ORIGINAL RESEARCH PAPER

Psychiatry

STUDY OF INSOMNIA IN HOSPITALIZED COVID-19 PATIENTS IN A TERTIARY CARE HOSPITAL OF CENTRAL GUJARAT

KEY WORDS: COVID-19, Insomnia, Stress, General ward Patients

Dr. Drashti Shah* 3rd year pg resident, Department of Psychiatry, GMERS Medical College, Gotri, Vadodara, India. 390021 *Corresponding Author

Dr Nimisha Desai Associate Professor, Department of Psychiatry, GMERS Medical College, Gotri, Vadodara, India. 390021

Dr Saurabh N Shah Assistant Professor, Department of Psychiatry, GMERS Medical College, Gotri, Vadodara, India. 390021

Dr. Sandip H. Shah Professor and Head, Department of Psychiatry, GMERS, Medical College Gotri, Vadodara, 390021, India

ABSTRACT

Background: Targeting underlying psychological issues and insomnia in hospitalized COVID-19 patients would contribute to early recovery of patient. So, this study aimed to assess insomnia and psychological stress. **Methods:** Prospective Longitudinal quantitative study was conducted during the first wave of COVID-19 pandemic in all the patients admitted in general COVID-19 ward over a period of 3 months. Two stage cross sectional assessment was done using a semi Structured interview schedule via telephonic mode which include socio-demographic profile, illness history and stressors if any on Day one and day 10 of hospitalization. Insomnia Severity Index and Patient Health Questionnaire-4 was utilized for assessing insomnia and psychological stress. Appropriate statistical analysis was done using MS excel software. **Results:** Total 194 patients (mean age= 55 years, 58% Males) completed both assessments on Day 1 and Day 10 of hospitalization. Prevalence of Insomnia was 24% and 9% on Day 1 and 10 respectively and reduction was statistically significant ($p< 0.001$). Prevalence of psychological stress based on PHQ-4 was 8% on day of admission and 5% on day 10. The mean duration of hospitalization was 4.7 days. A moderate to weak correlation was found in between insomnia and psychological stress ($r=0.45$). patients <30years of age had higher insomnia levels during both interviews that is 37% and 18% in 1st and 2nd interview while the psychological stress in the same age group was 19% in both the interviews. **Conclusion:** The patients who were admitted in the general ward had insomnia and psychological stress during early phase of illness and in majority of them insomnia was self-remitting.

INTRODUCTION

Insomnia is a predominant complain of dissatisfaction with sleep quality or quantity associated with either difficulty in initiating, maintaining or returning to sleep in early morning for a minimum of 3nights/ week for at least 1 month according to the icd-10 definition. Insomnia could be of two types, primary (without any underlying cause) and secondary. One of the main causes of secondary insomnia is psychological distress. [1]

The World Health Organization declared the outbreak of a respiratory virus by the name of ncov-19 a Public Health Emergency of International Concern on 30 January 2020, and a pandemic on 11 March 2020. [2]. Before the pandemic period the prevalence of sleep disturbance was around 48% in a tertiary care hospital, in adults who suffered from infection.[3] While in general population there was 21% prevalence of sleep disturbance pre lockdown, over the lockdown period of COVID-19 due to the changes in sleep and work pattern there was 23% population which showed new onset sleep problems owing to the additional stress and new lifestyle changes.[4]

The pandemic has been observed to be a trigger for psychosocial disturbances, due to isolation from support system (like family, friends, and even coworkers), loss of job, fear of infection and decreased access to mental health facilities .[5]

So the published data states that hospitalized patients have higher chances of insomnia and psychological stress than the non-hospitalized population [6] and the data even shows that the COVID-19 pandemic has negatively affected the sleep patterns and mental health of the general population.[7] Chronic insomnia can lead to new onset psychiatric disorders along with decrease in immune functioning, so early recognition and treatment becomes important in prevention of future comorbidities.[8] Thus, this study is aimed to assess insomnia and psychological stress amongst hospitalized COVID-19 patients as early recognition helps in overall treatment and recovery.

AIMS AND OBJECTIVES

1. To study prevalence of Insomnia in patients who were COVID -19 Positive
2. To screen for psychological stress in patients who were COVID-19 positive

Methodology

Sample population

Patients admitted for the treatment of COVID-19 in General ward of covid-19 designated tertiary care hospital.

Study Design

Prospective Longitudinal quantitative study

Study Period

3 months

Inclusion Criteria

All the Patients above the age of 18 years admitted in general COVID-19 ward and tested positive for COVID-19 either via Rapid Antigen Test or RT-PCR.

Exclusion Criteria

i. Patients who were admitted in ICU.
ii. Patients with known psychiatric illness or known case of sleep disorder or on psychotropic drugs (including Benzodiazepines) or with history of alcohol use in the last 1 month.
iii. Patients who did not give consent or were unable to participate due to physical conditions. Patients whose call were unreachable or not answered.

3. Study procedure

i. Approval from the institutional human ethics committee was taken before commencement of the study.
ii. Contact information was taken after due permission from hospital records and hospital authority
iii. The patients were be selected according to the inclusion criteria as mentioned above. The sample size was calculated using appropriate calculator.[9]
iv. We contacted the patients and verbal informed consent was taken before the commencement of the interview. The interview was planned as per their time convenience and verbal informed consent was taken. Telephonic interview was done in lieu of COVID-19 protocol and guidelines of the institute.
v. Contact number of the patient was taken on the first day of the interview and retained till the end of the last interview.
vi. Brief history regarding their socio-demographic profile, illness and any significant stressors in their life was taken. Patients were subjected to Insomnia Severity Index (ISI) and Patient Health questionnaire-4 (PHQ-4) on day of admission and on 10th day of hospitalization.
vii. All necessary steps were taken to maintain confidentiality of the patients.

4. Study tools

I. Semi-structured interview guide including

General History

Name, Age, Gender, Occupation, Education, Address, Contact No, Substance use, Co-morbidity, Medications, Stressors, and Family Members infected with COVID-19

ii. Insomnia Severity Index

Insomnia Severity Index consists of a series of 7 questions for rating severity of insomnia on a scale of 0-4 over the last 15 days. The validity and reliability is around 86.1% and 87.7% respectively.[10]

iii. Patient Health Questionnaire-4 (PHQ-4)

PHQ-4 consists of a series of 4 questions for the psychological stress on a scale of 0-3 over the last 15 days. The validity and reliability of the scale is around 80.5% and 94.5% respectively.[11]

RESULTS

The study was conducted during the first wave of the pandemic. Out of 250 patients in which we conducted 1st interview, 194 patients could be approached for 2nd interview as in 35 patients the contact was unavailable, 13 were shifted to ICU, 4 were on psychotropic medications and 6 died. 1st interview was done at the day of hospitalization while 2nd interview was carried out at 10th day post hospitalization as shown in Figure: 1. Average of 4.7 days of hospitalization was seen.

During the 1st interview, 23% had sub-threshold insomnia, while 1% had moderate insomnia. While during the 2nd interview 9% had sub-threshold insomnia. In the PHQ-4 questionnaire, 6% showed mild psychological stress during 1st interview as compared to 4% during 2nd interview. 2% showed moderate psychological stress during 1st interview out of which 1% had showed stress during 2nd interview as shown in Table 1.

Table:2 shows the relation between the socio-demographic profile and its relation with insomnia and psychological stress, in which 16% females, while during the 2nd interview 8% both males and females had insomnia. While comparing their psychological stress as per PHQ-4, during 1st interview 10% of the males and 6% of females reported the same as compared to 2% and 9% respectively during the 2nd interview. 34 patients belonged to rural areas while 160 belonged to urban areas. During the 1st interview 32% had insomnia as compared to 21% in urban population, while 11% and 8% continued to have insomnia. 18% rural patients had reported stress during the 1st interview as compared to 9% during the 2nd interview. In urban patients it was found that 6% had stress while in 2nd interview 4% had the same.

30 patients had history of tobacco use, out of which 26% had insomnia and 13% reported stress during 1st interview as compared to 10% during 2nd interview. Out of those who did not take any substance had 23% prevalence of insomnia and 7% had stress during 1st interview which reduced to 8% and 5% respectively during 2nd interview.

25 patients reported known stressors during the interviews and out of them 44% had insomnia and 24% had psychological stress during 1st interview while 32% of the patients continued to have sleep disturbance and 20% continued to score higher on phq-4 during 2nd interview. In the patients who did not report any stressors, 20% had insomnia and 6% had stress during 1st interview as compared to 5% and 2% respectively during 2nd interview.

There were 16 patients who were below 30 years of age, 37% and 19% of them had showed insomnia and psychological stress during the 1st interview, while in 18% and 19% of the patients the insomnia and psychological stress continued on day 10 after admission respectively. The maximum patient population was in the age group of 30-60 years (93) out of which 26% and 8% showed insomnia and psychological stress on the day of admission out the 93 patients, 11% patients continued to have insomnia while 3% had psychological stress on day 10 also. The last age group consisted of the patients aged above 60 years, wherein 85 patients were enrolled out of which 17% had insomnia and 7% reported depression and anxiety on the day of hospitalization as compared to 3% and 4% who had insomnia and psychological stress during 2nd interview.

The mean duration of hospitalization was 4.7 days. 160 patients had less than 10 days of hospitalization, out of which 25% and 8% had insomnia and psychological stress during 1st interview while, 9% had insomnia and 4% psychological stress was present during 2nd interview. The 34 patients who had more than 10 days of admission period had 14% prevalence of insomnia while psychological stress was present in 9% patients during 1st interview, 5% patients had insomnia during 2nd interview as compared to psychological stress in 6% patients.

17% of illiterate patients had insomnia during the day of admission, while after 10 days only 5% had insomnia, 21% patients who had gone to school had insomnia during the 1st interview as compared to 9% during 2nd interview. There was insomnia prevalence of 29% in graduates and above at the day of hospitalization as compared to 7% during 2nd interview. 6% of illiterate patients had stress during both 1st and 2nd interview, while 8% patients who had schooling had stress at the time of admission as compared to 4% on 10th day and 9% of graduates had stress on day of admission versus 5% during 2nd interview. Out of 194 patients, 47% of them had relatives infected with COVID-19, out of which 20% had insomnia and 12% had stress during the 1st interview as compared to 7% having both insomnia and stress during the 2nd interview. While in those who did not have any family members with COVID-19 had a prevalence of 16% and 9% insomnia respectively during the 1st and 2nd interview. As compared to 5% and 3% stress during the 1st and 2nd interview.

The mean of the scores of the insomnia severity index interview were 3.5 and 1.2 respectively during the 1st and 2nd interview. The minimum and maximum scores during 1st interview were 0 and 21 while the scores during 2nd interview were 0 and 14 respectively. The standard deviation during 1st interview was 4.43 and that during 2nd interview was 2.75. The p value for the paired t-test was <0.001 which was significant.

Figure: 2 shows box and whisker plot indicating majority of the patients had average score from 0-7, with minimum of 0 score and maximum score reaching 16 in patients in patients who had sleep difficulties.

Figure: 3 is a scatter diagram of PHQ-4 versus ISI shows a moderate to weak correlation between insomnia and depression and anxiety as per ISI and PHQ-4 respectively.

DISCUSSION

COVID-19 pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS CoV-2) was declared as a pandemic approximately 100 years after the last pandemic of Spanish flu. [12] There have emergence of variants of virus due to changes in protein spike mutations which has led to faster spread of virus. [13] Such mutations and pandemic status of disease leads to unpredictability further increasing the risk of insomnia, depression and anxiety in both general population and hospitalized patients of COVID-19. [14]

We found that 23% had sub-threshold insomnia, while 1% had moderate insomnia in the 1st interview. While during the 2nd interview 9% had sub-threshold insomnia (that is a score of more than 7 on Insomnia severity index). These results were similar to a cross sectional study conducted in Anhui province of China where they found insomnia in 26.45% of the patients. [15] While according to a meta-analysis done by Deng et al found prevalence of insomnia to be approximately 34%. [16]

According to study conducted by Rajkumar et al wherein they found stress in 8% population[17] the results were comparable to our study where we found in PHQ-4 questionnaire that 6% population had mild psychological stress and 2% had moderate stress during 1st interview while to 4% during 2nd interview had mild psychological stress and 1% had showed moderate stress during 2nd interview.

According to a study conducted in 2017 by An Ho, et al found that there was 36% prevalence of new onset insomnia in patients admitted in general ward before COVID-19[18] which was more as compared to our study as the considered patients on oxygen support and requiring cardiac monitoring. Insomnia is more common in patients admitted to ICU because of severe illness, pain due to procedures and anxiety due to illness, which was found in a study from 2012, by Pisani et al. [19]

As per the results of our study we found that there was moderate to weak correlation between insomnia, anxiety and depression which was similar to the results compiled in the meta-analysis by Alimoradi et al. [20]

In a study by Aziz, Sadaf et al they found that females have more anxiety and depression as compared to males [21] while in our study we found that even though prevalence was less in females to males it was persistent through both the interviews.

In our study we found that majority of the patients who had sleep disturbances and psychological stress belonged to age below 30 years and it persisted even after 10 days. These results were different to the findings by Yadav R et al, in which they found a higher prevalence of sleep in middle to elder aged population and they found that the prevalence of depression and anxiety was also prevalent in middle aged and elderly but the results were comparable as they also found that more males had depression, anxiety and sleep disturbances. [22]

According to our results we found that the number of patients having insomnia and psychological stress in those who had family members infected was more than those who did not have infection in family members. Similar to a study from Egypt they by El Sayed et al, wherein they found that the sleep disturbances and quality of life were affected in those patients whose relatives had suffered from COVID-19. [23]

A study conducted by Bajaj S et al, during the initial phase of COVID-19 lockdown found that the population belonging to younger age groups and with lower income populations had more prevalence of insomnia similar to our study were we found that the patients in younger age groups had more prevalence of insomnia. [24]

CONCLUSION

The prevalence of new onset insomnia was significant in patients with COVID-19 especially in younger aged males who had less education.

Limitations

Our study was conducted in patients who did not require oxygen and were admitted general ward facility. So findings cannot be generalized for all COVID-19 patients. Interview was taken via telephonic mode so assessment bias may be there.

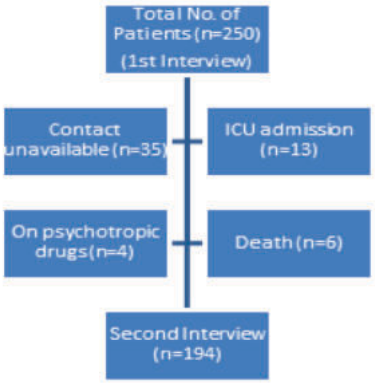

Figure: 1: Number of participants for both interview

Table 1: Prevalence of Insomnia and psychological stressor

	ISI (%)		PHQ-4 (%)	
	Day 1	Day 10	Day 1	Day 10
No	76	91	92	95
Yes	24	9	8	5

Table 2: Socio-demographic details and relation with insomnia and psychological stress

		ISI 1	%	ISI 2	%	PHQ1	%	PHQ2	%
Gender									
Male	114	33	28	10	8	11	10	2	2
Female	80	13	16	7	8	5	6	7	9
Address									
Rural	34	11	32	4	11	6	18	3	9
Urban	160	35	21	13	8	10	6	6	4
Tobacco Use									
Yes	30	8	26	3	10	4	13	0	0
No	164	38	23	14	8	12	7	9	5
Stressor									
Yes	25	11	44	8	32	6	24	5	20
No	169	34	20	10	5	10	6	4	2
Age									
<30	16	6	37	3	18	3	19	3	19
30-60	93	25	26	11	11	7	8	3	3
>60	85	15	17	3	3	6	7	3	4
Days of admission									
<10	160	41	25	15	9	13	8	7	4
>10	34	5	14	2	5	3	9	2	6
Education									
Illiterate	17	3	17	1	5	1	6	1	6

Schooling	113	24	21	11	9	9	8	5	4
Graduate and above	64	19	29	5	7	6	9	3	5
Family Member									
Yes	83	17	20	6	7	10	12	6	7
No	121	19	16	11	9	6	5	3	3

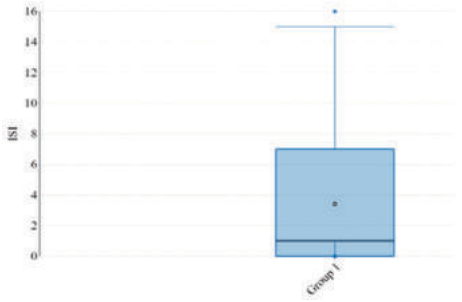

Figure 2: Box and Whisker diagram of Insomnia Severity Index

Figure 3: Scatter plot showing the relationship between Insomnia Severity index and Patient Health Questionnaire-4

REFERENCES

1. World Health Organization. (2004). ICD-10 : international statistical classification of diseases and related health problems : tenth revision, 2nd ed. World Health Organization .https://apps.who.int/iris/handle/10665/42980
2. WHO Director-General's opening remarks at the media briefing on COVID-19 – 11 March 2020". World Health Organization (WHO) (Press release). 11 March 2020. Archived from the original on 11 March 2020. Retrieved 20 July 20,2021
3. ManianFA,Manian CJ. Sleep quality in adult hospitalized patients with infection: an observational study. Am J Med Sci. 2015 Jan;349(1):56–60. PubMed PMID:25319438;eng.
4. Gupta R, Grover S, Basu A, Krishnan V, Tripathi A, Subramanyam A, et al.Changes in sleep pattern and sleep quality during COVID-19 lockdown. Indian J Psychiatry 2020;62:370-8
5. Alonzi S, Torre AL, Silverstein MW(2020); The Psychological Impact of Preexisting Mental and Physical Health Conditions During the COVID-19 Pandemic. Psychological Trauma: Theory, Research, Practice, and Policy , vol 12,S-236-238,http://dx.doi.org/10.1037/tra0000840.
6. Gambhir, Indrajeet & Chakrabarti, Sankha Shubhra & Sharma, Amit & Saran, Dharam. (2014). Insomnia in the elderly—A hospital-based study from North India. Journal of Clinical Gerontology and Geriatrics. 5. 10.1016/j. jcgg. 2014.05.005.
7. Effects Of Lockdown On Sleep Pattern In The General Population During Covid-19 Pandemic., Indian Journal of Psychiatry: March 2022 - Volume 64 - Issue Suppl 3 - p S544 doi: 10.4103/0019-5545.341556
8. Taylor DJ, Lichstein KL, Durrence HH. Insomnia as a health risk factor. Behav Sleep Med. 2003;1(4):227-47. doi: 10.1207/S15402010BSM0104_5. PMID: 15600216.
9. Dhand,N.K. &Khatkar,M.S.(2014).Statulator: An Online statistical calculator. Sample Size calculator for estimating a single proportion. Accessed 20 October 2020 at http://statulator.com/SampleSize/ssIP.html
10. Morin CM, Insomnia, psychological assessment and management. Guilford Press,NewYork,1993.
11. Kroenke K,Spitzer RL,Williams J B W,Lowe B,an Ultra brief screening scale for Anxiety and Depression: The PHQ-4.Psychosomatics 50: 613-621,Nov-Dec 2009.
12. Cascella M, Rajnik M, Aleem A, Dulebohn SC, Di Napoli R. Features, Evaluation, and Treatment of Coronavirus (COVID-19). 2022 May 4. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan–. PMID:32150360.
13. Akkız H. The Biological Functions and Clinical Significance of SARS-CoV-2 Variants of Corcern. Front Med (Lausanne). 2022 May 20;9:849217. doi: 10.3389/fmed.2022.849217.PMID:35669924;PMCID:PMC9163346.
14. Salari, N., Hosseinian-Far, A., Jalali, R. *et al.* Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Global Health* **16,** 57 (2020). https://doi.org/10.1186/s12992-020-00589-w
15. Xu F,Wang X,Yang Y,Zhang K,Shi Y,Xia L,Hu X,Liu H. Depression and insomnia in COVID-19 survivors: a cross-sectional survey from Chinese rehabilitation centers in Anhui province. Sleep Med. 2022 Mar;91:161-165. doi: 10.1016/j.sleep.2021.02.002. Epub 2021 Feb 8. PMID: 33627300; PMCID: PMC7869685.
16. Deng J, Zhou F, Hou W, Silver Z, Wong CY, Chang O, Huang E, Zuo QK. The prevalence of depression, anxiety, and sleep disturbances in COVID-19 patients: a meta-analysis. Ann N Y Acad Sci. 2021 Feb;1486(1):90-111. doi: 10.1111/nyas.14506.Epub 2020 Oct 2.PMID:33009668;PMCID:PMC7675607
17. Rajkumar RP. COVID-19 and mental health: A review of the existing literature. Asian J Psychiatr. 2020 Aug;52:102066. doi: 10.1016/j.ajp.2020.102066. Epub 2020 Apr 10.PMID:32302935;PMCID:PMC7151415.
18. Ho A, Raja B, Waldhorn R, Baez V, Mohammed I. New onset of insomnia in hospitalized patients in general medical wards: incidence, causes, and resolution rate. J Community Hosp Intern Med Perspect. 2017 Oct 18;7(5):309-313. doi: 10.1080/20009666.2017.1374108. PMID: 29147474; PMCID:PMC5676971.
19. Pisani, M. A., Friese, R. S., Gehlbach, B. K., Schwab, R. J., Weinhouse, G. L., & Jones, S. F. (2015). Sleep in the intensive care unit. American journal of respiratory and critical care medicine, 191(7), 731-738.
20. Alimoradi Z, Broström A, Tsang HWH, Griffiths MD, Haghayegh S, Ohayon MM, Lin CY, Pakpour AH. Sleep problems during COVID-19 pandemic and its' association to psychological distress: A systematic review and meta-analysis. EClinicalMedicine. 2021 Jun;36:100916. doi: 10.1016/j.eclinm.2021.100916. Epub 2021 Jun 10. PMID: 34131640;PMCID:PMC8192091.
21. Aziz, Sadaf; Chaudhary, Suprakash; Saldanha, Daniel Psychological effect of mild to moderate COVID-19 on hospitalised patients, Indian Journal of Psychiatry: March 2022 - Volume 64 - Issue Suppl 3 - p S599-S600 doi: 10.4103/0019-5545.341740
22. Yadav R Yadav P Kumar SS Kumar R.Assessment of depression, anxiety, and sleep disturbance in COVID-19 patients at tertiary care centre of north India. J Neurosci Rural Pract. 2021; 12: 316-322
23. El Sayed, S., Gomaa, S., Shokry, D. *et al.* Sleep in post-COVID-19 recovery period and its impact on different domains of quality of life. *Egypt J Neurol Psychiatry Neurosurg* **57,** 172 (2021). https://doi.org/10.1186/s41983-021-00429-7
24. Bajaj S, Blair KS, SchwartzA, DobbertinM, Blair RJR (2020)Worryand insomnia as riskfactorsfor depressionduringinitialstagesofCOVID-19pandemicin India.PLoSONE 15(12):e0243527.https://doi.org/ 10.1371/journal. pone. 0243527