indian study that exclusively included only doctors. With this we tried to highlight the ill effect on the health of doctors (both physical and mental).

Hence, long duty hours with suffocating PPE, limited provision of training and lack of adequate experience, fear of infecting and isolation from their family member, fatigue, dehydration, and public violence, collectively making our doctors vulnerable to physical and mental health hazards.

ACKNOWLEDGEMENTS

REFERENCES

1. India Today. Kerala confirmed first novel coronavirus case in India, 2020. Available at: ndiatoday.in/india/story/kerala-reports-first confirmed-novel-coronavirus-case-in-india-1641593-2020-01-30. Accessed on 12 January 2021.
2. The Indian Express. Coronavirus Live Updates: India's death toll crosses 1.03 lakh mark, cases reach 6,685,082, 2020. Available at: https://indianexpress.com/article/india/coronavirus-india-world-news-today-live-updates-covid-19-cases-vaccine-tracker-india-delhi-odisha-west-bengal-bihar-6702478/. Accessed on 12 January 2021.
3. Ny Times. Buckley China's doctors, Fighting the Coronavirus, Beg for masks, 2020. Available at: https//www.nytimes.com/2020/02/14/world/asia/china-coronavirus-doctors.html. Accessed on 12 January 2021.
4. The Hindu. Coronavirus COIVD-19 claims the lives of 104 doctors across the country, 2020. Available at: https://www.thehindu.com/news/national/coronavirus-covid-19-claims-the-lives-of-104-doctors-across-the-country/article32142311.ece. Accessed on 12 January 2021.
5. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med. 2006;166(10):1092-7.
6. Morin CM, Belleville G, Bélanger L, Ivers H. The Insomnia Severity Index: psychometric indicators to detect insomnia cases and evaluate treatment response. Sleep. 2011;34(5):601-8.
7. Asukai N, Kato H. Reliability and validity of the Japanese-language version of the Impact of event scale-revised (IES-R-J). Journal of Nervous and Mental Disease. 2002;190(3):175-82.
8. Creamer M, Bell R, Falilla S. Psychometric properties of the Impact of Event ScaleRevised. Behaviour Research and Therapy. 2002;41:1489-96.
9. Kawamura N, Yoshiharu K, Nozomu A. Suppression of Cellular Immunity in Men with a Past History of Post Traumatic Stress Disorder. American Journal of Psychiatry. 2001;158:484-6.
10. Covid-19: 130 red zones, 284 orange zones, 319 green zones in new govt list. Hindustan Times. 2020.
11. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N et al. factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA network open. 2020;3(3):e2039763.
12. Rossi R, Socci V, Pacitti F, DiLorenzo G, DiMarco A, Siracusano A et al. Mental Health Outcomes Among Frontline and Second-Line Health Care Workers During the Coronavirus Disease 2019 (COVID-19) Pandemic in Italy. JAMA network open. 2020;3(5):e2010185.
13. Ribeiro JD, Pease JL, Gutierrez PM, Silva C, Bernert RA, et al. Sleep problems outperform depression and hopelessness as cross-sectional and longitudinal predictors of suicidal ideation and behavior in young adults in the military. Journal of Affective Disorders. 2020;136:743-50.
14. L Seungjae, K Tark, L Eunjung, L Cheolgu, K Hojung, R Heejeong et al. Clinical Course and Molecular Viral Shedding Among Asymptomatic and Symptomatic Patients With SARS-CoV-2 Infection in a Community Center in the Republic of Korea. JAMA Intern Med. 2020;180(11):144752.
15. NT Prakash. COVID-19: Impact on health of people & wealth of nations. Indian J Med Res. 2020;151(2):121-3.
16. Wong TW, Yau JK, Chan CL. The psychological impact of severe acute respiratory syndrome outbreak on healthcare workers in emergency department sand how they cope. Eur J Emerg Med. 2005;12(1):13-8.
17. Cai H, Tu B, Ma J, Chen L, Fu L, Jiang Y et al. Psychological impact and coping strategies of frontline medical staff in Hunan between January and March 2020 during the outbreak of coronavirus disease 2019 (COVID 19) in Hubei, China. Med Sci Monit. 2019;26:e924171.