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Insomnia and its Correlates during a Pandemic in District Ghaziabad

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ABSTRACT
COVID-19 pandemic is a global health crisis, and has forced countries into lockdown. Starting from 24th March, 2020 a nationwide lockdown was enforced in India. The frontline workers as well as citizens confined to their homes had a wide array of psychosocial and mental health problems. To assess the prevalence of insomnia and its corelates among the adult population during COVID-19 pandemic. This is a cross-sectional study conducted among the adult population residing in urban areas of district Ghaziabad, Uttar Pradesh, India. The sample size for the study was calculated to be 396 individuals. Questionnaire used to collect information was pre-designed, semi-structured type. Insomnia was graded as per the Insomnia Severity Index and appropriate statistical tests were used to find its relation with the associated factors. There were 396 study participants, confirmed or suspected cases of COVID-19 included 36 (9.1%) individuals, those suffering from insomnia consisted of 58 (14.6%) individuals. Prevalence of Insomnia was comparable among the females and the males (females: males = 1.3:1). Living alone was strongly associated with insomnia (81.8%). Regression analysis suggested that among individuals who were divorced, insomnia was six times more common as compared to married people (OR 6 [95% CI, 1.1-3.3]). Among individuals who faced exposure at work insomnia was four times more than those who did not (OR 4 [95% CI, 2.1-7.9]). Individuals who had a COVID related death in the family suffered from insomnia twice (OR 2.1 [95% CI, 1.06-4.2]). as much as individuals who did not. During the pandemic individuals have been forced to lead a restricted lifestyle causing an impact on their mental health. Recognizing the vulnerable population and finding solutions will prevent and help to bring down the morbidity due to insomnia in our country.
KEYWORDS: *Covid-19, Pandemic, Insomnia, Insomnia Severity Index*

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INTRODUCTION

The COVID-19 pandemic has had a devastating impact on the physical and mental health of people all over the world. The strict quarantine, isolation protocols along with the fear of contracting an illness with an unpredictable course and outcome, has contributed to the mental health morbidity among the patients and the general population alike.

Sleep is a vital physiological state which recharges the immune system, regulates body metabolism, maintains brain plasticity and cognitive skills [1]. At the same time, reduced or disturbed sleep leads to decreased cognitive functions and physical abilities. As this cycle continuous over time, it causes deleterious effects on health with an increased risk of diseases like obesity, diabetes, stroke, cancer and cardiovascular disorders [2] Stress has been studied to be intimately linked to insomnia via neurobiological mechanisms [3]. Sleep and stress have a two-way relationship in a manner that stressors impact the quality and vice versa [4]. Insomnia is an important public health challenge because of its association with impairment of quality of life, work absenteeism, and considerable medical and societal costs [5]. The psychological effect of working in stressful situations during the SARS outbreak, resulted in insomnia among frontline and health care workers [6]. The COVID-19 pandemic has resulted in economic losses, and has brought the social life of individuals to a standstill. These paradigm shifts along with quarantine and isolation enforced by authorities with ever changing protocols in light of new evidence has had an adverse psychological impact on the population [7]. Insomnia attributable to COVID-19 pandemic has been largely under-reported in the general population, and most studies have focussed on insomnia among healthcare and frontline workers. Therefore, this study was designed to examine the sleep quality of general population including frontline workers, during the lockdown period of COVID-19 pandemic in India, and to determine the factors associated with insomnia.

MATERIAL AND METHODS

This is an observational cross-sectional study. It was conducted from 1st April 2020 to 15th July 2020 through a house-to-house survey, among the urban adult population of Ghaziabad district. Questionnaire used was pre-designed and semi-structured one. Medical ethics committee of Santosh Deemed to be university approved the study prior to its commencement collection in the field. The data for the prevalence of insomnia among the general population of India during the coronavirus pandemic was lacking, and global data varied from 6% to as high as 76.3% in order to calculate the sample size, prevalence of insomnia among the general population during the COVID-19 pandemic was assumed to be 50%. With a 5% degree of precision, our sample size came out to be 384. District of Ghaziabad comprises of 5 zones and from our database, 80 houses were selected randomly from each zone. We decided to randomly choose an adult participant from each household; thereby, 400 adults residing in Ghaziabad city were planned to be interviewed. We excluded those people who refused to give consent for the study, and/or those who had not completed 18 years of age. Thus, information was collected from 396 participants. The questionnaire consisted of 4 sections to gather socio-demographic information, pandemic-related information, quarantine conditions and social attitudes during the COVID-19 pandemic including a standardized scale – Insomnia Severity Index (ISI). ISI includes a normal score of (0-7), subthreshold score of (8-14), moderate score (15-21), and severe score (22-28) [8]. SPSS trial version 16 was used for analysis. Appropriate statistical tests were applied to determine the results, and multinomial logistic regression analysis was used to determine association between various factors and insomnia.

RESULT AND DISCUSSION

DEMOGRAPHIC CHARACTERISTICS

There were 203 males (51.3%) among the total 396 individuals under study. The mean age (SD) of the respondents was 38.2 (±12.7) years; and most of the participants were 40 years or younger (235 people, i.e., 59.3%). There were 274 (69.2%) participants living in nuclear families. More than half of the participants, 210 (53%) participants had a monthly family income of less than one lac rupees (<675 USD). It was observed that 315 (79.5%) people were graduates or post-graduates, with 48 individuals (12.1%) in government services, 131 people (33.1%) in private job, 79 (19.9%) people were self-employed, and 138 (34.8%) individuals were either student/housewives/unemployed. There were 303 (76.5%) married participants. The complete socio-demographic characteristics are depicted in table 1 below.

Table 1: Socio-demographic characteristics of the study population

Socio-demographic features	Number (n=396)	Percentage (%)
Gender		
Male	203	51.3
Female	193	48.7
Type of family		
Nuclear	274	69.2
Joint	102	25.8
Living Alone	20	5.1
Age (in years)		
18- 30	143	36.1
31-40	92	23.2
41-50	96	24.2
51-60	44	11.1
61 and above	21	5.3
Family income per month (in INR)		
less than 50000 [<675 USD]	137	34.6
50000 – 100000 [675 - 1349 USD]	73	18.4
100000 – 200000 [1349 – 2697 USD]	75	18.9
200000 and above [>2697 USD]	111	28.0
Marital status		
Married	303	76.5
Unmarried	86	21.7
Divorced or separated	7	1.8
Education		
Up to Primary school / Illiterate	9	2.3

Up to middle school	6	1.5
Up to 12 class	66	16.7
Graduate	166	41.9
Postgraduate	149	37.6
Employment		
Government job	48	12.1
Private job	131	33.1
Self employed	79	19.9
Unemployed	138	34.8

COVID-19 PANDEMIC-RELATED STATISTICS

We found that 36 respondents (9.1%) had a confirmed or suspected infection with COVID-19. Nearly one in three participants (128 people, 32.3%) reported that someone in their family or friend circle was infected with COVID-19; and 68 individuals (17.2%) had lost someone in their family or their friends to the COVID-19 disease. Frontline workers constituted 14.9% (59 people) of the total individuals participating in the study, and 41 of these people (69.5%) were directly exposed to COVID-19 patients at work. There were 58 (14.8%) people who were living with a frontline COVID-19 worker. During the pandemic at least 55 (13.9%) respondents underwent quarantine at least once, while 62 individuals (15.7%) reported that a household member had to undergo quarantine. **Table 2** summarizes the complete COVID-19 pandemic related statistics below.

Table 2: COVID-19 pandemic related statistics of the study population

COVID-19 pandemic-related statistics	Number (n=396)	Percentage (%)
Infected with COVID-19		
Yes	10	2.5
Suspected	26	6.6
No	360	90.9
Quarantine (positive/suspected COVID infection)		
Yes	55	13.9
No +	341	86.1
Immediate family members quarantined due to Covid-19 infection or suspected infection?		
Yes	62	15.7
No	334	84.3
Family and friends infected with COVID-19		
Yes	128	32.3
No	268	67.7
Covid-19 related death: - family/ friends/ neighbours		
Yes	68	17.2
No	328	82.8
Family member is a front line COVID-19 worker		
Yes	63	15.9
No	333	84.1
Front line COVID-19 worker		
Yes	59	14.9
No	337	85.1

FACTORS ASSOCIATED WITH SYMPTOMS OF INSOMNIA.

Insomnia was found among 58 (14.6%) participants, with mild insomnia in 32 (8.1%) people, moderate insomnia in 23 (5.8%) individuals, to severe insomnia in 3 (0.8%) individuals. Prevalence of insomnia among the females was found to be slightly higher as compared to males (16.6% vs 12.8%; females: males = 1.3**:**1). The family structure had a significant relation (p value <0.001) to the prevalence of insomnia, which was 14.2% (10 out of 102) for people living in joint families, 14.2% (39 out of 274) for people living in nuclear families and increased to 45% (9 out of 20) for people living alone. There was no relation found between total family income per month and insomnia. Insomnia was not significantly

associated with individuals who had either suspected or confirmed COVID-19 infection. Those participants who had a household member or friend infected with COVID-19 had significantly higher prevalence of insomnia (25% vs 9.7%, p value <0.001).

We analysed the association of various factors with insomnia using multinomial logistic regression analysis. We found that insomnia was ten times more common among divorced/separated individuals (OR 10.5 [95% CI 2.04 – 49.02]); and was two times more common in unmarried individuals (OR 2.3 [95% CI 1.2 – 4.4]), as compared to married people. Individuals living alone were seven times likely to be suffering from insomnia (OR 7.5 [95% CI 2.2 – 22.2]), as compared to people residing in joint families. Respondents having friends or family members who had tested positive (OR 3.1 [95% CI 1.7 – 5.4]); and participants who had come in contact with individuals with COVID-19 suffered from insomnia (OR 2.3 [95% CI 1.2-4.5]). Participants who underwent quarantine during the COVID-19 pandemic had twice the risk of having insomnia (OR 2.0 [95% CI 1.01 – 4.08]); and if any household member was quarantined during the pandemic, the risk of insomnia was nearly twice (OR 1.9 [95% CI 0.97 – 3.77]). We evaluated the effect of practicing meditation, yoga and pursuing hobbies during lockdown, on the prevalence of insomnia. We found that exercising at home/ practicing yoga regularly reduced insomnia (OR 0.42 [95% CI 0.21 – 0.85]), as did practicing meditation regularly (OR 0.3 [95% CI 0.09 – 0.99]). Pursuing hobbies during lockdown, had no significant effect on reducing insomnia. **Table 3** summarizes the results of multinomial logistic regression analysis for factors associated with Insomnia.

Table 3: Multinomial logistic regression analysis for factors associated with Insomnia.

Variables under study		Insomnia		Total (100%)	p-value	aOR	95% CI
		Present (%)	None (%)				
Age	40 years or younger	41 (17.4)	194(82.5)	235	0.057	0.559	0.30-1.02
	> 40 years	17(11.8)	144(88.2)	161		Reference	
Gender	Female	32 (16.6)	161 (83.4)	193	0.028	1.3	0.77 – 2.4
	Male	26 (12.8)	177 (87.2)	203		Reference	
Type of Family	Living Alone	9 (45)	11 (55)	20	<0.000	7.5*	2.2- 22.5
	Nuclear	39 (14.2)	235 (85.8)	274		1.5	0.73 – 3.1
	Joint	10 (9.8)	92 (90.2)	102		Reference	
Marital status	Divorced or separated	4 (57.1)	3 (42.8)	7	<0.001	10.5*	2.04 –49.02
	Unmarried	20 (23.2)	66(76.7)	86		2.3 *	1.2 – 4.4
	Married	34 (11.2)	269 (88.8)	303		Reference	
Employment	Not employed	20 (14.5)	118 (85.5)	138	0.950	1.02	1.35 - 3.44
	Employed	38 (14.7)	220 (85.3)	258		Reference	
Income per month in rupees (INR)	< 50,000	12 (8.8)	125 (91.2)	137	6.84	0.531	0.24-1.16
	50,000-100000	15 (20.5)	58 (79.4)	73		1.4	0.66 - 3.08
	100000- 200000	14 (18.6)	61 (81.3)	75		1.29	0.58 - 2.76
	200000 and above	17 (15.3)	94 (84.7)	111		Reference	
Substantial reduction in family income	Yes	41 (16.8)	202 (83.1)	243	<0.114	1.6	0.88 – 2.9
	No	17 (11.1)	136 (88.8)	153		Reference	
Infected with COVID-19	Suspected/ Confirmed	7 (19.4)	29 (80.5)	36	0.729	1.4	0.61 – 3.5
	No	51 (14.2)	309 (85.8)	360		Reference	
Family/ friends infected with COVID-19	Yes	32 (25)	96 (75)	128	<0.000	3.1*	1.7 – 5.48
	No	26 (9.7)	242 (90.3)	268		Reference	
Contact with patients of Covid-	Yes	15 (25.4)	44 (74.6)	59	0.011	2.3*	1.19- 4.54

19.	No	43 (12.7)	294 (87.2)	337		Reference	
Quarantine during the COVID-19 pandemic	Yes	13 (23.6)	42 (76.4)	55	<0.042	2.0*	1.01 – 4.08
	No	45 (13.2)	296 (86.8)	341		Reference	
Family/ friends had to quarantine	Yes	14 (22.6)	48 (77.4)	62	0.054	1.9	0.97 - 3.77
	No	44 (13.2)	290 (86.8)	334		Reference	
Covid-19 death among your family/ friends	Yes	16 (23.5)	52 (76.5)	68	<0.023	2.09*	1.09 –4.00
	No	42 (12.8)	286 (87.2)	328		Reference	
Practice meditation regularly	Yes	3 (5.5)	52 (94.5)	55	0.038	0.3*	0.09 – .995
	No	55 (16.1)	286 (83.9)	341		Reference	
Pursue any hobby during lockdown	Yes	24 (12.2)	172 (87.8)	196	0.181	0.681	0.387-1.19
	No	34 (17)	166 (83)	200		Reference	
Exercise/ practice yoga regularly	Yes	11 (8.4)	120 (91.6)	131	0.013	0.42*	0.21-0.85
	No	47 (17.7)	218 (82.3)	265		Reference	

Prevalence of Insomnia and its correlates were explored among the urban population of district Ghaziabad, during the lockdown phase of COVID-19 pandemic. Symptoms of insomnia were exhibited by 14.6% of the respondents.

According to the cognitive–behavioural model of insomnia, stress is the most common precipitating factor. Stress seems to trigger a state of chronic hyperarousal leading to impaired sleep quality. The lockdown imposed during the COVID-19 pandemic was found to be a stressor which impacted the emotional state of the people, leading to insomnia. In this study there were 203 males (51.3%) among the total 396 individuals under study. The mean age (SD) of the respondents was 38.2 (12.7) years; and most were 40 years or younger (235 people, i.e., 59.3%). We found that females had a greater predisposition to insomnia than males, similar results were observed in other studies conducted by San Martin *et al* and Gualano M.R. *et al* respectively [9-10]. In contrast to these findings Le Shi et al found that males were more susceptible to mental illnesses than females during the pandemic [11]. Yu-Tao Xiang et al observed that those who were divorced, separated, and widowed were more susceptible to insomnia, both in urban and rural areas [12]. Our observation was similar and showed that divorced or separated individuals had ten times higher chance of developing insomnia, while unmarried individuals were twice as likely to suffer from insomnia than married individuals.

Ephraim S et al found that COVID-19 related loneliness was associated with poor quality of sleep. The loneliness-sleep association was especially strong among those with more COVID-19 related worries or among those with lower resilience [13]. In corroboration to this, we found that individuals who were living alone had higher chances of insomnia than those living in a joint family.

Le Shi et al found that participants with confirmed or suspected COVID-19 cases and their family members or friends had a three times higher risk for developing insomnia. Our findings were consistent with these results, reflecting the stress and fear associated with contracting COVID-19 virus. It was found that among individuals undergoing quarantine / isolation, prevalence of insomnia which was a 23.6% which was lesser than studies by San Martin et al. Franceschini C showed that sleep habits get altered due to quarantine leading to poor sleep quality [14]. Regular schedules also played a role: complaints of poor sleep have been associated with irregular sleeping patterns. Yu-Tao Xiang et al found an unusually high rate of psychiatric disorder among insomniacs. (5) In our study we found that those who were exercising regularly or doing yoga were less likely to have symptoms of insomnia similarly Mangesh A. et.al found that subjective sleep quality and habitual sleep efficiency were significantly better ($P<0.0001$) in group of persons doing Yoga than non-Yoga group participants [15].

In Conclusion, our study showed that insomnia was prevalent mental health problem during the lockdown / quarantine period. We found its association with living alone, with divorce/ separation and those living single. Participants who underwent quarantine had increased risk of insomnia; further risk

factors included having a household member who was quarantined during the pandemic. Factors protective of insomnia included exercising / practicing yoga regularly. The long-term mental health effects of insomnia resulting due to stressors like COVID19 pandemic may become evident as further studies are carried out to explore these facets.

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