

# ANXIETY AND INSOMNIA AMONG HEALTHCARE PERSONNEL DURING THE SECOND WAVE OF COVID-19 IN DELHI GOVERNMENT HOSPITALS: A CROSS-SECTIONAL STUDY

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## ABSTRACT

**Objective:** The percentage of healthcare personnel suffering from anxiety and insomnia increased during the Covid-19 pandemic. The objective of the study is to assess insomnia and anxiety among healthcare personnel involved in the management of the Covid-19 pandemic in Delhi.

**Materials and Methods:** A cross-sectional study was carried out among healthcare personnel. Residents of 5 tertiary care hospitals were selected purposively in Delhi. 91 respondents were selected for the study. A questionnaire through Google Forms was distributed and some of the questions required hybrid mode so the interview was conducted in hybrid mode in person or telephonically.

**Results:** The study revealed an 88% prevalence of definite cases of anxiety and 44.6% of some insomnia. The chi-square test reported a linear-by-linear association of 0.002 between Anxiety, Insomnia, fear of infecting the family members, and feeling of agitation while wearing the PPE kits. The study found that healthcare personnel having direct contact through the treatment of the infected patients experienced an increase in their anxiety scores, compared to HCPs having no direct contact with infected patients.

**Conclusion:** The results of this survey indicate that mental health symptoms like anxiety and insomnia have increased during the COVID-19 outbreak among healthcare professionals. The study also identified the associated risk factors and causes of mental health problems. Therefore, governments should proactively help in implementing mental health intervention policies in the country for the health professionals at risk, particularly those working in the COVID-ward.

**Keywords:** Anxiety, Insomnia, Healthcare personnel, Resident doctors, Nurses, Covid-19

## INTRODUCTION

The first case of Covid-19 occurred in late December 2019 in Wuhan, China and it was declared a pandemic in March 2020[1]. A systematic review and meta-analysis across 65 studies, involving 97,333 healthcare workers in 21 countries, has identified a prevalence of

anxiety to be 22.1% during the Covid-19 pandemic[2]. Another systemic review reported that anxiety was higher among nurses ranging from 22% to 27% than among physicians who had approximately a 19% chance of getting anxious[3]. The rate of insomnia symptoms and insomnia disorder during the first wave of Covid-19 was significantly higher among women, younger age groups, and residents of Brazil, Canada, Poland, Norway, and the United Kingdom compared to residents of Asian countries[4].

In India, with a population of approximately 1.4 billion[5] and a doctor-population ratio of 1:1800[6], the already inadequate public health care system crumbled during this period, further pushing frontline HCPs to the edge. Working >6 hours and staying single were important risk factors contributing to moderate, moderately severe, and severe depression whereas only working > 6 hours contributed to moderate and severe perceived stress[7]. Other healthcare personnel was more at risk of developing insomnia as compared to doctors and nurses whereas quarantine is a significant predictor of insomnia[8].

The practice of medicine is unique and more challenging than most other professions of the world and as a result, doctors have increased occupational anxiety, and doctors with MD or DO degrees are at increased risk of burnout in comparison to individuals with master's or bachelor's degree[9]. Clinical doctors also perceived high levels of work-family conflict which were positively related to high workload[10].

During Covid-19 in Hunan province increased stress among front-line medical staff was seen due to increased working hours, over-enthusiastic media news, and a sense of inadequate support provided by the government[11]. Studies from the SARS epidemic demonstrated that the effects of social isolation were the most potent in terms of provoking stress among HCPs and also Covid-19 added to this list by making them fear contracting the disease themselves or transmitting it to their family members[12,13].

Loneliness also added to the woes of the people[14]. In several studies, it was revealed that psychological interventions and measures have to be targeted and prioritized for HCPs experiencing high levels of anxiety and stress due to fear of contracting the infection and infecting family members, and low levels of perceived safety and security[15].

The situation in Delhi was particularly bad during the second wave of the pandemic. From April 1, 2021, Delhi's daily Covid-19 cases began a steady climb, going from 2,720 on April 1 to more than 10,000 in 10 days. Throughout the month, the capital struggled for oxygen, medical supplies, and hospital beds and fatalities touched record highs[16]. Prolonged duty shifts, watching patients die every day and their family members pleading with doctors to save their lives, doctors on COVID duty in Delhi said that they went through unimaginable mental agony during the second wave of the pandemic[17]. It was like every dying patient was taking away a bit of them as it's common especially among resident doctors and nurses to feel bad about dying patients[18]. The personal protective equipment was also taking a toll on them as it was too constricting and was weighing down their movements[19].

Keeping these things in mind the tertiary hospitals designated as Covid hospitals in Delhi were included in this study.

## **METHODS**

### **STUDY DESIGN, AREA, AND PARTICIPANTS**

A descriptive cross-sectional survey was conducted in Covid- designated government hospitals in Delhi after the second wave of the pandemic in September 2021. Government

medical colleges with associated hospitals in Delhi were considered for the study. The study population consisted of interns, post-graduate students, senior residents, and nurses of these hospitals.

### **SAMPLING METHOD AND SAMPLE SIZE**

A purposive sampling based on Covid-19 care facilities including separate ICU facilities has been used to select the hospitals in Delhi. A prevalence rate of 60% was found in a similar study conducted on doctors working in tertiary care hospitals in India[7]. With a margin of error of 10% (standard value of 0.1), and a confidence level of 95% (standard value of 1.96) the sample size was found to be 83.

### **TOOLS AND MEASUREMENTS**

#### **Hospital Anxiety and Depression Scale (HADS)**

HADS, devised 39 years ago was used; no permission is required for using it[20]. It had two subscales, the HADS-A (Anxiety scale) and HADS-D (Depression Scale). It comprises 14 questions-seven for anxiety and seven for depression. Each domain score is calculated based on response to specific items, scoring for each item ranges from 0 to 3 Likert -type (with a higher score indicative of more anxiety). The total score is obtained by adding the scores within each subscale. Recommended cut-off scores are 8-10 for doubtful cases and >11 for definite cases of anxiety. Its beauty lies in its simplicity and understandability. It is easily understood by literate people, so it is used as a self-assessment tool for anxiety. It was originally designed to be utilized as a short screening tool for clinicians to identify patients requiring further psychiatric evaluation and assistance.

#### **Insomnia Severity Index (ISI)**

ISI developed by Charles M Morin in 1993 is a 7-item self-report questionnaire assessing the nature, severity, and impact of insomnia. The recall period is the “last two weeks” and it covers a range of aspects including sleep onset difficulty, sleep maintenance problems, difficulty in early morning awakening, sleep quality affecting daily functioning, noticeability to others regarding impairment of sleep, and distress induced by a sleep problem. A 5-point Likert scale with 0 indicating no problem and 4 indicating a very severe problem is used for concluding. The total score is calculated by summing up the individual subscale score and ranges from 0 to 28. The total score is interpreted as follows: absence of insomnia (total score from 0 to 7), sub-threshold insomnia (8-14), moderate insomnia (15-21), and severe insomnia (22-28).

### **DATA COLLECTION**

The healthcare personnel of government hospitals in Delhi was contacted for their consent. The questionnaire was made through google forms and sent through social media including WhatsApp, Instagram, etc to each of the participants. Telephonic interviews were also carried out when no response was obtained. Before the interview, a preferred time slot was obtained from them. Only those responses which were complete in all aspects were included in the study and incomplete google forms were discarded.

### **STATISTICAL ANALYSIS**

The dependent variables like anxiety and insomnia were classified according to the above-mentioned tools. Then SPSS version 20, obtained from the National Institute of Health and Family Welfare was used to obtain Chi-Square after the categorical variables were summarised as n%) and sub-classified. R version 4.2, which is an open-source software was used for further

statistical analyses. The individual responses on the Likert scale were changed to ordinal variables to apply multivariate linear regression with Anxiety and Insomnia as Dependent variables. From the output of the regression, the independent variables with p- values of 0.05 or smaller in the t-test were considered significant.

### ETHICS STATEMENT

Approval from the Institutional Review Board, NIHFV, New Delhi was taken. Written informed consent was taken from the study participants.

### RESULTS

The age of the healthcare professionals interviewed was in between 23 years to 34 years. Participants in 30 years age group were in the third majority followed by the 24 and 26 years age group.

The majority of the personnel (31.3%) interviewed were pursuing their Post-Graduation course while 27.7% had completed their MBBS and were working as junior residents. 24.1% were the ones who had completed their MS or MD and were either working as senior residents or were pursuing M.Ch. 9.6% of the personnel involved had done their B.Sc Nursing and only 2.4% had completed their M.Sc Nursing and were working as nurses. 56% felt sad and frustrated a little on seeing the death of Covid-19 patients in hospitals as they could not be saved even after trying their level best and also because it showed them that they were at increased risk of exposure and infection because of their duty nature since they were frontline workers, 17% got affected by it too much whereas 24% were not affected by it at all and 2% had mixed emotions regarding it (Figure 1).

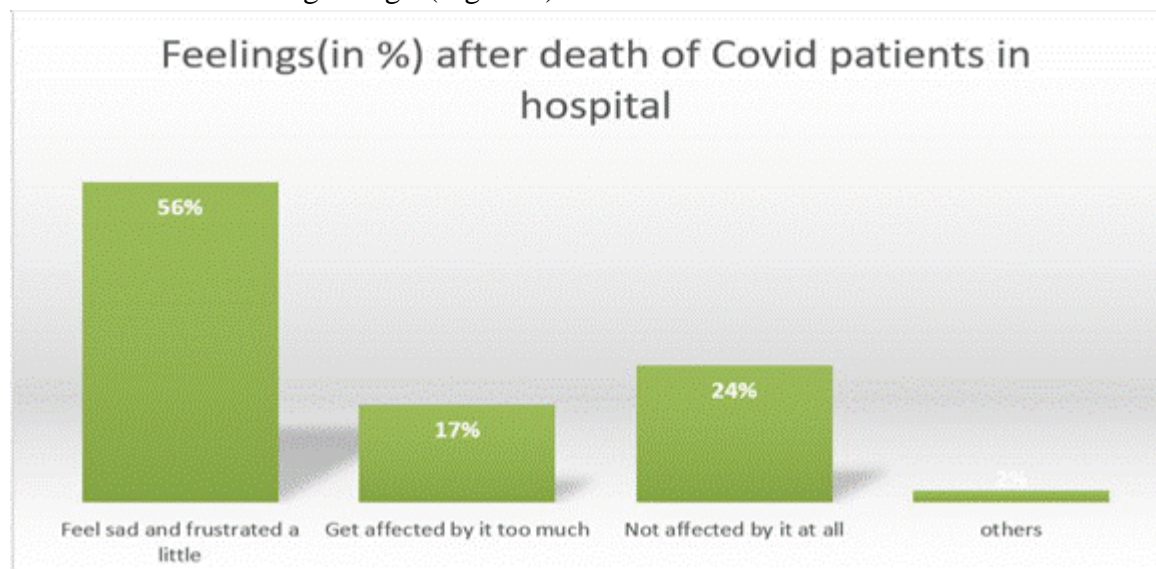


FIGURE 1: Distribution of feelings of the HCPs regarding the death of COVID-19 patients. 41% of the total HCPs interviewed had normal sleep patterns and were not sleep deprived without requiring any intervention, 44.6% reported some Insomnia and 14.5% reported severe Insomnia and were sleep deprived (Table 1).

88% of the participants were in the category of Definite anxiety by the HADS scoring system. Only 4.8% of participants were doubtful cases (i.e., having a scoring between 8-10 on the hospital anxiety and depression system) of anxiety whereas 7.2% didn't have any anxiety (Table 2).

Table 1: Distribution of Insomnia and its classification according to ISS.

		Frequency	Percent	Valid Percent	Cumulative Percent
	Normal sleep (0-7)	34	41.0	41.0	41.0
	Some Insomnia (8-14)	37	44.6	44.6	85.5
	Severe Insomnia (15-21)	12	14.5	14.5	100.0
Total		83	100.0	100.0	

**Anxiety Grouping Percentage according to HADS scoring**

TABLE 2 :Distribution of anxiety group

	Frequency	Percent	Valid Percent	Cumulative Percent
No anxiety(0-7)	6	7.2	7.2	7.2
Doubtful cases(8-10)	4	4.8	4.8	12.0
Definite cases(>11)	73	88.0	88.0	100.0
Total	83	100.0	100.0	

59% felt confused and distraught regarding the ever-changing treatment regime and felt it to be problematic without any sure shot treatment for the disease, 38.6% felt good regarding the ongoing research and were hopeful that the future would have the treatment and 2.4% were not affected by it all (Table 3).

TABLE 3: Feelings regarding the ever-changing treatment regime

	Frequency	Percent	Valid Percent	Cumulative Percent
Feel good as research is going on	32	38.6	38.6	38.6
Feel confused and distraught	49	59.0	59.0	97.6
Not affected by it at all	2	2.4	2.4	100.0
Total	83	100.0	100.0	

Around 57.8% felt sad and frustrated a little regarding the patients of Covid -19 dying in the hospital, 16.9% of the HCPs were affected too much by seeing Covid patients die in the hospital and 22.9% were not affected by seeing the patients die too much (Table 4).

TABLE 4: Distribution of healthcare personnel w.r.t feelings of patient death in the hospital

	Frequency	Percent	Valid Percent	Cumulative Percent
Not affected by it at all	19	22.9	22.9	22.9
Feel sad and frustrated a little	48	57.8	57.8	80.7
Others	2	2.4	2.4	100.0
Total	83	100.0	100.0	

The Chi-square test showed a significant linear by-linear association of 0.002 between feelings regarding wearing the PPE kit and insomnia and anxiety showing that the chi-square test was significant regarding anxiety, insomnia, and wearing the PPE kit (Table 5).

TABLE 5: Relationship between Anxiety, Insomnia, and feeling regarding wearing PPE kit during duty hours

Feeling regarding wearing the PPE kit during the duty hours		Value	df	Asymp. Sig. (2-sided)
Feel agitated while donning it	Pearson Chi-Square	10.018 <sup>b</sup>	4	.040
	Likelihood Ratio	11.397	4	.022
	Linear-by-Linear Association	7.651	1	.006
	N of Valid Cases	57		
Feel good about it	Pearson Chi-Square	2.019 <sup>c</sup>	4	.732
	Likelihood Ratio	2.783	4	.595
	Linear-by-Linear Association	1.356	1	.244
	N of Valid Cases	15		
Not bothered by it	Pearson Chi-Square	.917	1	.338
	Continuity Correction	.000	1	1.000
	Likelihood Ratio	1.295	1	.255
	Fisher's Exact Test			
	Linear-by-Linear Association	.833	1	.361
	N of Valid Cases	11		
Total	Pearson Chi-Square	12.070	4	.017
	Likelihood Ratio	14.578	4	.006
	Linear-by-Linear Association	9.484	1	.002
	N of Valid Cases	83		

The chi-square test between dependent variables like anxiety scoring and insomnia severity index and independent variables like fear of infecting the family members and feeling while wearing the PPE kit shows a total linear association of 0.002 (Table 6).

TABLE 6: Relationship between anxiety about infecting family members, Insomnia, and Anxiety

Anxiety about Infecting the family members		Value	df	Asymp. Sig. (2-sided)
Yes	Pearson Chi-Square	7.453	4	.114
	Likelihood Ratio	9.256	4	.055
	Linear-by-Linear Association	5.925	1	.015
	N of Valid Cases	58		
No	Pearson Chi-Square	1.406	1	.236
	Continuity Correction	.014	1	.906
	Likelihood Ratio	1.780	1	.182
	Fisher's Exact Test			
	Linear-by-Linear Association	1.250	1	.264
	N of Valid Cases	9		
Maybe	Pearson Chi-Square	3.810	4	.432
	Likelihood Ratio	4.418	4	.352
	Linear-by-Linear Association	2.380	1	.123
	N of Valid Cases	16		
Total	Pearson Chi-Square	12.070	4	.017
	Likelihood Ratio	14.578	4	.006
	Linear-by-Linear Association	9.484	1	.002
	N of Valid Cases	83		

### MULTIVARIATE LINEAR REGRESSION

After identifying the independent variables for Linear regression, we check for any signs of association among themselves. We use Kendall's Tau (Rank correlation coefficient) as our responses are primarily ordinal.

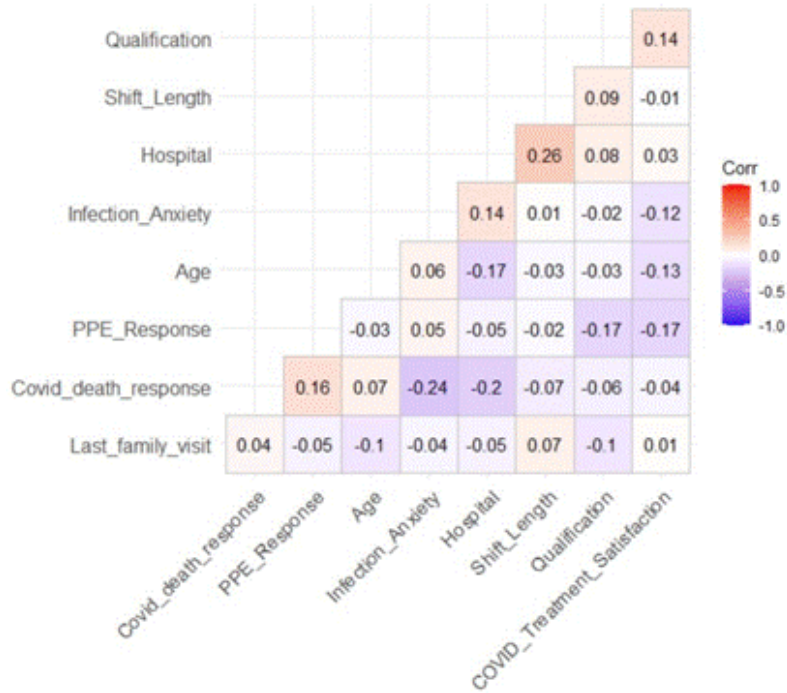


Figure 2: Visualizing the ordinal association between independent variables  
 The charts indicate that the association between the independent variables is weak and thus we can proceed with using them in tandem in our multivariate regression. Examining the univariate relationship between the Independent and Dependent variables, we see a weak association as shown in the figures below.

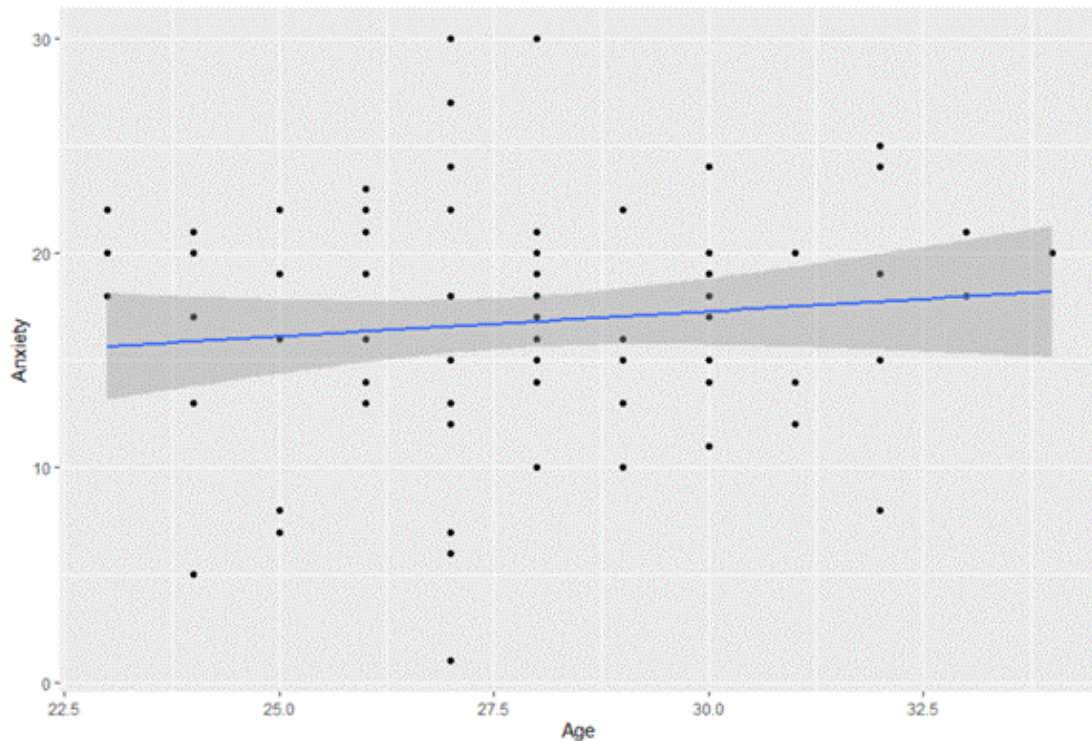


Figure 3: Anxiety vs Age



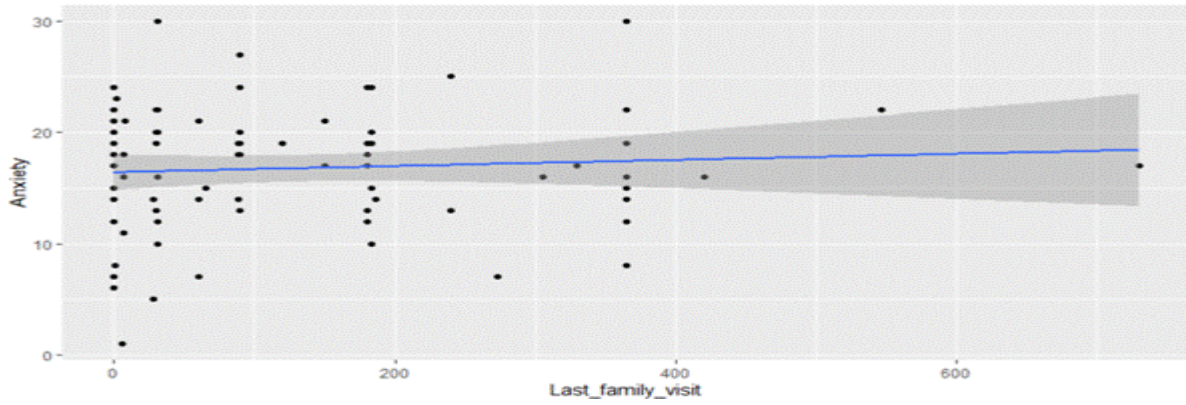


Figure 4: Anxiety vs Days to Last family visit

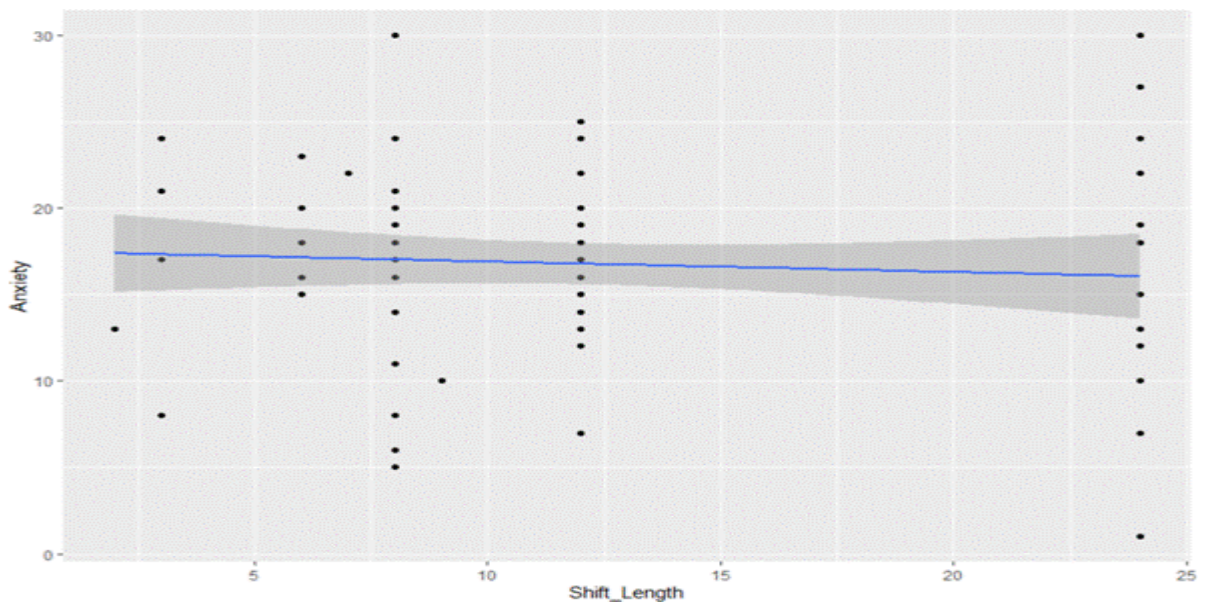


Figure 5: Anxiety vs Average Length of a Work shift (In hours)

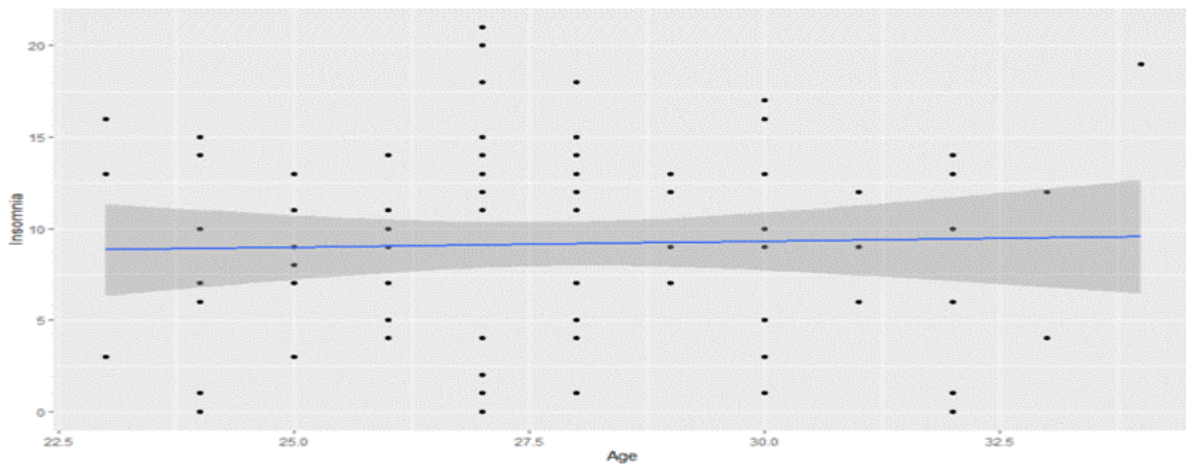


Figure 6: Insomnia vs Age

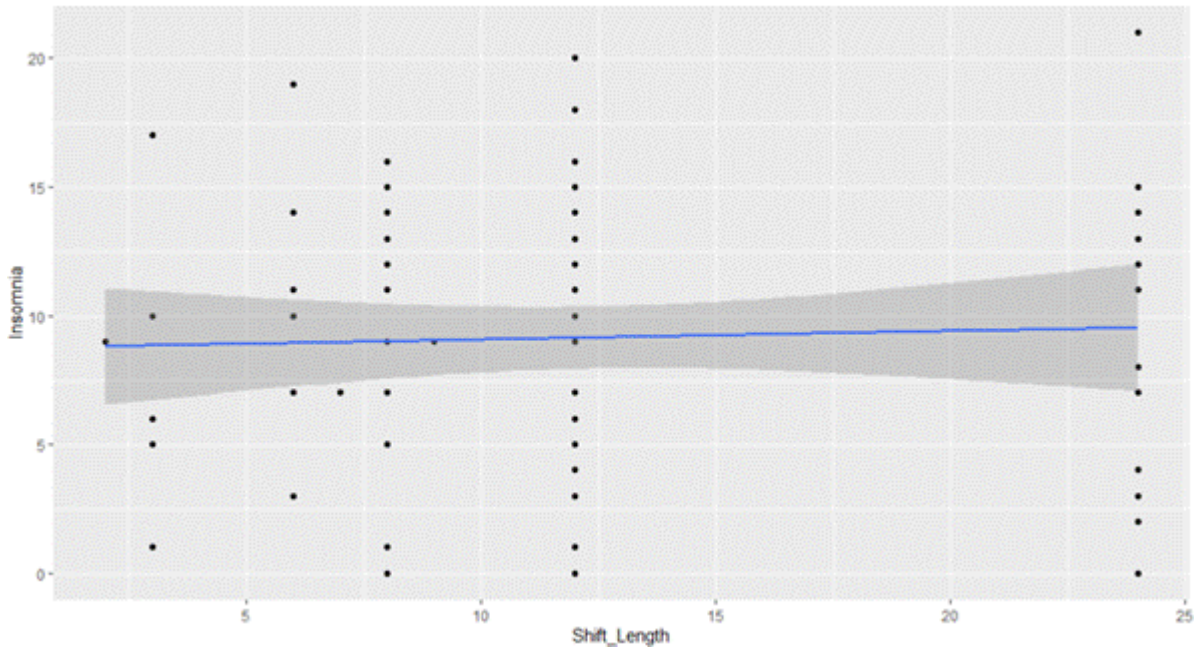


Figure 7: Insomnia vs Average Length of a Work shift (In hours)

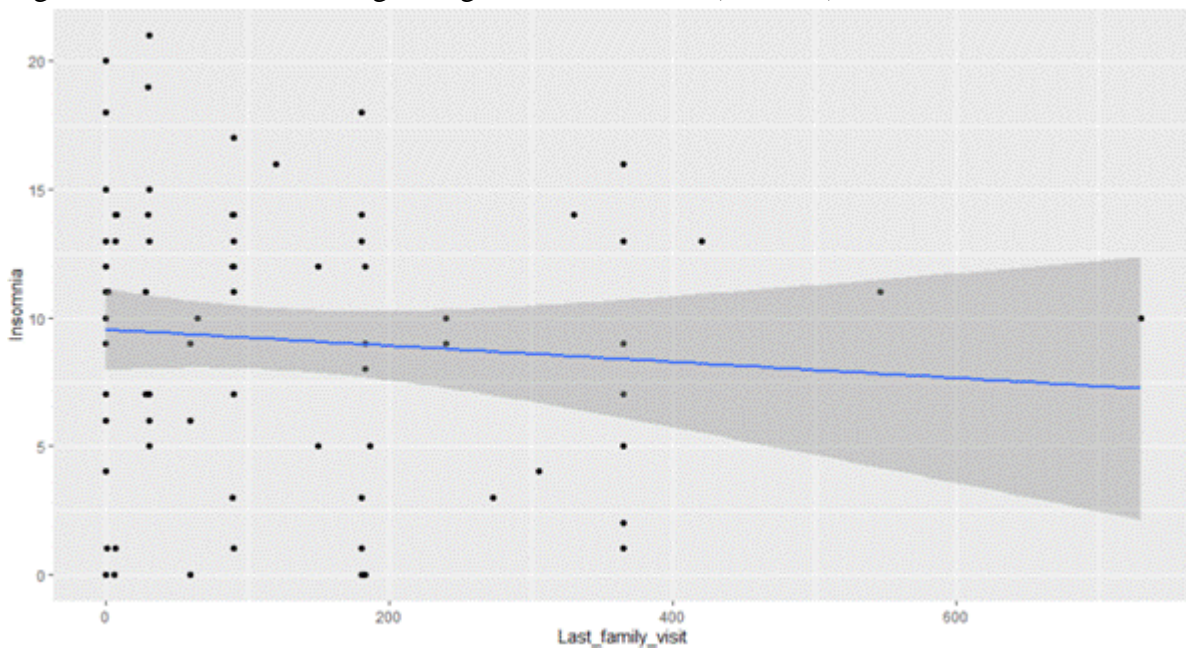


Figure 8: Insomnia vs Days to Last family visit

Table 7: Multivariate regression with Anxiety as the Dependent variable

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	14.209333	8.95286	1.587	0.1177
Age	0.106372	0.271226	0.392	0.6963
Qualification M.S. Nursing	2.728068	4.601236	0.593	0.5555
Qualification Intern	-2.688014	3.630963	-0.74	0.462
Qualification MBBS	-4.917086	2.492472	-1.973	0.0531.
Qualification PG	-4.933874	2.35422	-2.096	0.0403 *

Qualification MD/MS/MCh	-2.189058	2.436749	-0.898	0.3726
Shift length (Hours)	-0.101291	0.104327	-0.971	0.3355
Covid death response Sad	1.583155	1.839333	0.861	0.3928
Covid death Effect Too Much	2.281649	2.137791	1.067	0.2901
Covid death response Others	5.247183	4.379327	1.198	0.2356
Last family visit (days)	0.002263	0.004436	0.51	0.6117
Infection Anxiety No	-1.561891	2.186735	-0.714	0.4778
Infection Anxiety Maybe	2.604322	1.966985	1.324	0.1905
PPE Kit response Positive	-2.800012	1.764706	-1.587	0.1178
PPE Kit response Neutral	-1.229586	2.035477	-0.604	0.5481
Covid treatment satisfaction Negative	2.427619	1.485043	1.635	0.1073
Covid treatment satisfaction Neutral	-1.037822	4.228395	-0.245	0.807

Residual standard error: 5.285 on 60 degrees of freedom Multiple R-squared: 0.3006, Adjusted R-squared: 0.04413

F-statistic: 1.172 on 22 and 60 DF, p-value: 0.3059

The factors in the Multivariate regression explain 30% of the overall variance in the Dependent variable. The variables which had a significant effect on the Anxiety of the respondents are their Qualifications in Medicine, with Post Graduate Degree being significant at a 95% level of confidence and MBBS Degree being significant at a 90% level of confidence. The negative relationship with the significant variables to Anxiety could be due to the rigorous training undergone by the respondents during their studies.

Table 8: Multivariate regression with Insomnia as the Dependent variable

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	11.974637	8.271091	1.448	0.1529
Age	-0.024658	0.250572	-0.098	0.9219
Qualification M.S. Nursing	-3.553434	4.250848	-0.836	0.4065
Qualification Intern	0.38121	3.354461	0.114	0.9099
Qualification MBBS	-5.289217	2.302668	-2.297	0.0251*
Qualification PG	-1.370836	2.174943	-0.63	0.5309
Qualification MD/MS/MCh	-4.139866	2.251189	-1.839	0.0709
Shift length (Hours)	-0.023773	0.096382	-0.247	0.806
Covid death response Sad	0.909721	1.699266	0.535	0.5944
Covid death Effect Too Much	1.542909	1.974996	0.781	0.4377

Covid death response Others	7.947028	4.045837	1.964	0.0541
Last family visit (days)	-0.004678	0.004098	-1.141	0.2582
Infection Anxiety No	-1.786752	2.020213	-0.884	0.38
Infection Anxiety Maybe	1.681358	1.817197	0.925	0.3585
PPE Kit response Positive	-1.960004	1.630322	-1.202	0.234
PPE Kit response Neutral	-3.417046	1.880473	-1.817	0.0742
Covid treatment satisfaction Negative	3.264946	1.371955	2.38	0.0205*
Covid treatment satisfaction Neutral	-2.033306	3.906398	-0.521	0.6046

Residual standard error: 4.882 on 60 degrees of freedom Multiple R-squared: 0.4182, Adjusted R-squared: 0.2049

F-statistic: 1.961 on 22 and 60 DF, p-value: 0.0207

The factors in the Multivariate regression explain ~42% of the overall variance in the Dependent variable. The variables which had a significant effect on the amount of sleep of the respondents (Insomnia) are their Qualification in Medicine, with an MBBS Degree, and their feeling of negativity towards the current COVID treatment regime being significant at a 95% level of confidence. The negative relationship between the MBBA qualification to Insomnia could again be due to reasons similar to anxiety, however, respondents who felt negatively towards the COVID treatment regime were more likely to experience Insomnia.

## DISCUSSION

The result revealed an 88% prevalence of definite cases of anxiety and 44.6% had some insomnia among resident doctors, interns, and nurses working in government hospitals with covid care facilities in Delhi. The contributing factors were long duty hours, fear of infecting the family member, and feeling of confusion about the ever-changing treatment regime, and the chi-square test showed a .002 linear association between anxiety, insomnia, fear of infecting the family members, and feeling frustrated while wearing the PPE kit. A multi-center survey involving 422 participants revealed 63.5% and 45% prevalence of symptoms of depression and stress among tertiary care hospitals in the hospitals of (East: Kolkata, West Bengal; North: New Delhi; West: Nagpur, Maharashtra; and South: Thiruvananthapuram, Kerala) conducted from May 23, 2020, to June 6, 2020. It revealed that longer working hours and residing away from family were significant contributing factors [7].

In Italy out of 1379 HCPs interviewed, 49.38% (681 respondents) had post-traumatic stress syndrome, 8.27% had insomnia, 19.80% had symptoms of depression and 21.9% had high perceived stress. A multivariable logistic regression model showed an association between sex, age, occupation, and self and colleagues' exposure to contagion. Similar to my findings it showed an association between self and colleagues' exposure to the infection with anxiety and insomnia[21]. The Spanish Influenza pandemic of 1918 was similar to it the limited knowledge

of the Spanish flu led to similar restrictions and actions taken during the Covid-19 pandemic. Like the paucity of planning for health emergencies when Influenza first appeared. Unlike the 1918 influenza pandemic vaccines are available today for the Covid – 19 pandemic[22].

To tackle the ever-increasing mental health problems, especially during the Covid pandemic the population, the Mental Health Care Act, of 2017 was passed which takes a right based approach. The Act provides persons with mental illness protection from cruel, inhuman and degrading treatment, right to information about their illness and treatment, right to confidentiality of their medical condition and right to access their medical records, to list just a few rights. The government is explicitly made responsible for setting up programmes for the promotion of mental health, prevention of mental illness and suicide prevention programmes[23]. But it is the call of the hour to give special emphasis to mental health among healthcare personnel and make special provisions for them. Despite doctors having irregular duty hours and no time to distress themselves, no step has been taken to remove the stigma attached to seeking mental health among themselves. Developed nations, for example, the U.K., New Zealand, etc. have put an upper limit on the maximum permissible duty hours within a week, the government of India should also ensure that the 48 duty hours in a week according to the central residency scheme are strictly put into practice. Moreover, the duty hours may be reduced for the HCPs posted on COVID duty. Like the 'Kiran' (1800-599-0019) helpline of the ministry of social empowerment of India, a helpline should be made to ensure support for mental health among healthcare personnel through experts during Covid-19. The Chaupal concept may be activated to bring the doctors together to vent their mental agony as organized as is being done by CRPF personnel. Government can also draw some lessons from the 'Manodarpan Initiative' for teachers, and students for their mental health and well-being and such initiatives should also be taken for the healthcare personnel.

A major limitation of the study is data collection was done using an online method and hence some data was missing as some people filled out the form incompletely.

## **CONCLUSION**

The findings also showed that there was increased anxiety and insomnia during the Covid-19 pandemic and the risk factors associated with it are fear of infecting family members, suffocation caused by wearing the PPE kit but it is a necessity during the pandemic, the death of patients infected with Covid-19. Daily changes in the treatment regime also took a toll on the mental health of healthcare professionals. Our study found the prevalence of anxiety is mild; however, medical staff who had direct contact through the treatment of infected patients experienced an increase in their anxiety scores, compared to HCPs having no direct contact with infected patients. In addition, healthcare personnel who faced discrimination outside the hospital premises during the pandemic and those who were suspect cases also saw increased anxiety scores. Therefore, a systemic approach to tackling mental health issues among HCPs is crucial. A decrease in anxiety levels would in turn lead to a decrease in insomnia. Therefore, governments and healthcare authorities should proactively implement appropriate measures, such as providing psychological counseling services, to prevent, alleviate or treat increased anxiety among medical staff, especially in the worst affected areas, during the COVID-19 pandemic.

The government can also make it mandatory for doctors to attend counseling sessions by

psychiatrists and psychologists once monthly as routine practice especially during the Covid pandemic to ensure mental health sanitation. The PPE kit and other things for the welfare of doctors should be readily available and in abundance and the government should ensure that they don't go in short supply during the pandemic. The healthcare personnel should be incentivized during the pandemic and it should be ensured that their family members get hospital beds during the pandemic on an urgent basis. Therefore, governments and healthcare authorities should proactively implement appropriate measures to prevent and treat increased anxiety among HCPs during the COVID-19 pandemic.

### **ACKNOWLEDGEMENTS**

The authors are particularly grateful to all the participants for their cooperation.

### **CONFLICT OF INTEREST**

The authors declare that there is no competing interest or any source of conflict of interest.

### **FUNDING**

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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