Prevalence and Correlates of Post-Traumatic Stress Disorder and Insomnia Disorder on Post- COVID-19 Patients: A Comparative Study

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Abstract

The study aimed to study the Prevalence and Correlates of Post-Traumatic Stress Disorder and Insomnia Disorder on post-COVID-19 patients: A comparative studyin Aizawl City, 80 post-COVID-19 patients and 80 non-COVID-19 patients comprised of 40 female and 40 male patients who had equally matched demographic variables and who were selected from Zoram Medical College in Mizoram using purposive sampling procedures, age range between 28 to 67 years of age served as a sample. The study used the (i) PTSD Inventory (PTSD-8;and (ii) Insomnia Severity Index (Morin, 2016) for the collection of data. Results revealed that COVID-19 survivors had higher Post-Traumatic Stress Disorder and Insomnia than non-COVID-19 patients and that female patients had higher scores on Post-Traumatic Stress Disorder and Insomnia than male patients; the Post-Traumatic Stress Disorder and Insomnia had a significant positive relationship, and Post-Traumatic Stress Disorder significantly predicted Insomnia in post COVID-19 patients but not in non-COVID-19 patients. The results revealed the GAD comorbidity with PTSD and Insomnia; the prediction of PTSD on Insomnia; and also highlighted the dreadfulness of the COVID-19 pandemic and the survivors' need for psychological support much more than other patients.

Keywords: COVID-19, post-traumatic stress disorder, insomnia disorder

Introduction: Coronavirus disease 2019 (COVID-19) is an on-going pandemic that is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV- 2). Originating from Wuhan, Hubei, China, SARS-CoV-2 had infected and induced COVID-19 and had spread throughout the world. Common clinical signs and symptoms included Fever, Cough, Fatigue, Shortness of breath, Expectoration, Myalgia, Rhinorrhea, Sore throat, Diarrhoea, Anosmia or Ageusia preceding the onset of

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respiratory symptoms. Older people and immune-suppressed patients in particular presented with atypical symptoms such as fatigue, reduced alertness, reduced mobility, diarrhoea, loss of appetite, delirium, and absence of fever. Children had not reported fever or cough as frequently as adults. All viruses, including SARS-CoV-2, the virus that causes COVID-19, change over time. Most changes have little to no impact on the virus' properties. However, some changes may affect the virus's properties, such as how easily it spreads, the associated disease severity, or the performance of vaccines, therapeutic medicines, diagnostic tools, or other public health and social measures.

The first COVID-19 case in Mizoram, India was declared on 26th March 2020 while the first fatality was reported on 28th October 2020. Thus, apart from highlighting important topics related to COVID-19 like the epidemiology, adverse health effects, and pharmaceutical interventions; this article mainly describes the incidence of COVID-19 in Mizoram between 26th March 2020to 26th November 2020. The first outbreak of COVID-19 in Mizoram startedin the 2nd week of June and ended in the 1st week of July. The second outbreak of COVID-19 in Mizoram started in the 2nd week of July and ended by the 3rd week of October. The third outbreak of COVID-19 in Mizoram started in the 4th week of Octoberand as of 26th November 2020, it was still an ongoing outbreak with a trend declining ofactive cases.

Due to its swift growth and high death rate, the current coronavirus disease 2019 (COVID-19) outbreak had caused major disruptions and was considered a global emergency. The total number afflicted by coronavirus 2 (SARS-CoV2), continued to propagate quickly across the world due to severe acute respiratory syndrome. COVID-19 patients develop pneumonia, significant signs of multiple organ failure and acute respiratory distress syndrome (ARDS).

Post-traumatic stress disorder (PTSD) is defined as an autoimmune disease that develops as a result of exposure to a severe traumatic incident or injury.PTSD is a mental illness that can appear after witnessing extremely frightening or threatening situations. Many people exhibit incredible fortitude and recuperation ability after experiencing trauma.

Insomnia disorder is defined as symptoms that occur during the day and at night. It is characterized by difficulty initiating sleep and a main complaint of unhappiness with the quality or duration of sleep, sleep at night, extended or frequent wakefulness, or awakening early in the morning and being unable to go back to rest.An inability to fall asleep, remain asleep, or experience non-refreshing sleep is known as insomnia, and it can have adverse consequences during the day. Insomnia can occur as a primary disorder, though it usually occurs as a secondary symptom of a medical, psychiatric, circadian, or sleep disorder.

Review of literature:

The prevalence of Post-Traumatic Stress Disorder in COVID-19 patients who were admitted to the hospital was worrying. Especially, females and those having mental disorders were at a greater risk for acquiringPost-Traumatic Stress Disorder. Health personnelswho were treating COVID-19 patients were to be considered for screening for Post-Traumatic Stress Disorder while performing assessments in patients before discharge (Tarsitani, Vassalini, Koukopoulos, Borrazzo, Alessi, Di Nicolantonio & D'Ettorre, 2021). As, neuropsychiatric clinical manifestations, especially those that were related with Post-Traumatic Stress Disorder aggravated as time went by in post COVID-19 patients(Kyzar, Purpura, Shah, Cantos, Nordvig & Yin 2021)

Trauma-exposed disturbed sleep and greater rates than the general population (Milanak, Zuromski, Cero, Wilkerson, Resnick & Kilpatrick 2019;Neylan, Marmar & Metzler 1998) which include difficulty initiating and maintaining sleep (Neylan et al., 1998) sleep-disruptive behaviours (Mysliwiec, Brock, Creamer, O'Reilly, Germain & Roth 2018), recurrent nightmares (Davis, Byrd, Rhudy & Wright, 2007), and frequent awakenings (Mellman, David &Kulick-Bell, Hebding& Nolan, 1995). Trauma experience-related sleep problems are now recognized as primary symptoms of needing interventions (Spoormaker& Montgomery, 2008).The Post-Traumatic Stress Disorder group usually experienced anxiety, distress, and concurrent body motion, which were all associated with sleep disorder. Their nightmares occurred frequently and made it harder to fall asleep again compared to the non-Post-Traumatic Stress Disorder insomnia group who did not have symptoms. The Post-Traumatic Stress Disorder group further reported being tired and anxious at daytime functioning compared to those non-Post-Traumatic Stress Disorder insomnia group (Inman, Silver &Doghramji, 1990).

Sleep disturbances are closely related to Post-Traumatic Stress Disorder with associated distress and impairment, and the close link between trauma and sleep is reflected in the diagnostic criteria for Post-Traumatic Stress Disorder, which include nightmares and sleep disturbances (APA, 2013), Sleep disturbances and dysfunction and functional disability (Giosan, Malta &Wyka2015)and complicate recovery (Smith, Huang & Manber, 2005).Sleep disturbances and Post-Traumatic Stress Disorder(Harvey, Jones & Schmidt, 2003;Spoormaker& Montgomery, 2008) with estimates of up to 80–90% of patients with Post-Traumatic Stress Disorder experiencing insomnia symptoms and 50–70% experiencing nightmares (Neylan et al., 1998;Leskin, Woodward, Young & Sheikh, 2002) greater than five per week, 8 nightmares and insomnia, other sleep disorders and disruptive nocturnal behaviours are prevalent among trauma-exposed individuals. Sleep-disordered breathing, periodic leg movement disorders, and other parasomnias were common in trauma-exposed samples (Krakow, Ulibarri, Moore & McIver, 2014;Mellman, Kulick-Bell, Ashlock, & Nolan, 1995).Older

people, lonely relationships, not being supported by relatives and those having mental health problems were the common factors affecting the patients' insomnia. So, adults recovering from COVID 19 were to be screened for sleep disturbances and managed as well (Huynh, Nguyen, Vo, Le & Nguyen, 2022)as it was found that at various time points after being discharge from the hospital due to COVID-19 pneumonia, several sleep disorderswere observed (Kalamara, Pataka, Boutou, Panagiotidou, Georgopoulou, Ballas&Pitsiou, 2022).

Statement of the Problem:

According to Shalevet al. (2017), Post–post-traumatic stress disorder (PTSD) is characterized by an onset of symptoms associated with intrusion, avoidance, adverse changes in mental and emotional state, and heightened arousal and reactivity after experiencing a traumatic event. When examining the cognitive effects of COVID-19, it is important to take into account the trauma survivors have endured. On the other hand, not much information on possible psychological impacts had been revealed.

The COVID-19 pandemic's unpredictability and uncertainty, the lockdowns, physical separation, and other containment measures that followed, as well as the subsequent economic collapse, could have made mental health problems more likely and exacerbate health disparities.Only few studies have been conducted specifically addressing post-COVID-19 sleep impairment. Isolation, hospitalization, and stress are important factors, but the exact mechanism behind COVID-19related sleep disturbances, as well as the duration of such manifestations, remain to be investigated. Therefore, this study attempts to highlight the effects of COVID-19 on recovered patients admitted at Zoram Medical Collegerelating to Post-Traumatic Stress Disorder and Insomnia disorder and its unique relation and predicting effects on one another.

Objectives: The study aims to study the Prevalence and Correlates of Post-Traumatic Stress Disorder and Insomnia Disorder inPost-COVID-19 patients: A comparative study and the objectives are as follows:

1) To examine the applicability of the *PTSD Inventory (PTSD-8; Hansen, Andersen, Armour, Elklit, Palic& Mackrill, 2010)* and *Insomnia Severity Index (Morin, 2016) to the target population*
2) To examine any significant difference between post-COVID-19 patients and non-COVID-19 patients, and also between Female Patients and Male patients on PTSD and Insomnia.
3) To examine any significant relationship between *PTSD and Insomnia* variables.
4) To study any significant effect of *PTSD* on *Insomnia* among the samples.

Hypothesis: In consistency with the objectives of the study the following hypotheses were framed for the present study:

1) *The PTSD Inventory* (PTSD-8; Hansen, Andersen, Armour, Elklit, Palic& Mackrill, 2010) *and Insomnia Severity Index* (Morin, 2016)will have applicability in the targeted population.
2) Post-COVID-19 patients will have higher scores than non-COVID-19 patients and Female Patients will score higher than Male patients on PTSD and Insomnia.
3) There will be a positive significant positive relationship between *PTSD and Insomnia* variables.
4) PTSD will have a significant effect on Insomniavariables among the samples.

Methodology

Sample: The study sample consistsof 80 post-COVID-19 patientsand 80 non-COVID-19 patients having equal representation of male and female (80 females and 80 males).Purposive sampling technique was employed. Permission was taken from the authorities, and informed consent was obtained from the participants after making them know about the nature and risk of the study.

Inclusion Criteria:

1) The post COVID-19 patientswho were identified from ZoramMedical College run by the Government of Mizoram.
2) Age range between 28 to 67 years.
3) COVID-19 patients who had taken treatment at the hospital for more than 10 days served as samples.
4) The non-COVID-19 patients who matched well with the post COVID-19 patients on demographic variables but not affected by COVID-19 and admitted in the same hospital for other physical illnesses and who had taken treatments for more than 10 days served as thecontrol group for the comparison with the post COVID-19 survival patients.

Exclusion Criteria:

1) The post COVID-19 patients who were not identified from Zoram Medical College run by the Government of Mizoram.
2) Age range below 28 and above 67years old.

3) COVID-19 patients who had taken treatment at the hospital for less than 10 days.

4) The non-COVID-19 patients who did not match the post COVID-19 patients on demographic variables and who werenot affected by COVID-19 and were admitted to the same hospital for other physical illnesses and who had taken treatments for less than 10 days.

Tool used: The present study used are:

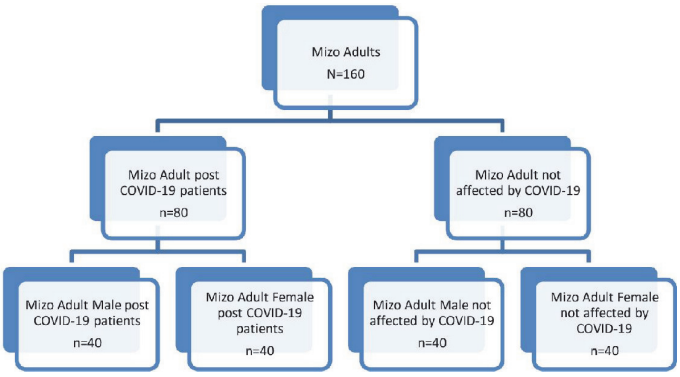
1) *PTSD Inventory (PTSD-8; Hansen et al, 2010):*The scale was constructed by Hansen and colleagues consisting of 8 items. The results of the PHQ-9 was used to make a depression diagnosis according to DSM-IV criteria and which took less than 3 minutes to complete. Reliability and tests found a Cronbach's alpha of 0.89 among 3,000 primary care patients and 0.86 among 3,000 OB-GYN patients. The result was interpreted as depression Severity: 0-4 none, 5-9 mild, 10-14 moderate, 15-19 moderately severe, 20-27 severe.

2) *Insomnia Severity Index (Morin, 2016):*The Insomnia Severity Index (ISI) was developed by Charles M. Morin, Professor of Psychology at the Université Laval in Quebec City, Canada, a world-leading authority on insomnia and its treatment. It is a brief screening assessment tool designed to evaluate insomnia.The ISI is one of the most widely used assessment instruments in clinical and observational studies of insomnia.

3) *The socio-demographic profiles* (Lalrinchhani, 2021): It is a socio-demographicprofile which includes age, gender, address, type of illness, onset time of illness, any other illness with onset, treatment history, etc which can be utilized for identifying the true representation of the sample and to get any further relevant information.

4) *Informed Consent Form* (Lalrinchhani, 2022): It was constructed by the researcher and was intended to get written consent from the sample after making them understand the purpose, activities to be done, duration of time, voluntary participation, etc.

Design: The present study employed a 2 x 2 factorial design which represents 2 types of patients (80 post-COVID-19 patients and 80 non-COVID-19 patients) and 2 genders (80 males and 80 females).



Data Analysis: t-test, correlation and regression and other applicable statistical analyses were used. The significance level was set at <0.05 level. An available version of SPSS was used.

Procedures: Tools to be used were identified which were freely available, and copies were made for ready administration. Samples as per design to meet the objectives for the study were identified, necessary permissionsand consentswere taken from authorities from the samples/guardians. The administration was done following the manual of the test and APA guidelines.

Results: The raw data of the study were checked for missing entries/data and outliers data; and if the same were not found, then further analysis was proceeded with following the sequence of the objectives of the study.

Objective-1: To examine the applicability of the PTSD Inventory (PTSD-8; Hansen et al, 2010) and Insomnia Severity Index (Morin, 2016) to the target population.

The results provided that skewness values and Kurtosis values were less than 1.0 (+/-) which conveyed that the data had a normality. Alpha Reliability result showed high reliability as both are higher than .70 reliability on PTSD felt at .73 and Insomnia had reliability .77. Homogeneity of variance was also checked and the scales showed acceptable homogeneity (PTSD =.18 and Insomnia = .21). The overall results showed the applicability of the tests in the targeted population and also highlighted the appropriateness of parametric statistics for further analysis, and the results accepted hypothesis no 1 as it demonstrated the COVID-19-PTSD questionnaire's strong convergent validity and good internal consistency (Forte & Favieri, 2020)which found that the insomnia severity index had high scores (13.01±4.9) (Sayed & Gomaa, 2021).

Table -1: Showing the Psychometric Properties of *i) PTSD Inventory (PTSD-8; Hansen et al. 2010) and (ii) Insomnia Severity Index (Morin, 2016)* for the targeted population

Statistics	PTSD	Insomnia
Mean	23.19	32.28
Std. Deviation	4.37	5.12
Kurtosis	-0.72	0.79
Skewness	-0.81	0.84
Reliability (Alpha)	0.73	0.77
Test of Homogeneity of Variances	0.18	0.21

Objective-2: To examine any significant difference between post-COVID-19 patients and non-COVID-19 patients, and also between Female Patients and Male patients on PTSD and Insomnia.

The result in Table -2 displayed that *post-COVID-19 patients* scored higher than *non-COVID-19 patients* on PTSD (M=26.35; 20.02; t=3.93.10;p<.01)and Insomnia (M=34.92; 29.65; t=2.41; p<.01) and is significant at .01 level. It was also found that female patients scored higher than male patients on PTSD (M=24.91; 21.47; t=4.46;p<.01) and on Insomnia (M=34.02; 30.56; t=2.73; p<.01) and is significant at .01 level. The findings were in line with the second hypothesis of the study as a significant proportion of PTSD symptoms (29.5%) was discovered in the Italian population during COVID 19 pandemic (Forte et al., 2020). One of the main issues in the post-COVID-19 environment is sleep disruption (Tedjasukmana&Budikayanti, 2022)and despite the less severe course of their illness, female patients had significantly higher rates of depression, anxiety, traumatic stress, and insomnia (Pappa, Barmparessou, Athanasoiu&Sakka, 2022).

Table-2: Showing the Mean for post-COVID-19 survivor patients non-COVID-19 patient groups, and male and Female Patient groups; t-test between post-COVID-19 survivor patients non-COVID-19 patient groups, and between male and Female Patient groups

Four comparison groups	Stats	PTSD	Insomnia
post-COVID-19 survivor patients	Mean	26.35	34.92
non-COVID-19 patients	Mean	20.02	29.65
Female Patients	Mean	24.91	34.02
Male Patients	Mean	21.47	30.56
t-test between *post-COVID-19 survivor patients and non-COVID-19 patients*		3.93**	2.41 **
t-test between *Female Patients and Male patients*		4.46**	2.73**

Objective-3: To examine any significant relationship between *PTSD and Insomnia* variables.

The results showed significant positive correlation between PTSD and Insomnia (r=.38; p>.01) which accepts hypothesis no 3 of the study. Insomnia was related with post-traumatic stress disorder (Pedrozo-pupo, Caballero-Dominguez & Campo-Arias, 2022).

Table- 3: Showing the significant relationship between the PTSD and Insomnia variables among the samples

Dependent Variables	PTSD	Insomnia
PTSD	1	.38**
INSOMNIA	.38**	1
**= significant at the 0.01 level (2 tailed)		

Objective -4: To study any significant effect of *PTSD* on *Insomnia* among the selected samples.

The simple regression analysis was done to examine the prediction of PTSD on Insomnia, and results showed that PTSD affected Insomnia at 21%, and Durbin Watson was lower than 2.0 (DW=1.09) indicating that there was no autocorrelation detected in the sample, and the results proved significant accepting the hypothesis no 4 that exposure to traumatic events is associated with a significant risk of developing clinically significant insomnia (Sinha, 2016).

Table-4: Showing the prediction (simple regression analysis) of PTSD on insomnia for the samples.

Predictor	Criterion	R Square	F Change	df	Sig.	Durbin-Watson
PTSD	Insomnia	0.21	72.91	1/187	0	1.01

Discussion:

The present study titled, "Prevalence and Correlates of Post-Traumatic Stress Disorder and Insomnia Disorder on Post- COVID-19 Patients: A Comparative Study" was conducted: (i) To examine the applicability of the PTSD Inventory (PTSD-8; Hansen et al, 2010) and Insomnia Severity Index (Morin, 2016) to the target population (ii) To examine any significant difference between post-COVID-19 patients and non-COVID-19 patients, and also between Female Patients and Male patients on PTSD

and Insomnia. (iii) To examine any significant relationship between PTSD and Insomnia variables. (iv) To study any significant effect of PTSD on Insomnia among the samples with having hypotheses: (i) The PTSD Inventory (PTSD-8; Hansen et al, 2010) and Insomnia Severity Index (Morin, 2016) will have applicability in the targeted population. (ii) Post-COVID-19 patients will have higher scores than non-COVID-19 patients and Female Patients will score higher than Male patients on PTSD and Insomnia. (iii) There will be a positive significant positive relationship between PTSD and Insomnia variables. (iv) PTSD will have a significant effect on Insomniavariables among the samples. 160 samples which comprised of 80 post COVID-19 patientsand 80 non-COVID-19 patients having equal representation of male and female (80 females and 80 males) served as samples. Selected Psychological tools; (i) PTSD Inventory (PTSD-8; Hansen et al, 2010)(ii) The Insomnia Severity Index (Morin, 2016) (iii) The socio-demographic profiles (Lalrinchhani, 2021) and (iv) Informed Consent Form (Lalrinchhani, 2021). Thedesign was a 2 x 2 factorial design which represents 2 types of patients (80 post COVID-19 patients and 80 non-COVID-19 patients) and 2 genders(80 males and 80 females). Results accepted the hypotheses and met the objectives of the study that the Psychometric Properties of the PTSD Inventory (PTSD-8; Hansen et al, 2010) and Insomnia Severity Index (Morin, 2016*)* for the targeted population show normality and the obtained overall results showed the applicability of the tests in the targeted population and also highlighted the appropriateness of parametric statistics for further analysis. It was also found that the prevalence of Post-Traumatic Stress Disorder and Insomnia Disorder were higher in post-COVID-19 patients than in non-COVID-19 patients, as well as in female patients than in male patients. There was a positive significant relationship between Post-Traumatic Stress Disorder and Insomnia disorder; and that, Post-Traumatic Stress Disorder have a significant prediction on Insomnia disorderand also highlighted the dreadfulness of the COVID-19 pandemic and the survivors' need for psychological support much more than other patients.

Significance of the study: The present study contributes to the academic knowledge on COVID-19 related Psychological problems, especially on the level of post-traumatic stress disorder and insomnia disorder and the high needfor psychological interventions for the same; and also provides the lack of authentic research findings.

Limitation: As with the majority of studies, the design of the current study is subject to limitations. The present study, due to time constraints,was not able to take large sampleswith more varied psychological and demographic variables which is very much needed.

Ethical Declaration: Informed consent was obtained from all the participants explaining the voluntary nature of participation, their anonymity, and that their option to withdraw at any time without a need to give a reason. The study protocol was presented for ethical clearance from the Institute of Human Ethics Committee of Mizoram University.

Declaration: This is an extract from Ph. D thesis of Ms Vida Lalrinchhani and not published anywhere in any form of publication.

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