Sleep disturbance and psychological distress among frontline healthcare workers during COVID-19 pandemic in South India - A questionnaire-based survey

E.V Deepasree Varier[1], Febin Joseph[2], Fousiya[3], Nikita Pandey[4], Gayathri. S[5], Dr. Gitanjali Natarajan[6], Dr.(col)Vishal Marwaha[7], Greeshma C Ravindran[8]

[1,2,3,4,5] *Undergraduate student, Amrita Institute of Medical Science, Kochi, India*

[6]*Head of Department, Clinical Psychology, Amrita School of Medicine, Kochi,*

Associate professor, Clinical Psychology, Amrita School of Medicine, Kochi

[7]*Principal, Amrita School of medicine, Kochi*

[8] *Tutor, Department of Biostatistics, Amrita Institute of Medical Sciences, Kochi*

Abstract **- Novel corona virus (COVID-19) reported in December 2019 affects humans both psychologically as well as physically. There had been very few studies that were conducted on its psychological effect and sleep disturbances caused on those medical health workers who work as frontline workers outside India. Primary Objective: To study the relationship between sleep disturbances and psychological distress among frontline medical health workers. Secondary Objective: To assess the sleep disturbance among the frontline health workers and the psychological distress among the frontline health workers.**

An online Google Form was created based on Dass-21 and ISI and a set of socio-demographic details was sent to the personal accounts of the medical workers working as frontline health care workers in South India through social media.

Pearson's correlation coefficient was used to test the Linear relationship between sleep disturbances and psychological distress among frontline medical health workers. Descriptive analysis was used for assessing the prevalence of depression, anxiety and stress.

Signs and symptoms of mild, moderate, severe, and extremely severe depression were observed among 8%, 14%, 5% and 11% respectively. Of the total 38 who had symptoms of depression, half of them were in the age group of 18-30 (N=19). There is no difference seen between incidence in males (N=19) and females (N=19). 45% were doctors. 43 participants exhibited symptoms of anxiety of which half were doctors of the age group 18-30, and only 25 participants had symptoms of stress. A significant correlation with insomnia was established for depression(r=.542), anxiety(r=.652) and stress(r=.670).

The study suggests a significant correlation between insomnia with depression, anxiety and stress. Also, there is a high incidence of depression, anxiety and stress among frontline healthcare workers during the pandemic.

Index Terms **- Anxiety, COVID 19, Depression, Healthcare workers, psychological distress, Sleep, Stress.**

I.INTRODUCTION

The novel corona virus is causing COVID- 19 and the first case of this novel corona virus disease 2019(COVID-19) was reported in December 2019 in Wuhan, Hubei province, China. It is caused by SARS-CoV-2 which is transmitted by respiratory droplets, direct human contact, as well as through asymptomatic carriers [1], [2]. In March 2020 it was declared as a pandemic by WHO [3].

During these difficult times, healthcare workers (HCW) which included all medical staff (doctors, nurses, allied health workers and other paramedical workers) were involved in screening, carrying, nursing, and treating the affected day and night. Among the HCW, whose work involved direct contact with the affected patients were more at risk than others. They also worry about becoming infected or infecting their family members by improperly handling the work assigned to them, that means all outbreaks causes stress among medical staff [4]. Stress is one of the primary causes of insomnia [5]. Also, previous studies conducted during and after the earlier SARS, H1N1 and Ebola epidemics have reported that there is an increased incidence of psychological

problems among healthcare workers [6],[7],[8],[9], [10],[11],[12],[13].

So, it is of utmost importance to assess the psychological health as much as the physical health of the HCW. Several studies are addressing the mental problems of the general population during this COVID-19 pandemic, but there are very few studies addressing the psychological issues faced by frontline medical staff, especially Indian studies. So, the HCW must be protected from mental health problems to control the pandemic and also ensure their long-term wellbeing [5].

RATIONALE

The rationale of this study is to find the psychological effect on frontline workers due to the Covid-19 pandemic.

EXISTING DEFICIENCIES OF CURRENT LITERATURE: The available data regarding the study are based on other countries which may not apply to the south Indian population subset.

II. MATERIAL AND METHODS

Study design: Cross-sectional

Study Setting: Hospitals-Government and private, working as COVID-19 frontline.

Study duration (including data collection period): 2months.

Study Tools: Insomnia Severity Index (ISI) and DASS-21 (Depression, Anxiety and Stress Scale 21) questionnaire.

An online Google Form consisting of pre-designed questionnaires (DASS-21 and ISI) and demographic details was sent to the personal accounts of frontline medical health workers of South India (doctors, nurses, allied health and other medical health staff) through social media such as WhatsApp, Facebook, Instagram, and Gmail. Data collection was carried out during November and December of 2019. The statistical package of social sciences (SPSS) version 20 was used for analyzing the data. To find the correlation of depression, anxiety and stress to insomnia, Pearson's correlation was used. The socio-demographic features and prevalence of depression, anxiety, and stress were described using descriptive statistics.

TOOLS

1. *Questionnaire:* The questionnaire consists of socio-demographic data and other pre-designed questions of DASS-21 and ISI.

2.*Socio-demographic data:* It consists of variables such as age, occupation, hospital setting, marital status, gender, working in, any pre-existing physical abnormalities, any pre-existing psychological abnormalities, any sleep disturbances before COVID-19

3.*Insomnia severity index (ISI):* It consists of seven questions involving the severity and quality of sleep. Each question has a score ranging from 0-4. These seven are added to get a total score,

4.*The Depression, Anxiety and Stress Scale-21 (DASS-21):* It is a scale used to evaluate depression, anxiety, and stress by analyzing the self–report made by the participants. The three scales contain 7 items respectively which are further divided into subscales with similar content. The depression scale is used for assessing anhedonia, hopelessness, self-deprecation, devaluation of life, lack of interest/involvement, dysphoria, and inertia. The anxiety scale is used to assess skeletal muscle effects, autonomic arousal, situational anxiety, and subjective experience of anxious effect. The stress scale assesses difficulty relaxing, nervous arousal, and being easily upset or agitated, irritable or overactive and impatient.

Scores for depression, anxiety, and stress are calculated by summing the scores and multiplying by 2.

SAMPLE SIZE

The pilot study conducted previously showed at least 3/4th of the participants is distressed, and half of them had symptoms of depression, 2/5th of the healthcare workers reported anxiety symptoms and a third of them reported insomnia. There is increasing evidence suggesting that COVID-19 alone can be a factor of stress in medical healthcare workers [14]. Our sample size was 100.

Selection of study participants:

(a)Inclusion criteria

1. Healthcare workers (doctors, nurses, allied health and other medical health staff) working as frontline workers during the pandemic in South India.

(b) Exclusion criteria

1. Other healthcare workers not involved in the COVID-19 pandemic

Informed consent is obtained through the google form. The study got ethical clearance from the IRB department of AIMS, Kochi

III. RESULT

Most of the participants 55 (39.9%) were in the age group of 18-30. 52 (37.7%) were females and 48(34.8%) were males. Most of the participants in our study were doctors (64(46.4%) followed by allied health professionals (N=14, 10.1%), paramedical staff (N=13,9.4%), and nurses(N=9,6.5%).

TABLE I: A comparison of prevalence of depression, stress, anxiety and insomnia among different groups

	MILD TO EXTREMELY SEVERE			SCORE =/>8
	DEPRESSION (n=38)	ANXIETY (n=43)	STRESS (n=25)	INSOMNIA (n=42)
GENDER				
FEMALE	19	21	12	21
MALE	19	22	13	21
OCCUPATION				
DOCTOR	17	21	9	23
NURSE	4	5	3	4
PARAMEDICAL STAFF	8	8	5	8
ALLIED HEALTH PROFESSIONAL	9	9	7	7
MARITAL STATUS				
SINGLE	16	18	10	16
MARRIED	22	25	15	26
WORKING IN				
GOVT HOSPITAL	24	25	14	22
PRIVATE HOSPITAL	13	17	10	17
OTHER	1	1	1	3
HOSPITAL SETTING				
RURAL	17	16	12	12
URBAN	21	27	13	30
PRE-EXISTING PHYSICAL ABNORMALITIES				
DIABETES	0	1	0	1
HYPERTENSION	2	2	1	3
OTHER	3	2	2	3
NO PRE-EXISTING PHYSICAL ABNORMALITIES	33	38	22	35
PRE-EXISTING PSYCHOLOGICAL DISTRESS				
ANXIETY	0	0	0	0
STRESS	4	4	3	4
NO PRE-EXISTING PSYCHOLOGICAL DISTRESS	34	39	22	38
ANY SLEEP DISTURBANCES BEFORE COVID 19				
YES	4	5	2	15
NO	34	38	23	37
AGE				
18-30	19	21	10	19
31-40	9	11	7	10
41-50	8	8	5	8
51-60	2	3	3	4
ABOVE 61	0	0	0	0

This is one of the first studies done for evaluating the relationship and assessing the sleep disturbances and psychological distress among the frontline HCW during the COVID-19 pandemic in South India.

Table I shows a comparison of the prevalence of depression, stress, anxiety, and insomnia among different groups. Among 100 participants it was found that 38% had signs and symptoms of depression with equal distributions among males and females (19%). 43% had anxiety (21% females, 22% males). 25% showed stress of which 13% were males and 12% females. While considering insomnia, 42% showed signs and symptoms of insomnia with an equal distribution among males and females (21%). Occupational-wise, it was seen that 17% of doctors, 9% allied health professionals, 8% paramedical staff, and 4% nurses had depression.

		DEPRESSION	*ANXIETY*	*STRESS*
ISI	*PEARSON CORRELATION COEFFICIENT*	*.542***	*.652***	*.670***
	P VALUE	*<0.001*	*<0.001*	*<0.001*
	N	*100*	*100*	*91*

It was also seen that doctors were suffering from more anxiety when compared to other HCW (21%). Similarly, while we were considering stress and insomnia it was also noted that doctors were more affected (9% and 23% respectively). When we were considering marital status, it was seen that married people suffered from depression (22%), anxiety (25%), stress (15%), and insomnia (26%) more than people who were not. People working in government hospitals in the urban sectors responded having depression (24%, 21%), anxiety (25%, 27%), stress (14%, 13%), and insomnia (22%, 30%) more than the people working in private hospitals or other working conditions and rural areas. Many of the participants who responded had no pre-existing physical abnormalities, psychological distresses as well as sleep disturbances before COVID-19. When we considered age, people from the age group of 18-30 were more depressed (19%), anxious (21%), stressed (10%), and insomniac (19%) as compared to other age groups.

STATISTICAL ANALYSIS

Among 100 participants, signs and symptoms of mild, moderate, severe and extremely severe depression were observed among 8%, 14 %, 5 %, 11 %. Of the total 38, who had signs and symptoms of depression, half of them were in the age group 18-30 (19%). There is no difference between incidence in Males (N=19) and Females (N=19). 17/38 were doctors.

Using Pearson's Correlation, it was found that sleep disturbance and depression had a positive moderate correlation (r =0.542) with a p-value of <0.001. 43 exhibited symptoms of anxiety (mild=11, moderate=13, severe=8, extremely severe=11). Nearly half of them (21) were doctors and within the 18-30 years of age group (21). Using Pearson's correlation, anxiety is also found to have a positive moderate correlation (r=0.652) with sleep which was found to be significant (p=<0.001). Only 25 participants had symptoms of stress, of which most of them had only moderate symptoms (14). There was no significant predisposition to profession or age groups. A positive moderate correlation (r=0.670) which is significant (p=<0.001) is found between stress and sleep too. Prevalence of insomnia is found among 42 frontline workers with no gender predilection. Most of them were doctors. Nearly half of them (19) were younger individuals (18-30yrs). The above 4 variables don't show any female or male predilection. One thing which was common for all these variables was, married people are showing symptoms of depression, anxiety, stress, and insomnia (22%, 25%, 15%, 26% respectively) slightly more than unmarried individuals. This is pointing towards the fact that they may have these symptoms due to the fear of infecting their family. Most of the individuals who are having the symptoms don't have any pre-existing physical, psychological or sleep disturbances.

IV. DISCUSSION

As reported by Lai et al. the level of depression, anxiety, insomnia, and other distress symptoms among nurses, females, and front-line workers was more [15]. Also, according to him, in HCW anxiety had no relation with age, sex, education, marital status, location, or psychological counseling requirements [16]. As per Zhang et al. 's, the likelihood of insomnia and education level had an inverse relation among those working as HCW. The authors related this to the night shifts, workload, and also as compared to doctors, nurses are more in contact with risky patients [17]. When compared with this study, we got an entirely different picture, that is most of the people who are suffering were doctors working in urban areas and the study did not show much predilection for gender. Health workers have to witness patients' death, and later have to inform the dead person's family through phone or by video call as there are no normal routines for notifying deaths [18] which leads to excessive stress among HCWs [19],[20],[21], [22],[23]. These problems cause an impact on the quality of sleep of the health care worker as well as to have a greater chance of them developing post-traumatic stress disorder (PTSD) [24]. Those individuals who have PTSD are bound to be at a greater risk of suicidal thoughts and some of them committed suicide [18].The work of a medical worker is extremely risky and mental health disorders like PTSD should be given relevant attention to prevent any suicidal attempts.[25].As per Chew et al.'s study, there has been a very significant association between the prevalence of physical symptoms and psychological outcomes among HCWs during the pandemic[26]. Despite all risks and the outcomes, only one in ten medical health care workers are known to have received any kind of psychiatric support [18].

KIRAN, a 24/7 toll-free mental health rehabilitation helpline, through video conferencing was launched by the Union minister for social justice and empowerment Thaawar Chand Gehlot [27]. Central government along with NIMHANS has also launched a teletherapy helpline on mental issues related to the COVID pandemic and lockdown [28]. The hospitals have established tele-psychiatric applications and local psychiatric support measures which were later introduced in many countries [29],[30]. According to this study, we can establish a relationship between sleep quality and the incidence of depression, anxiety, and stress. In our study, the prevalence of insomnia is 42%. Previous studies show a prevalence rate of 50.4% [18]. Using Pearson's correlation, a significant relationship was established between insomnia and stress which was consistent with a previous study conducted in Romania with an R-value of 0.59 in between insomnia and secondary traumatic stress [31]. Also, a significant relationship was established between insomnia, depression, and anxiety. A similar result, where it has been found that depression and anxiety are more common among insomniac people in a Chinese study [17]. In the same study, the prevalence of insomnia, depression, and anxiety was found to be 36.1%, 50.7%,44.7%. When compared to a prevalence of 42%, 30%, and 32% (insomnia, depression, and anxiety) In our study, the above result shows inconsistency. Studies of Lie et al, (d=50.4%, a=44.6%I=34.0%) [14], Que et al (d=44.37%a=46.04%I=28.75%) [32] and Liu et al (d=50.7%a=44-7%I=36.1%) [16], also shows entirely different values from our study.

This difference may be due to the use of different population settings, different measuring tools, study period differences, sample size differences, and differences in the distribution of data among health workers (the questionnaire was sent mostly to people who belonged in the age group of 18 to 30 and doctors).

V. CONCLUSION

Generally, however, it appears that HCW are facing sleep disturbances as well as psychological distress during the COVID-19 pandemic. Hence a significant connection was established between insomnia and psychological distress (depression, anxiety, stress) in frontline workers. It's also seen that our frontline medical workers have a major need for psychiatric support, both now during the pandemic and after in the future [18].

LIMITATIONS OF OUR STUDY

The smaller sample size was one of the major limitations of our study; a bigger sample size can produce variation in results. Also, since it is an online survey, we were not able to interact directly with the subjects and assess their correct physical and emotional environment.

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