

**POST COVID19 MENTAL HEALTH: POST-TRAUMATIC
STRESS DISORDER, DEPRESSION, INSOMNIA, AND
OBSESSIVE-COMPULSIVE DISORDER**

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF
PHILOSOPHY**

VIDA LALRINCHHANI

MZU REGISTRATION NO.: 2100002

Ph.D. REGISTRATION NO.: MZU/Ph.D./1669 of 07.12.2020



**DEPARTMENT OF NURSING
SCHOOL OF MEDICAL AND PARAMEDICAL SCIENCES
DECEMBER, 2025**

**POST COVID19 MENTAL HEALTH: POST-TRAUMATICSTRESS
DISORDER, DEPRESSION, INSOMNIA, AND OBSESSIVE-COMPULSIVE
DISORDER**

BY
VIDA LALRINCHHANI
Department of Nursing,

Supervisor: Prof. Zokaitluangi
Joint-Supervisor: Prof. Geeta Das

Submitted
In partial fulfillment of the requirement of the Degree of Doctor of Philosophy
in Nursing of Mizoram University, Aizawl



**MIZORAM UNIVERSITY DEPARTMENT OF NURSING
SCHOOL OF MEDICAL AND PARAMEDICAL SCIENCES
MIZORAM: AIZAWL
796004**

CERTIFICATE

This is to certify that the present research work titled, **“Post COVID19 Mental Health: Post-traumatic Stress Disorder, Depression, Insomnia and Obsessive-Compulsive Disorder”** is the original research work carried out by Ms. Vida Lalrinchhani under my supervision. The work done is being submitted for the Award of the degree of Doctor of Philosophy in Nursing of Mizoram University.

This is to further certify that the research conducted by Ms. Vida Lalrinchhani has not been submitted in support of an application to this or any other University or an Institute of Learning.

(Prof. ZOKAITLUANGI)
Supervisor


(Prof. GEETA DAS)
Joint Supervisor

DR. GEETA DAS
Principal
B.Sc, Nursing College
Silchar

DECLARATION
MIZORAM UNIVERSITY
DECEMBER, 2025

I **VIDA LALRINCHHANI**, hereby declare that the subject matter of this thesis is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to do the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University/Institute.

This is being submitted to the Mizoram University for the **Degree of Doctor of Philosophy in Nursing**.

(VIDA LALRINCHHANI)
Candidate


(Prof. GEETA DAS)
Joint Supervisor

DR. GEETA DAS
Principal
B.Sc. Nursing College
Silchar

(Prof. ZOKAITLUANGI)
Supervisor
Department of Nursing
Mizoram University

(Prof. C LALFAMKIMA VARTE)
Head
Department of Nursing
Mizoram University

ACKNOWLEDGEMENT

“So teach us to number our days, That we may gain a heart of wisdom”.

(Psalm 90:12)

At the beginning, I express my deep gratitude and praise to ***GOD Almighty*** whose grace and continuous blessing have given me strength and courage to complete this study. ***Thankfulness finds something good in every circumstance.***

I extend my deepest appreciation to my supervisor, Prof. Zokaitluangi (Dean, School of Medical and Paramedical Sciences) whose mentorship extended beyond the academic realm into personal guidance, for the untiring efforts and constant vigilance throughout my research journey. Her deep commitments to academic excellence have significantly shaped this dissertation.

I am thankful to my joint-supervisor, Prof. Geeta Das (Principal I/C, B.Sc Nursing College Silchar, Srimanta Sankaradeva University of Health Sciences) for her constant support, encouragement and guidance throughout this study.

I pay my deep respect to my loving parents, Mr. Lalsanglura and Mrs. R. Sanghnuni, I owe an immense debt of gratitude to my parents and siblings, who are the pillar on which I am standing and who supported my educational endeavors from the very beginning. Your prayer for me was what sustained me thus far. Thank you for believing in me.

I am sincerely grateful to Dr. Lalruattluanga Chawngthu for your unwavering support, for all the late nights, for being my editor and proofreader, offering invaluable advice and feedback on my writing. Your patience, kindness and humor have been my anchor.

To my seniors, classmates, friends and colleagues for their supports and help. Thanks are due to many others who have helped me directly and indirectly towards the presentation of this dissertation.

Aizawl: December, 2025

(VIDA LALRINCHHANI)

Candidate

TABLE OF CONTENTS

Contents	Page
List of Tables	i
List of Figures	ii
List of Appendices	iii
Chapter – I : Introduction	1-15
Chapter – II : Review of Literature	16-36
Chapter – III : Statement of the problem	37-41
Chapter – IV : Method and Procedure	42-48
Chapter – V : Result and Discussion	49-71
Chapter – VI : Summary and Conclusion	72-77
APPENDICES	78-86
REFERENCES	87-118
Bio-Data	
Particulars of the Candidate	

LIST OF TABLES

- Table-1** : Showing the age distribution, no of hospitalization, HB level, temperature and blood pressure.
- Table-2** : Showing the Descriptive Statistics, Normality (Kurtosis, Skewness), Reliability (Cronbach's Alpha), and Homogeneity of variance (PTSD, Depression, and Insomnia, OCD).
- Table-3** : Showing the mean difference (Mean, SD, Kurtosis, Skewness) and significant difference (independent t-test) in PTSD, Depression, Insomnia, and OCD.
- Table-4** : Showing the Mean difference (Mean, SD, Kurtosis, Skewness) and significant level (independent t-test) in PTSD, Depression, Insomnia, and OCD between male and female patients.
- Table-5** : Showing the Relationship (Pearson's Correlation) between PTSD, Depression, Insomnia and OCD.
- Table-6** : Showing the Independent effect (Two-Way ANOVA) COVID19 and Gender on PTSD, Depression, Insomnia and OCD.
- Table-7** : Showing the Interaction effect (Two-Way ANOVA) COVID19 and Gender on PTSD, Depression, Insomnia and OCD.
- Table-8** : Showing Prediction (linear regression) of PTSD on Insomnia, Depression and OCD.

LIST OF FIGURES

- Figure -1** : Showing the 2X2 Factorial Design
- Figure -2** : Showing the age distribution in percentage for the four age groups
- Figure -3** : Showing the mean difference between the whole sample, Post COVID19 patients and Non COVID19 patients on PTSD, Depression, Insomnia and OCD
- Figure -4** : Showing the mean difference between Post COVID19 patients and Non COVID19 patients on PTSD, Depression, Insomnia and OCD.
- Figure -5** : Showing the mean difference between Male and Female patients on PTSD, Depression, Insomnia and OCD.

LIST OF APPENDICES

Appendix – I	:	Consent Form for research participation
Appendix – II	:	Socio-Demographic Data
Appendix – III	:	PTSD-8 Inventory
Appendix – IV	:	Beck Depression Inventory-13
Appendix – V	:	Insomnia Severity Index
Appendix – VI	:	Yale-Brown Obsessive Compulsive Scale

CHAPTER-1
INTRODUCTION

COVID19

A year ago, no one could have predicted that a microscopic pathogen would be so deadly and cause such uncertainty in the lives of billions of people (Ahuja et al., 2020). In Wuhan, Hubei Province, China, an outbreak of pneumonia with an unclear cause was reported in December 2019. Epidemiological evidence connected cases of pneumonia to the Huanan Seafood Wholesale Market. After respiratory samples were injected into Vero E6 and Huh7 cell lines of human airway epithelial cells, a novel respiratory virus was isolated. Genome analysis of the virus revealed that it was a novel coronavirus related to SARS-CoV, and it was thus named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Ciotti et al., 2020) that has caused a highly contagious disease known as Coronavirus Disease 2019 (COVID19) (Lone & Ahmad, 2020).

Although the precise cause of COVID19 is still unknown, research is being done to determine it. According to a comprehensive study published in 2020 by Zhou, Yang, Wang et al. from the Wuhan Institute for Virology, the genetic composition of the novel coronaviruses is 96% identical to that of bats which are known to carry the coronavirus (Kazmi et al., 2020).

The COVID19 outbreak has been classified by the World Health Organization as a public health emergency of global concern as of January 30, 2020. Millions of people have already experienced direct effects from the virus on their physical health, and it is also thought to be a major global threat to mental health (Talevi et al., 2020). Health inequalities and mental health problems may worsen due to the COVID19 pandemic's unpredictability and uncertainty, lockdowns, physical distancing, and other containment measures, as well as the subsequent economic collapse (Moreno et al., 2020). A number of guidelines have been released by the WHO Department of Mental Health to assist various population groups in maintaining their mental and psychosocial well-being (Ahuja et al., 2020).

The pandemic has resulted in significant global social and economic disruption, including the largest global recession since the Great Depression (IMF, 2020), and

its consequences have led to fears, worries, and anxiety among individuals (Ahorsu et al., 2020). The fear of COVID19 is a negative emotional state that captures the anxiety and depression experienced due to an awareness of the possible consequences of the COVID19 pandemic, such as being infected with the coronavirus (Ahorsu et al., 2020; Qiu et al., 2020), high rates of transmission and mortality of COVID19, combined with a lack of effective prevention and treatment measures, have left many people fearful of COVID19 (Schimmenti et al., 2020). The uncertainty of COVID19 captures a reasonable cognitive response to the pandemic that a large number of asymptomatic infected people, a lack of effective treatment, and continuously changing infection and mortality trends add up to a health crisis with a complex and unpredictable pattern, which gives rise to cognitive uncertainty (Sohrabi et al., 2020; Tanne et al., 2020; Wang et al., 2020).

The COVID19 pandemic has devastated the world. India is also facing a difficult situation as the number of positive and infected cases rises daily. Fear and uncertainty are among the many psychological and emotional reactions that the Indian people are experiencing as a result of the government's stringent preventive measures and restrictions, which include a nationwide lockdown (Kazmi et al., 2020). To stop the spread of the new coronavirus disease (COVID19) among its 1.3 billion citizens, India imposed a nationwide lockdown on March 24, 2020 (Pinchoff et al., 2020).

The sudden outbreak of Coronavirus 19 disease (COVID19) is transforming the psychology and interpersonal relationships across the country, initial emotional response to a pandemic which can be overwhelming and gradually move towards negative emotions such as stress, anxiety and depression that can lead to social discontent and mental health illness (Shigemura et al., 2020) including Post-traumatic Stress Disorder, Depression, Insomnia and Obsessive-Compulsive Disorder among the COVID19 survivors.

Despite this, there are usually insufficient resources available to control or lessen the impact of pandemics on mental health and wellness (Taylor, 2019). Although this

may make sense during the acute stage of an outbreak, when health systems place a higher priority on testing, stopping the spread of the disease, and providing essential patient care, psychological and psychiatric needs should not be disregarded at any stage of pandemic management (Cullen et al., 2020).

SARS-CoV-2 is regarded as a "crowd disease," much like influenza and SARS-CoV-1, and it spreads most readily in situations where people are closely confined to one another. Phylogenetic evidence suggests a zoonotic origin (Narayan et al., 2025). It can cause a wide range of symptoms, from infection without any symptoms to pneumonia and potentially fatal outcomes. If the disease is present, symptoms like fever, coughing, or loss of taste or smell (ageusia or anosmia) can help identify it early on (Struyf et al., 2022). Fever, cough, myalgia or fatigue, expectoration, and dyspnea were the most common clinical symptoms among COVID19 patients. Headache or vertigo, diarrhea, nausea, and vomiting, are examples of minor symptoms. According to the laboratory results, leukocytopenia, elevated lactate dehydrogenase, lymphocytopenia, and an increase in C-reactive protein were more common (Li et al., 2020).

Many patients had underlying medical conditions, mainly diabetes, hypertension, cardiovascular disease, and cancer. All patients had bilateral patchy shadows or ground glass opacity in their lungs on chest computed tomography scans. Antibiotic therapy, corticosteroids, and antiviral therapy were administered to all patients (Wan et al., 2020). Low molecular weight heparin (LMWH) anticoagulation therapy and early intravenous immunoglobulin (IVIG) administration are critical (Li et al., 2020). The fatality rate and the amount of medical resources used are determined by the severity of the COVID19 (Liao et al., 2020). Individuals requiring intensive care unit treatment are the most susceptible to mortality in COVID19 (Bastug et al., 2020).

POST-TRAUMATIC STRESS DISORDER:

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 COVID19, it is important to take into account the trauma survivors have endured. On the other hand, not much information on possible psychological impacts has been revealed (Longo et al., 2017).

The symptoms of PTSD include:

1) Reliving the occasion:

Recalling the traumatic events is one of the symptoms. They have the ability to resurface at any time of day or night (for example, in the form of nightmares). Occasionally, people may even experience flashbacks, which are the sensation of experiencing the event again.

2) Steer clear of reminders of the incident:

Sometimes people try to stay away from people or places that bring up memories of the traumatic experience. They might also attempt to keep the incident from coming to mind or from coming up in conversation.

3) Negative alterations in sentiments and beliefs:

Changes in one's thoughts and feelings about oneself, other people, and the outside world are part of these symptoms. People might, for instance, stop feeling love for other people or believe that the world is an extremely dangerous place.

4) Being energized:

After a traumatic event, people may become highly sensitive and vigilant about potential threats. They might have trouble sleeping, have trouble focusing, or startle easily (jumping at the sound, for example) (Sumner, 2016).

The diagnosis criteria outline elements pertaining to the victim's understanding of the trauma as well as the length and significance of related symptoms, such as persistently reliving the traumatic event, a noticeable avoidance of routine activities, and signs of elevated arousal (Grinage, 2003). It is crucial to ascertain the preferences of patients for treatment interventions since individuals may be reluctant to talk about traumatic experiences and may consequently avoid treatment. The degree of symptoms, the comfort and experience of the individual physicians, and the resources available locally all have an impact on the treatment decisions that are made (Warner, 2015).

PTSD Theories

Conditioning Theory

This theory states that fear is initially learned through classical conditioning and avoidance through instrumental conditioning. Ivan Pavlov proved over a century ago that dogs could be trained to anticipate a biologically significant event using a neutral cue. Through repeated predictive pairings, Pavlov's pups were trained to salivate in anticipation of food when a bell rang. Similar to nourishment, danger has biological significance, and when neutral cues foretell a threat to survival, they can become highly salient. This kind of conditioned fear does not go away in anxiety disorders like post-traumatic stress disorder (PTSD), and memories of traumatic experiences can trigger pathological conditioned fear reactions decades after the danger has passed (Offringa et al., 2012).

Schema Theories:

These theories use the concept of schemas—basic presumptions and beliefs that direct how information is perceived and interpreted—to explain the psychological effects of traumatic experiences. The tenets of attachment, cognitive-behavioral, and psychodynamic theories are all integrated within schema theory. Subjective structures with a broad pattern of memories, feelings, and thoughts that direct behavior are called "schemas." Schemas can influence one's perceptions of the self, other people, and interpersonal relationships. Early infancy or adolescence is when

schemas first appear, and unless substantial corrective experiences are had, they gradually become more fixed (Young, Klosko, & Weishaar, 2006)

Emotional Processing Theories:

The theory is based on two fundamental assumptions. The first assumption is that pathological fear structures in memory are reflected in anxiety disorders. Interconnected representations of feared stimuli, fear reactions, and the meanings attached to them make up a fear structure.

The second fundamental assumption of the theory of emotional processing is that effective therapy alters the pathological components of the fear structure so that information that previously caused anxiety symptoms no longer does.

Cognitive Theory:

This theory is predicated on the idea that emotional responses are triggered by one's interpretation of events rather than by the events themselves. As a result, different interpretations of the same event can lead to different feelings (Matthew et al., 2007).

DEPRESSION

Depression is a common psychiatric disorder, with an estimated lifetime prevalence of 10% in the general population (Kessing, 2007), and 20% in a clinical setting. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), the diagnosis of a Major Depression Episode (MDE) requires five or more symptoms to be present within 2 weeks (APA, 2013). One of the symptoms should, at least, be either a depressed mood (DM) or anhedonia (loss of interest or pleasure- LI). The secondary symptoms of MDE are appetite or weight changes (AW), sleep difficulties (insomnia or hypersomnia), psychomotor agitation or retardation (PAR), fatigue or loss of energy (FE), diminished ability to think or concentrate (C), feelings of worthlessness or excessive guilt (FW), and suicidality (SU). These symptoms are rated in an all or none (0 or 1) fashion. According to the DSM-5 criteria, the symptoms are summed to determine the presence or absence of a major depression episode (APA, 2013). Several studies have described different

sub-types of depression (Van et al., 2012). Previous investigations have reported that cognitive dysfunction, age, psychosis, unemployment, suicidal ideation are associated with depression severity (McDermott & Ebmeier, 2009).

Depression is a common illness worldwide, with more than 264 million people affected (Wu et al., 2024). A long-lasting and with moderate or severe intensity, depression may become a serious threat to health conditions with poor function at work, at school and in the family, at the worst case may lead to suicide. Although there are known effective treatments for mental disorders at 76% to 85% of people in low and middle income countries receive no treatment for their disorder (Wang et al., 2007); the common barriers include a lack of resources, lack of trained healthcare providers, the social stigma associated with mental disorders, and inaccurate assessment. People who are depressed are often not correctly diagnosed, and others who do not have the disorder are too often misdiagnosed and prescribed antidepressants.

Types and symptoms of Depression

Depending on the number and severity of symptoms, a depressive episode can be categorized as mild, moderate or severe. A key distinction is also made between depression in people who have or do not have a history of manic episodes. Both types of depression can be chronic (i.e. over an extended period) with relapses, especially if they go untreated.

Recurrent depressive disorder: this disorder involves repeated depressive episodes as the person experiences depressed mood, loss of interest and enjoyment, and reduced energy leading to diminished activity for at least two weeks. Many people with depression also suffer from anxiety symptoms, disturbed sleep and appetite, and may have feelings of guilt or low self-worth, poor concentration and even symptoms that cannot be explained by a medical diagnosis.

An individual with a mild depressive episode will have some difficulty in continuing with ordinary work and social activities but will probably not cease to function completely. During a severe depressive episode, it is unlikely that the

sufferer will be able to continue with social, work or domestic activities, except to a limited extent (WHO, 2020).

Bipolar affective disorder: Bipolar disorder is a type of depression typically consists of both manic and depressive episodes separated by periods of normal mood. Manic episodes involved elevate or irritable mood, over-activity, the pressure of speech, inflated self-esteem and a decreased need for sleep. Depression results from a complex interaction of social, psychological and biological factors. People who have gone through adverse life events (unemployment, bereavement, psychological trauma) are more likely to develop depression. Depression can, in turn, lead to more stress and dysfunction and worsen the affected person's life situation.

Traditionally, the diagnosis of depression has been established using clinical criteria that take into account the patient's past and present symptoms. Although this method is commonly employed, it is interpretive in nature. A variety of interview-based and non-interview methods are available for testing and screening for depression in different clinical settings, with the goal of standardizing both the data obtained and data interpretation (Smith et al., 2013). A number of factors make it difficult to diagnose and treat depression, including stigma, patient somatization and denial, physician ignorance and skill deficiencies, time constraints, a lack of providers and treatments, restrictions on third-party coverage, and limitations on access to specialized, pharmaceutical, and psychotherapy care. Reduced stigma, increased access to mental health care, and public and professional education initiatives are all necessary to lower these obstacles (Goldman et al., 1999).

There are efficient therapies for both the independent occurrence of depression and its co-occurring general medical conditions. Many cases of depression that are seen in general medical settings can be treated there. In primary care settings, about half of all cases of depression are diagnosed; however, the treatments that follow frequently do not meet current best practices. Short-term patient outcomes are typically good when treatments with proven efficacy are used (Goldman et al., 1999).

Beck's Cognitive Theory of Depression:

This theory is based on maladaptive self-schemata that incorporate dysfunctional attitudes and themes of failure, worthlessness, inadequacy, and loss make up the cognitive vulnerability. These schemata are knowledge bases that have been stored and influence how information is encoded, recognized and retrieved. According to depression models based on vulnerability and stress, these dysfunctional attitudes are believed to be activated after the event in life that is detrimental, producing particular negative thoughts, such as those regarding the self, world, and future, and result in improvements to signs of depression. The cause of depression is conclusions drawn from warped thinking and processes that are driven by schemas, while the non-depressives' conclusions are based on pertinent contextual data.

Hopelessness Theory of Depression:

A revision of the reformulated helplessness theory of depression, hopelessness theory (Abramson et al., 1989), asserts that certain people have a more depressogenic inferential style and are more likely to experience depressive symptoms when faced with a traumatic life event. The theory draws conclusions to three categories of negative inferences that people can make in response to the occurrence of negative events, even though it acknowledges other potential causes of depression (genetics, neurotransmitters, etc.): causal inferences (inferences about why the event occurred, including stable and global attributions), inferred consequences (inferences about what will happen as a result of the event), and inferences about the self (inferences about the self with respect to the event that occurred).

Response Styles Theory:

According to the response styles theory, how people react to their depression symptoms affects how severe and long they last. Rumination, distraction, and problem-solving are the three primary response styles that have been suggested. Rumination is characterized by ideas and actions that direct one's focus inward toward unfavourable emotions and ideas, exacerbating and extending depressive symptoms.

It is believed that problem solving and distraction, as opposed to rumination, can lessen depressive symptoms. Solving problems entails making a concerted effort to improve undesirable circumstances or find solutions. This is frequently challenging since one's capacity to use problem-solving techniques may be hampered by a number of depression-related factors. To distract oneself from signs of depression and distress, one can partake in activities that provide positive reinforcement. Such positive reinforcement frequently reduces the severity of depressive symptoms and lessens their duration (Zia et al., 2007).

INSOMNIA

Insomnia is a sleep disorder in which a person has trouble falling and/or staying asleep, habitual sleeplessness; inability to sleep. The condition can be short-term (acute) or can last a long time (chronic). It may also come and go. Acute insomnia lasts from 1 night to a few weeks. Insomnia is chronic when it happens at least 3 nights a week for 3 months or more.

Types of Insomnia

There are two types of insomnia: primary and secondary.

Primary insomnia: This means your sleep problems aren't linked to any other health condition or problem.

Secondary insomnia: This means you have trouble sleeping because of a health condition (like asthma, depression, arthritis, cancer, or heartburn); pain; medication; or substance use (like alcohol).

Insomnia Causes

Causes of primary insomnia include:

- Stress-related to big life events, like a job loss or change, the death of a loved one, divorce, or moving.
- Things around you like noise, light, or temperature.
- Changes to your sleep schedule like jet lag, a new shift at work, or bad

habits you picked up when you had other sleep problems.

Causes of secondary insomnia include:

- Mental health issues like depression and anxiety
- Medications for colds, allergies, depression, high blood pressure, and asthma
- Pain or discomfort at night
- Caffeine, tobacco, or alcohol use
- Hyperthyroidism and other endocrine problems
- Other sleep disorders, like sleep apnea or restless legs syndrome

Insomnia Risk Factors

- Insomnia affects women more than men and older people more than younger ones. Young and middle-aged African Americans also have a higher risk.
- Long-term illness Mental health issues
- Working night shifts or shifts that disrupt natural sleep-wake cycle

Symptoms of insomnia include:

- Sleepiness during the day
- Fatigue
- Grumpiness
- Problems with concentration or memory

The etiology of insomnia affects how severe it is. Whereas episodic insomnia results in drowsiness and decreased psychomotor function, persistent insomnia is linked to increased health care utilization, frequent accidents, absenteeism, and memory impairment. A higher risk of depression is the effect of insomnia that occurs most consistently (Roth & Roehrs, 2003).

Despite laboratory studies showing older men have more disrupted sleep, reports of insomnia tend to increase with age and are more common among women. Divorced, widowed, or separated individuals report experiencing insomnia more frequently than married individuals do; insomnia is also correlated with a lower socioeconomic status (Kupfer et al., 1997). It is now recognized that patients with primary insomnia exhibit elevated heart rate and sympathetic nervous system activation during sleep, aberrant hormone secretion, increased whole body and brain metabolic activation, and increased high-frequency EEG activation. This chronic activation is measurable at all times of the day and night (Michael et al., 2010).

The available research suggests that some of the most widely used insomnia therapies lack rigorous double-blind, randomized, controlled trials. These options include both non-medication treatments, most notably cognitive behavioral therapy for insomnia, and a variety of pharmacologic therapies such as benzodiazepines, “z-drugs”, melatonin receptor agonists, selective histamine H1 antagonists, orexin antagonists, antidepressants, antipsychotics, anticonvulsants, and non-selective antihistamines (Krystal et al., 2019).

OBSESSIVE-COMPULSIVE DISORDER

Obsessive Compulsive Disorder is characterized by the presence of obsessions and/or compulsions, which:

- Take up at least an hour a day
- Are beyond your control
- Are not enjoyable
- Interfere with work, your social life, or another part of life

OCD Types and Symptoms- OCD comes in many forms, but most cases fall into at least one of four general categories:

- Checkings, such as locks, alarm systems, ovens, or light switches, or think that you have a medical condition like pregnancy or schizophrenia.
- Contamination, a fear of things that might be dirty or a compulsion to clean. Mental contamination involves feeling like you've been treated like dirt.
- Symmetry and order, the need to have things lined up in a certain way
- Ruminations and intrusive thoughts, an obsession with a line of thought. Some of these thoughts might be violent or disturbing.

Obsessions and Compulsions- Many people who have OCD know that their thoughts and habits do not make sense. They do not do them because they enjoy them, but because they cannot quit. And if they stop, they feel extreme distress and anxiety.

Obsessive thoughts can include:

- Worries about yourself or other people getting hurt
- Constant awareness of blinking, breathing, or other body sensations
- The suspicion that a partner is unfaithful, with no reason to believe it

Compulsive habits can include:

- Doing tasks in a specific order every time or a certain “good” number of times
- Needing to count things, like steps or bottles
- Fear of touching doorknobs, using public toilets, or shaking hands

The use of selective serotonin reuptake inhibitors as first-line pharmacologic interventions for OCD is still supported by current research; however, more recent findings also support the use of neuroleptics, deep brain stimulation, and neurosurgical ablation as adjunctive treatments for OCD that is resistant to treatment. Although their effectiveness in treating OCD has not yet been determined, preliminary data suggest the safety of other medications (e.g., riluzole, ketamine, memantine, N-acetylcysteine, lamotrigine, celecoxib, ondansetron), either in combination with or alone from selective serotonin reuptake (Hirschtritt et al., 2017).

Obsessive-Compulsive Disorder Theories:

Aristotle's concept of a continuum, according to which a moving object must first reach the end of a sequence of infinities, is accepted a priori by the unified theory.

Aristotle also looked at the relationship between two objects and proposed three criteria for that relationship: continuity, contiguity, and sequence. These items might merge together in contact areas by fusing into one another. These emergents could not be a final fusion and could be either transient or persistent, heterogeneous or homogenous (Yaryura et al., 1998).

CHAPTER-2
REVIEW OF LITERATURE

COVID19 and Post-Traumatic Stress Disorder

Post-traumatic stress disorder (PTSD) is a severe mental illness that may develop in individuals who have experienced or witnessed a traumatic event (Sareen, 2014). It can negatively affect the functional and social well-being of patients and PTSD has four core features: (a) re-experiencing the traumatic event; (b) avoidance of situations; (c) experiencing negative changes in emotions and beliefs; and (d) hyper-arousal (Weathers et al., 2020). Not all individuals who are exposed to a traumatic event or stressful situation develop PTSD. The risk of developing PTSD depends on the individual's initial response to the traumatic event, the intensity of the memory, coping style, feeling of safety and social support.

PTSD, or post-traumatic stress disorder, is another one of the possible long-term effects of COVID19 (Schou et al., 2021; Bajoulvand et al., 2022). Being in contact with infectious diseases, the COVID19 pandemic presents a distinct and multifaceted severe stressor that can be categorized into multiple sources: direct (such as a potentially fatal physical discomfort experience) and indirect (such as exposure to seeing others battle the illness; experiencing exclusion and stigmatization (Xiao et al., 2020). Though it's debatable whether or not some of these incidents qualify as traumatic stressors because they don't endanger the person's life or integrity (Sekowski et al., 2021) all of these situations may lead to the development of protracted symptoms that are either the same or very similar to those of post-traumatic stress disorder (PTSD), including persistent intrusion, heightened awareness, avoidance behavior, and negative impacts on mood and cognition linked to the traumatic stimuli (Ochnik et al., 2022).

COVID19 can cause traumatic experiences to the patients and caregivers that may lead to PTSD and/or psychological disorders (Liu et al., 2020). It has been estimated that around 20- 25% of such patients may develop PTSD symptoms. COVID19 survivors discharged from quarantine reported post-traumatic stress symptoms nearly 96.2% (Bo et al., 2020) that the higher rate of symptoms was partly attributed to the hospital/quarantine which lasts for weeks preventing social contact with family and friends, and the same finding was observed in China (Tang

et al., 2020) in Italian web-based cross-sectional survey for COVID19 with a higher prevalence of PTSD symptoms at 29.5% (Forte et al., 2020). A cross-sectional study suggested that the quarantine resulted in psychological distress and PTSD which persisted even after quarantine (Fawaz & Samaha, 2020). A recent meta-analysis showed the prevalence of PTSD at 32.2%, depression at 14.8% and anxiety disorders at 14.8% (Rogers et al., 2020).

There is limited information available on the psychological impact of COVID19 on patients, caregivers and healthcare workers. Hospitalisation due to life-threatening COVID19 illness appeared to be a risk factor for developing PTSD (Liu et al., 2020) as is being quarantined (Brooks et al., 2020), stigmatization and rejection can also increase the risk of PTSD (Logie & Turan, 2020), death of loved ones secondary to COVID19 infection, as well as poverty with experience of stressful situations enhance the risk of PTSD. Studies showed that women are more vulnerable to PTSD than men (Liu et al., 2020), but older individuals with less post-traumatic stress as compared to young individuals post COVID19 (Jiang et al., 2020).

A systematic reviewed studies conducted by Carmassi et al. (2020) showed that Healthcare workers involved in emergency are at high risk for developing Post-Traumatic Stress Disorder and Post-Traumatic Stress Symptoms although variables such as exposure level, age, gender etc. must be considered. Among the Greeks, health care professionals appeared to be moderately stressed from the COVID19 crisis, with women scoring higher on all clinical scales and the difference between women and men being statistically significant. Criteria for a probable posttraumatic stress disorder diagnosis were met by a total of 16.7% (21.7% of women; 5.1% of men). Negative emotion and threatened or physical tension are positive significant predictors of PTSS. Those suffering with higher levels of PTSS scored positively for insomnia and exhibited significantly higher peri-traumatic distress (Blekas et al., 2020).

Among a total of 115 recruited survivors, PTSD and sub-threshold PTSD rates in patients hospitalised for COVID19 are worrying. Being female and having pre-existing mental disorders are established risk factors for PTSD, while the prospective association with obesity needs further investigation. Multivariate Regression shows that being male acted as a protective factor (Tarsitani et al., 2021).

A cross-sectional study found a PTSD prevalence of 30.2% after acute COVID19 infection. Associated characteristics were female sex, which has been extensively described as a risk factor for PTSD. PTSD was found in 115 participants (30.2%). In the total sample, additional diagnoses were depressive episode (66 [17.3%]), hypomanic episode (3 [0.7%]), generalized anxiety disorder (27 [7.0%]), and psychotic disorders (1 [0.2%]). Patients with PTSD were more frequently women (64 [55.7%]), reported higher rates of history of psychiatric disorders (40 [34.8%]) and delirium or agitation during acute illness (19 [16.5%]), and presented with more persistent medical symptoms in the post-illness stage (more than 3 symptoms, 72 [62.6%]). Logistic regression specifically identified sex ($\text{Wald}_1 = 4.79; P = .02$), delirium or agitation ($\text{Wald}_1 = 5.14; P = .02$), and persistent medical symptoms ($\text{Wald}_2 = 12.46; P = .002$) as factors associated with PTSD (Janiri et al., 2021).

Distress tolerance, which measures an individual's capacity to control and tolerate emotional distress, and individual resilience, which measures an individual's capacity to handle stress, may be important traits that guard against the mental health symptoms that follow significant stressors. After natural disasters, individual resilience plays a critical protective role against depression, PTSD, and poor general health (Kukihara et al., 2014).

Despite the fact that the majority of people recover from traumatic experiences (Bonanno et al., 2007), the success of adaptation may be hampered by a number of risk factors, such as female gender, lack of social support, and a past mental health history (Brewin et al., 1999; Ozer et al., 2003; Carmassi et al., 2020a, 2020b), having small children (Yehuda et al., 2015; Bryant, 2019), having intense emotions

when exposed, such as anger or peritraumatic distress, or feeling powerless during the trauma (Vance et al., 2018; Carmassi et al., 2017). Resilience, on the other hand, is the ability to respond to stress in a healthy way so that objectives can be met with the least amount of psychological and physical damage (Epstein & Krasner, 2013), plays a crucial part in lessening the effects of traumatic events, which lowers PTSS while also improving the standard of care (Wrenn et al., 2011; Ager et al., 2012; Haber et al., 2013; McGarry et al., 2013; Craun & Bourke, 2014; Hamid and Musa, 2017; Colville et al., 2017; Cleary et al., 2018; Winkel et al., 2019).

A prior review of the literature on previous coronavirus outbreaks indicated that there was a high chance that COVID19 survivors would experience mental health issues, particularly PTSD symptoms (Kaseda & Levine, 2020). Post-traumatic stress symptoms (PTSS) are also linked to functional impairment, even in people who do not fully meet the diagnostic criteria for PTSD (Shalev et al., 2017). As previously mentioned, at one year after the outbreak, 42% of those who survived MERS had scores above the clinical cut-off for PTSD, and at thirty months after the outbreak, nearly 26% of those who survived SARS fulfilled the complete diagnostic criteria for PTSD (Lee et al., 2007; Mak et al., 2010).

A study conducted by Horn et al. (2020) investigated a total of 180 patients among which the prevalence of PTSD was 6.5%. The prevalence of PTSD in patients with COVID19 is not as high as that reported among patients during previous epidemics. Initial psychological responses were predictive of a PTSD diagnosis, even though most patients showing acute psychological distress (33.5% of the sample) improved in the following weeks. PTSD symptoms also increased following a stay in an intensive care unit.

Yunitri et al. (2022) investigated the Global Prevalence and associated risk factors of PTSD. In this meta-analytical study, a total of 63 studies ($n = 124,952$) from 24 different countries were involved. The overall pooled estimate of PTSD prevalence was 17.52% (95% CI 13.89 to 21.86), with no evidence of publication bias ($t = -0.22$, $p\text{-value} = 0.83$). This study found a high prevalence of PTSD among patients with

COVID19 (15.45%; 95% CI 10.59 to 21.99), health professionals (17.23%; 95% CI 11.78 to 24.50), and the population at large (17.34%; 95% CI 12.21 to 24.03).

COVID 19 and depression

Fear, worry, and stress are normal responses to perceived or real threats, and at times when we are faced with uncertainty or the unknown. Fear of contracting the virus in a pandemic such as COVID19 is the significant change to our daily lives as our movements are restricted in support of efforts to contain and slow down the spread of the virus. Studies conducted among adults surviving COVID19 evinced that 28% for PTSD, 31% for depression, 42% for anxiety, 20% for OC symptoms, and 40% for insomnia, females suffered more for both anxiety and depression (Mazza et al., 2020).

Three to four months following diagnosis or hospital discharge, the majority of studies assessed the frequency of depressive symptoms and clinically significant depression; nonetheless (Daher et al., 2021) found that 27% of people had moderate depressive symptoms and 5% had severe depressive symptoms when it was measured 6.5 months ($\bar{x} = 197$ days) after hospital discharge. The COVID19 subjects had significantly higher depression scores ($\bar{x} = 3$ vs. $\bar{x} = 1$ on the DASS-21 depression scale, $p = 0.036$) in the one study that included a control group that was not exposed to SARS-CoV-2 (Mattioli et al., 2021). However, not all patients met the criteria for post COVID19 syndrome because the time of assessment in that study varied from 12 to 215 days after diagnosis. There was significant heterogeneity in the tools used to assess depression and the time points of assessment after COVID19 diagnosis, so a meta-analysis was not conducted (Renaud-Charest et al., 2021).

Psychopathological consequences have been documented during acute infection and in the post COVID19 phase in COVID19 survivors since the pandemic spread. During an acute viral infection, confusion, delirium, depression, anxiety, and sleep disturbances have been reported (Rogers et al., 2020). Long-term neuropsychiatric consequences of COVID19 are now recognized as the primary symptoms of the post acute COVID19 syndrome, in addition to acute infection, as was previously noted in the SARS and Middle East Respiratory Syndrome (MERS) outbreaks. (Nalbandian et

al., 2021). Anxiety, depression, and cognitive deficits have been the most common long-term neuropsychiatric after effects (Khraisat et al., 2021). Between one and three months, six months, and twelve months following SARS-CoV-2 infection, roughly thirty to forty percent of patients had clinically significant depressive psychopathology (Mazza et al., 2021; Taquet et al., 2021). Depression adversely affects day-to-day functioning and is typified by a low mood, decreased interest, and cognitive impairment. The outcome of SARS-CoV-2 infection was found to be influenced by pre-existing depression as well as depressive symptoms related to COVID19. These factors were linked to higher rates of infection, hospitalization, admission to the intensive care unit, and mortality (Vai et al., 2021, Ceban et al., 2021). The immune inflammatory response to the viral infection and any ensuing neuroinflammation, as well as the psychological stressor brought on by SARS-CoV-2 infection, are the primary mechanisms accountable for the COVID19 psychiatric consequences (Troyer et al., 2018; Passavanti et al., 2021).

Between 3% and 73.10% of the general population was reported to have experienced depression during the previous epidemic outbreaks of SARS and Ebola (Chew et al., 2020) and the majority of them are lower than the depression rate that was noted during the COVID19 outbreak. The fact that these previous epidemics were contained more quickly and had lower infection rates in spite of higher death rates could account for the decreased prevalence of depressive symptoms (Huremović, 2019). Furthermore, during the SARS outbreak in Canada, Hawryluck et al. (2004) reported that the length and uncertainty of the lockdown contributed to higher levels of depression (Hawryluck et al., 2004). Thus, the higher rates of depressive symptoms seen during the COVID19 outbreak may also be explained by the current lockdown measures implemented globally (Bueno-Novitol et al., 2021).

Research on those who survived the 2003 severe acute respiratory syndrome (SARS) pandemic has shown that depression can persist for up to a year after being released from the hospital (Liu et al., 2021). Therefore, depression could be considered a plausible consequence for coronavirus infection survivors. All things considered, it is necessary to describe the connection between depression and post COVID19 syndrome (Renaud-Charest et al., 2021).

Frequency and factors associated with depression in post COVID19 syndrome were recorded and qualitatively assessed through narrative synthesis. Methodological quality and risk of bias was assessed using a modified version of the Newcastle-Ottawa Scale (NOS) for prospective cohort studies. Of 316 articles identified through this systematic search, eight studies were included. The frequency of depressive symptoms +12 weeks following SARS-CoV-2 infection ranged from 11 to 28%. The frequency of clinically-significant depression and/or severe depressive symptoms ranged from 3 to 12% (Renaud-Charest et al., 2021).

A study conducted by Ma and colleagues (2020) investigated a total of 770 participants. Among these participants the prevalence of depression was 43.1% (95%CI: 39.6%-46.6%). Binary logistic regression analysis found that having a family member infected with COVID19 (OR=1.51, $P = 0.01$), suffering from severe COVID19 infection (OR=1.67, $P = 0.03$), male gender (OR=0.53, $P < 0.01$), and frequent social media use to obtain COVID19 related information (OR=0.65, $P < 0.01$) were independently associated with depression. Patients with depression had lower Quality of Life (QOL) than those without. The study highlighted the high prevalence of depression among clinically stable patients with COVID19. Regular screening and appropriate treatment of depression are urgently warranted for this population.

Hospitalized patients with COVID19 are often presented with features of anxiety and depression. Mental concern and appropriate intervention are essential parts of clinical care for those who are at risk. A total of 144 patients diagnosed with COVID19 were included in this study. 34.72% and 28.47% patients with COVID19 had symptoms of anxiety or depression, respectively. The bivariate correlations showed that less social support was correlated with more anxious ($r = -0.196$, $p < 0.05$) and depressive ($r = -0.360$, $p < 0.05$) symptoms among patients with COVID19. The multiple linear regression analysis showed that gender ($\beta = 1.446$, $p = 0.034$), age ($\beta = 0.074$, $p = 0.003$), oxygen saturation ($\beta = -2.140$, $p = 0.049$), and social support ($\beta = -1.545$, $p = 0.017$) were associated with anxiety for COVID19 patients. Moreover, age ($\beta = 0.084$,

$p=0.001$), family infection with SARS-CoV-2 ($\beta =1.515$, $p=0.027$) and social support ($\beta =-2.236$, $p<0.001$) were the factors associated with depression (Kong et al., 2020).

Baroiu et al. (2021) conducted an assessment on a group of 109 hospitalized patients with moderate forms of COVID19 and 32.11 % had varying degrees of depression and had an age and body mass index statistically significantly higher than those without depression. These patients also scored higher on tests of comorbidities. Although pre-existing studies showed higher prevalence of depression among this population, this particular study had recorded a lower incidence of depression.

Although some reports suggested lower incidence, a study conducted by Ettman et al. (2020) suggest that prevalence of depression symptoms in the US was more than 3-fold higher during COVID19 compared with before the COVID19 pandemic. Individuals with lower social resources, lower economic resources, and greater exposure to stressors (eg, job loss) reported a greater burden of depression symptoms. Post COVID19 plans should account for the probable increase in mental illness to come, particularly among at-risk populations. This finding showed that several variables contributed significantly in acquiring depression among COVID19 patients.

A cross-sectional study by Saidi et al. (2021) assessed symptoms of depression and anxiety among 103 COVID19 patients. Of the 103 participants, 36.89% and 23.30% patients with COVID19 had symptoms of anxiety or depression; respectively. The mean score of anxiety subscale and depression subscale for all patients was 6.45 ± 4.29 and 5.38 ± 4.47 , respectively. There is an increasing level of anxiety and depression in hospitalized patients with COVID19. Mental concern and appropriate intervention remain an important part of clinical care for those who are at risk.

Another cross sectional study conducted at Wuhan investigated the prevalence of depression and anxiety and associated risk factors. A total of 78 patients who were confirmed to have COVID19 were enrolled in the study. Prevalence of depression

and anxiety symptoms were diagnosed in 35.9% and 38.5% of the patients, respectively. Multivariate linear regression analysis found female gender was an independent predictor for higher depression severity index. Having family members who were diagnosed with COVID19 and family members who died from COVID19 were independently associated with higher depression severity index and anxiety score (Nie et al., 2021).

Matalon and colleagues (2021) conducted a one month follow-up of hospitalized COVID19 patients. The study had interesting results where the levels of depressive and anxiety symptoms decreased one-month following hospitalization. Moreover, higher levels of anxiety (standardized $\beta = 1.15$, 95% CI = 0.81–1.49, $p < 0.001$) and depression ($\beta = 0.97$, 95% CI = 0.63–1.31 $p < 0.001$) symptoms during the first week of hospitalization, feeling socially disconnected ($\beta = 0.59$, 95% CI = 0.37–0.81 $p < 0.001$) and experiencing a longer hospitalization period ($\beta = 0.25$, 95% CI = 0.03–0.47 $p = 0.026$) predicted higher PTSS scores a month post-hospitalization.

In contrast, a study conducted by Li et al. (2021) at Wuhan showed that there was no significant gender difference on Depression among COVID19 patients. Besides, patients whose hospital stays were longer than 14 days had a higher risk of depressive symptoms than those whose stays were less than 7 days. There was no significant difference in the correlation between the level of dyspnea and the levels of anxiety or depressive symptoms. In conclusion, COVID19 patients might have anxiety and depressive symptoms during hospitalization. Clinicians should pay attention to the middle age group and patients with longer hospital stays.

COVID 19 and Insomnia

The emergence of sleep disturbances in response to major stressful events including natural disasters (eg, wildfires, earthquakes, floods) or wartime, has been documented (Belleville et al., 2019; Lavie, 2001). Unlike those events, which are typically fairly localized, the 2019 novel coronavirus (COVID19) pandemic is a worldwide crisis that has produced unprecedented changes in life. Such a major

stressful life event can cause impairment of sleep and circadian rhythms, at a time when healthy sleep is particularly important to cope adaptively with this crisis and uncertainty about the future. Study of the early impact of COVID19 pandemic on sleep and psychological symptoms on insomnia, anxiety, depression, and acute stress during the peak of COVID19 spread revealed very high rates of clinically significant insomnia at 20% and depression (24.5%), that insomnia and psychological symptoms were more severe among participants living in the epicentre (Hubei province) and among those who experienced a higher degree of threats, i.e, health-care workers and management staff on the front lines; suggested a 37% increase in the rates of clinical insomnia ranging from 14.6% to 20% between before and peak of the COVID19 pandemic (Lin et al., 2021). Sleep disturbances such as insomnia and nightmares are often precursors of psychiatric disorders, resulting in greater risk for long-term adverse outcomes (Altena et al., 2020).

Lin and colleagues (2021) investigated the early impact of the COVID19 pandemic on sleep and psychological symptoms in China and found a very high rate of clinically significant insomnia (20%), acute stress (15.8%), anxiety (18.5%), and depression (24.5%), 37% increase in the rates of clinical insomnia (from 14.6% to 20%) from before to peak of COVID19 pandemic. Studies on healthcare workers indicated a higher rate of insomnia (34%–36%), anxiety (45%) and depressive symptoms (50%); more severe among front line workers directly involved with patients diagnosed or at risks for COVID19 (Lai et al., 2020) and among females.

Despite the fact that a significant amount of research conducted after COVID19 concentrated on the physiological effects of the virus, a large body of later studies has demonstrated that COVID19 infection has a significant psychological burden and that patients may experience an excess of negative psychological outcomes and neuropsychiatric complications (Huang et al., 2021; Khan et al., 2020; Rogers, 2020; Deng, 2021). Thus, in addition to a host of other psychosocial factors, a diagnosis of COVID19 is likely to increase the likelihood of developing mood, cognitive, and sleep disturbances because infected patients frequently need to be hospitalized for

mechanical ventilation and the intensive care unit (ICU), both of which are thought to be risk factors for the development of acute psychiatric disorders; direct bio-immunological effects have also been linked to this phenomenon (Hatch, 2018; Mazza, 2020).

There were more internet searches for insomnia during the early stages of the pandemic, which may indicate that the pandemic exacerbated symptoms of insomnia (Zitting, 2021). In comparison to pre-pandemic estimates, emerging research shows higher prevalence rates of insomnia and mental health symptoms like anxiety and depression (Voitsidis et al., 2020; Pappa et al., 2020; Mandelkorn et al., 2021; Lahiri et al., 2021; Li et al., 2020; Pieh, 2021). While insomnia is sometimes associated with anxiety and depression, it is also recognized as a separate disorder that can lead to and aggravate mental health problems (Cheng et al., 2004; Baglioni et al., 2011; Hertenstein et al., 2019; Vargas et al., 2019; Miller et al., 2016). Furthermore, increased suicidal thoughts during the COVID19 pandemic have been connected to the severity of insomnia (Killgore et al., 2020). Therefore, independent evaluation and treatment of insomnia is necessary, as is further investigation into the implications of insomnia symptoms during the COVID19 pandemic.

After recovering from COVID19, 26% of participants in a Chinese six-month follow-up study on 1733 patients reported having trouble sleeping (Huang et al., 2021). The Insomnia Severity Index (ISI) was used to compare sleep disturbances between non-COVID19, COVID19 positive, and post-COVID19 patients in a study involving 507 participants. The research findings indicate that individuals with extended COVID19 had a noteworthy incidence of sleeplessness and a general decline in their Quality of Life (QOL) (Orru et al., 2021). When measured using the ISI, 22% of patients in a case series of post COVID19 patients who were released from the University of Virginia ICU reported having insomnia that had just started at a six-week follow-up (Ramani et al., 2021).

Depression, anxiety, insomnia, and distress symptoms were significantly greater among females, individuals with a history of psychiatric illness, and individuals receiving psychiatric support during the COVID19 pandemic. Health Care Workers

serving in Turkey during the COVID19 pandemic experienced high levels of depression, anxiety, insomnia, and distress symptoms. Female gender, being a nurse, working on the front line, history of psychiatric illness, and being tested for COVID19 were identified as risk factors for mental health problems (Şahin et al., 2020).

During the COVID19 pandemic, a comparatively significant prevalence of sleeplessness among healthcare workers was revealed by the findings of this comprehensive analysis of meta-analyses. Policymakers and health administrators should routinely evaluate health care workers for psychological disorders and potential suicidal tendencies, as sleeplessness can be linked to other psychological issues. Additionally, treating insomnia can lower the prevalence of certain mental health conditions (Sahebi et al., 2021).

Alimoradi and colleagues (2021) conducted a systematic review and meta-analysis which estimated the magnitude of sleep problems during the COVID19 pandemic and its relationship with psychological distress. The results come from 168 cross-sectional, four case-control, and five longitudinal design papers comprising 345,270 participants from 39 countries were identified. The corrected pooled estimated prevalence of sleep problems were 31% among healthcare professionals, 18% among the general population, and 57% among COVID19 patients (all p -values < 0.05). Sleep problems were associated with depression among healthcare professionals, the general population, and COVID19 patients, with Fisher's Z scores of -0.28, -0.30, and -0.36, respectively. Sleep problems were positively (and moderately) associated with anxiety among healthcare professionals, the general population, and COVID19 patients, with Fisher's z scores of 0.55, 0.48, and 0.49, respectively. Sleep problems appear to have been common during the ongoing COVID19 pandemic. Moreover, sleep problems were found to be associated with higher levels of psychological distress. With the use of effective programs treating sleep problems, psychological distress may be reduced. Vice versa, the use of effective programs treating psychological distress, sleep problems may be reduced.

Another cross-sectional study by Simonetti et al. (2021) among a total of 1,005 nurses employed in different Italian hospital wards, during the COVID19 pandemic showed that the prevalence of sleep disturbances, moderate anxiety and low self-efficacy was 71.4%, 33.23% and 50.65%, respectively. A positive correlation was found between anxiety and sleep quality (0.408; $p < .0001$) and negative correlations between self-efficacy and anxiety (-0.217 ; $p < .0001$) and sleep quality and self-efficacy (-0.134 ; $p < .0001$). The factor independently associated with all variables was gender. Females were more prone to sleep disturbances, anxiety and low levels of self-efficacy than males ($p < .05$).

A systematic review by Jahrami and colleagues (2021) revealed that the global pooled prevalence rate of sleep problems among all populations was 35.7% (95% confidence interval, 29.4–42.4%). Patients with COVID19 appeared to be the most affected group, with a pooled rate of 74.8% (95% confidence interval, 28.7–95.6%). Health care workers and the general population had comparative rates of sleep problems, with rates of 36.0% (95% confidence interval, 21.1–54.2%) and 32.3% (95% confidence interval, 25.3–40.2%), respectively.

COVID 19 and Obsessive Compulsive Disorder

Major pandemic or epidemic outbreaks have many negative impacts on individuals and society (Duan & Zhu, 2020), especially the healthcare personnel who has been impacted (Chong et al., 2004). The Chinese government made efforts to address psychological concerns including fear and anxiety, depression, psychophysiological symptoms, and post-traumatic stress symptoms experienced by medical and nursing staffs in China due to the SARS pandemic in 2003 (Maunder et al., 2006). COVID19 influenced the mental health of many individuals in addition to patients with COVID19 pneumonitis, close contacts, suspected cases isolated at home, patients in clinics, families, and friends of affected people, and health professionals caring for patients, the general public may also experience elevated mental health concerns (Xiang et al., 2020). A substantial psychological impact of both the outbreak and the response was found among the residents of the United Kingdom (Kisely et al., 2020), while infected individuals had panic and anxiety disorders in

Bangladesh (Paul et al., 2021; Rahat et al., 2021) with more prevalence in females (McLean et al., 2011; Vesga-López et al., 2008).

The COVID19 pandemic has prompted global measures to prevent infection. Regular handwashing has been introduced as the standard of prevention across the world, the practice of which resulted in 72 % of the participants reporting an increase in OCD. With the outbreak of the COVID19 pandemic (WHO, 2020), a large percentage of the world's population has been exposed to multiple burdens, including immediate hazards such as the risk of infection as well as social isolation and economic insecurity. Based on the diathesis-stress model, which helps explain the development and maintenance of many mental disorders, these stresses may particularly affect people with pre-existing mental disorders (Pfefferbaum & North, 2020) due to low resilience, fewer social contacts, and reduced psychiatric care. The prevalence of anxiety and depression increased from 4% in 2019 to 20 % in 2020 in the Chinese general population (Li et al., 2020). The COVID19 pandemic increased obsessive-compulsive disorder (Fineberg et al., 2020; Fontenelle & Miguel, 2020). Research evinced the exacerbation of OCD symptoms due to the COVID19 pandemic (Benatti et al., 2020; Prestia et al., 2020) in approximately one-third of their sample, and the first lockdown increased OCD symptoms. Evidence on OCD during the start of the COVID19 pandemic showed increased OCD in Italy (Benatti et al., 2020; Prestia et al., 2020). However, large sample sizes are lacking, and so are data from another country. Thus, the study aims to fill this gap by investigating the influence of the COVID19 pandemic on COVID19 patients.

Chakraborty and Karmakar (2020) studied patients who contracted COVID19 and are currently diagnosed with OCD and their findings showed that although 5 patients of 84 showed exacerbated symptoms the rest were not particularly affected by the COVID19 regarding their handwashing compulsion. In a nutshell, it does not increase their fear of contamination as a result of COVID19. Most studies showed that obsessive-compulsive symptoms worsened during the early stages of the pandemic, particularly for individuals with contamination-related obsessive-

compulsive disorder (OCD), though other symptoms dimensions were found to worsen as well. Many patients and individuals in the general population experienced new obsessive–compulsive-like symptoms centered on COVID19. Self-reported rates of symptom exacerbation and COVID19-focused symptoms were consistently lower in studies that recruited patients from specialty clinics (Guzick et al., 2021). Although the effects of OCD is nullified in some regions, data based on other regions such as Liao et al. (2021) showed that female gender, concern about COVID19 and OCD symptom severity at baseline were risk factors for exacerbation of OCD symptoms during early COVID19, while optimism, as one composite factor of resilience, was a protective factor against exacerbation of OCD symptoms both during early COVID19 and at follow-up. This study showed that COVID19 had immediate and long-term impacts on the exacerbation of OCD symptoms, and interventions targeted at improving resilience are recommended.

Severe Infection pandemic triggered perturbation in the immune system which can be associated with psychiatric implications. The Severe Acute Respiratory Syndrome Coronavirus (COVID19) pandemic triggered perturbation of the immune system provoked psychiatric sequelae were investigated among the survivors including post-traumatic stress disorder (PTSD), depression, anxiety, insomnia, and obsessive-compulsive (OC) symptomatology, and the results indicated 28% of psychiatric sequelae for PTSD, 31% for depression, 42% for anxiety, 20% for OC symptoms, and 40% for insomnia; females suffered more for both anxiety and depression (Mazza et al., 2020).

Respiratory viral diseases are connecting with acute and long-lasting psychopathological consequences among the survivors (Bohmwald et al., 2018). Coronaviruses cause infections ranging from common colds to severe acute respiratory syndrome (Peiris et al., 2003). Studies highlighted that exposure connected to neuropsychiatric diseases during and after Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) outbreaks (Rogers et al., 2020) which included post-traumatic stress disorder (PTSD), depression, panic disorder, and obsessive-compulsive disorder (OCD) at 1 to

50 months follow up (Wu et al., 2020; Cheng et al., 2004; Lam et al., 2009), and seropositivity was associated with suicide and psychosis persisting one year after SARS (Okusaga et al., 2011).

The Severe Acute Respiratory Syndrome Coronavirus (COVID19) pandemic was found associated with the psychiatric implication (Troyer et al., 2018) as the preliminary research suggests that patients might have delirium, depression, anxiety, and insomnia (Rogers et al., 2020) due to direct viral infection on the central nervous system (CNS) or indirectly via an immune response (Wu et al., 2020) as animal studies demonstrated the induced neuronal injuries (Desforges et al., 2019) causing psychiatric symptoms (Dantzer, 2018; Netland et al., 2008). Infection-triggered perturbation of the immune system seems to foster psychopathology that psychological stress enduring a potentially fatal disease and stress-related inflammation (Miller & Raison, 2016), emerged as a mechanism underpinning mood disorders, psychosis, and anxiety disorders (Najjar et al., 2013). Furthermore, the immunological mechanisms, fear of illness, the uncertainty of the future, stigma, traumatic memories of severe illness, and social isolation experienced by patients during the COVID- 19 are significant psychological stressors that may interact in defining psychopathological outcomes (Brooks et al., 2020; Carvalho et al., 2020).

Taking leads from the earlier research findings evidence about SARS and MERS outbreaks, the present study hypothesizes that COVID19 survivors will show a high prevalence of PTSD, Depression, insomnia and OCD among the targeted population. No data exist on psychopathology in the post-illness phase (Rogers et al., 2020; Vindegaard & Benros, 2020). Thus, the present study aims to investigate the psychopathological impact of COVID19 on survivors at one month follow up, also considering the effect of possible risk factors.

Male and Female differences on effect of COVID19:

Given the current COVID19 pandemic, it is critical to comprehend the variables influencing the differences in health outcomes and healthcare access between men and women. Initial reports from China in 2020 indicated a gender disparity in COVID19 death and case rates, with men dying from the virus at a higher rate (Guan et al., 2020). Subsequent research presented an alternative picture as more data became available. According to a study conducted across 21 developed nations, the proportion of deaths caused by COVID19 increased similarly for men and women. However, later in the pandemic, the balance of excess deaths shifted from being dominated by men to being equal or dominated by women (Kontis et al., 2020). In spite of this, the data covered in this paper indicates a significant disparity in some regions of the world, with men apparently accounting for a larger proportion of COVID19 cases and fatalities than women. The purpose of this study is to look into the variables causing these differences across 133 nations (Aleksanyan & Weinman, 2022). Adolescent girls and young women are already disproportionately affected by COVID19, and in order to encourage behavior change, they might need more focused, gender-sensitive messaging (Pinchoff et al., 2020).

The COVID19 pandemic has affected millions of patients across the globe. Multiple studies, national and international governmental data have shown important sex and gender differences in the incidence and outcomes of patients with COVID19. These differences are not only attributed to the differences in age and comorbid conditions but likely a combination of factors, including hormonal differences, immune response, inflammatory markers and behavioral attitudes, among others. In this review, we discuss the studies addressing sex- and gender-specific differences in COVID19 infections with a focus on the potential pathophysiological mechanisms of these differences (Ya'qoub et al., 2021).

The pandemic has affected gender variations especially employment and other necessities of livelihood. Overall, female employment dropped 13 percentage points between March and early April – from 59% to 46% -- while male employment

dropped 10 percentage-points – from 64% to 54%. Non-college-educated women were hit the hardest by job loss. They suffered a 15 percentage-point drop in employment, from 51% in March to 36% in early April, while non-college-educated men suffered an 11 percentage-point drop, from 58% to 47%. Among non-college-educated workers employed in March, women reported more job losses than men. Nineteen percent of women reported a permanent or temporary lay-off by early April compared to 14% of men. Relative to women without a college degree, college-educated men and women suffered a much smaller, 9 percentage-point drop in employment. There are no significant gender differences in employment rates among those holding a college degree. Among college-educated workers employed in March, men suffered a higher rate of job loss than women. Nine percent of men reported a permanent or temporary lay-off by early April compared to 6% of women. In contrast, a higher proportion of women declared being on leave or other by early April -8% of women compared to 5% of men (Zamarro et al., 2020).

COVID19 has had a significant impact on both men and women's lives since December 2019. This study looked at coping mechanisms, resilience levels, belief in a just world (BJW), and psychiatric symptomatology (depression, anxiety, and somatization) in relation to gender disparities brought on by the pandemic-resultant-lockdown. Online interviews were conducted with 1,560 Israeli adults during Israel's first mandatory lockdown in March 2020 (309 men and 756 women). According to the results, women had higher levels of somatization, sadness, and anxiety ($t(635.238) = -8.86, p < .001$; $t(606.414) = -5.31, p < .001$; $t(743.856) = -6.80, p < .001$; accordingly respectively). The lockout caused more women to quit their jobs ($Z = 2.08, p = .037$) and fewer women to say that their occupations were "essential" (Laufer & Bitton, 2021).

The actual COVID19 pandemic scenario has generated a context of uncertainty, helplessness, and inequality. Yet, the perception of COVID19 risk has influenced nutritional, psychological, and physical activity patterns depending on gender. Results of this study showed that females presented a higher perception of danger to the COVID19 virus than males but showed no differences in how the pandemic has

affected personal lives. Females showed higher values of anxiety, conscientiousness, neuroticism, and openness to experience, while males presented higher values of extraversion. Nutritionally, males presented greater consumption of soft drinks, meat, and pasta or rice, and lower buccal hygiene. Yet, no differences were found regarding physical activity patterns. Results from this study could be used by various educational institutions to implement multidisciplinary interventions to reduce the stress and risk perception (Rodriguez-Besteiro et al., 2021).

It is clear that the COVID19 pandemic is significantly affecting the academic experience, interpersonal connections, and mental health of post-secondary students. COVID19 is causing more negative effects and challenges, especially for female students. In connection with these detrimental effects, women are more likely to use social media to deal with the pandemic, maybe as a result of their greater social isolation. However, male students who turn to substance abuse as a coping mechanism report more detrimental effects on their academic performance, stress levels, and mental health (Prowse et al., 2021).

Gebhard et al. (2020) noted that sex and gender disparities observed in COVID19 vulnerability emphasize the need to better understand the impact of sex and gender on incidence and case fatality of the disease and to tailor treatment according to sex and gender. The ongoing and planned prophylactic and therapeutic treatment studies must include prospective sex- and gender-sensitive analyses.

Older age and a high number of comorbidities were associated with higher severity and mortality in patients with both COVID19 and SARS. Age was comparable between men and women in all data sets. In the case series, however, men's cases tended to be more serious than women's ($P = 0.035$). In the public data set, the number of men who died from COVID19 is 2.4 times that of women (70.3 vs. 29.7%, $P = 0.016$). In SARS patients, the gender role in mortality was also observed. The percentage of males was higher in the deceased group than in the survived group ($P = 0.015$). While men and women have the same prevalence, men with COVID19 are more at risk for worse outcomes and death, independent of age (Jin et al., 2020).

In another study conducted by Liu et al. (2020), Hierarchical regression analysis was done on gender which revealed that women reported significantly higher PTSS in the domains of re-experiencing, negative alterations in cognition or mood, and hyper-arousal. Participants with better sleep quality or less frequency of early awakenings reported lower PTSS. This study showed that among the COVID19 patient, females have higher PTSS experience.

Although it is well known that females experienced higher distress compared to males, among the female COVID19 patients, women with children report a substantial amount of distress compared to women without children. But, among men, the magnitude of difference is much smaller compared to women. Often, men do not interfere with children as much as women do, thereby indicating the significance of exposure to additional stress (Zamarro et al., 2020).

Calmness, psychological resilience, and regular interaction with co-workers were protective variables. The ways that men and women adjusted to their current living and working situations, dealt with heating, and required psychological support services also varied greatly. Self-reported COVID19 related stress among Chinese people was substantially correlated with coping strategies, resilience, age, sex, and job. Those who are most at risk of experiencing stress should get age-and/or sex-appropriate supports for psychological health and emotional well-being in future responses to such public health hazards (Kangxing et al., 2020).

CHAPTER-3
STATEMENT OF THE PROBLEM

The COVID19 pandemic resulted in an economic recession and fear that negatively affected the mental health of the masses. About 4 in 10 adults in the U.S. have reported symptoms of anxiety or depressive disorder; also found that many adults are reporting difficulty in sleeping (36%) or eating at 32% (Panchal et al., 2021). People are experiencing numerous psychological issues as they adapt to the lifestyle of locking up and in dealing with fear of the disease during which the world attended to testing, finding a cure, and preventing transmission (Varshney et al., 2020). Although speculations could be made regarding the devastating impact of the pandemic, the gravity was intense beyond expectations. It was an all-round recession affecting the economics, social life, psychological and emotional aspects. Since these variables are related and affect each other, the magnitude of the pandemic heightens.

Marginalised sections of the society such as those living in poverty and daily wagers were seriously affected. All usual activities were shut down and with no proper income, a lot of people were in turmoil leading to various psychological problems. On top of that, when an individual contracted the disease, they were automatically inflicted with fear, which deeply affected their mental health. During the lockdown period, it was observed that the population of India was inclined to depression, anxiety, and stress. In addition to the meticulous steps taken to cease the spread of COVID19, the Indian government and mental health professionals must give full attention to their citizens' mental health (Verma et al., 2020). Lots of these psychological problems persist post-pandemic, sanctioning the importance of focusing more than ever on improving the mental health facilities and infrastructure. Another worrisome consideration is the effect it showed on individuals who already had mental health problems and even those who are in a recovering phase. Those individuals with pre-existing physical and mental health conditions required extra attention and caution to avoid complications or recurrence (Hazarika et al., 2021).

An important factor to consider when examining the cognitive effects of COVID19 is taking into account the trauma survivors have endured. Suicidal behavior among susceptible people has also been affected by the COVID19 in various situations. Numerous examples of people killing themselves out of fear of COVID19 can be

found in case studies based on news media reports (Mamun et al., 2020). This pandemic has a high mental health burden, as evidenced by the cases from Bangladesh, Pakistan, and India that demonstrate how people have attempted suicide as a result of their perceived vulnerability and fear of contracting the virus (Hossain et al., 2020).

There have been records of several plagues down the history which are often the result of insanitary living conditions. Therefore, the situations and impact might not be comparable with COVID19, but even with the advancement in mental health and technologies, the world was not prepared for a devastating repercussion. So, to help individuals affected by the COVID19, it is important to know the distinctions between the two groups of populations; those who contracted the disease and those who did not. Difference exists between the two as fear of the disease is only psychological whereas actually contracting the disease combined both psychological and physiological distress.

For low income families, apart from the two major distresses, financial burden added to the cluster of distresses which could affect their intensity promoting one another. Although the pandemic might have been a good outcome for some, it was a real challenge for others especially for lower income families. Therefore, the effect of the COVID19 could be different between those who actually contracted the disease and those who did not. In order to clarify it, we need to study whether differences actually exist from the research point of view and to what degree. Understanding of the relations between the two groups could provide insight into observing the details, further providing the basis for action plans and collaterals.

When examining research papers, especially in the field of psychology and allied studies, gender plays a key role as a determining factor. In terms of mental health status, men and women are significantly different due to factors like genetics, hardiness, hormones, etc. Due to such diversities, the impact and consequences of the pandemic were not similar among men and women. Therefore, the present study attempted to disclose the results in mental health as a consequence of contracting

COVID19. If the results support the objectives, it could have a profound impact on the process of dealing with mental health.

Although recent research has demonstrated the psychological toll that the pandemic took on Indians, no study has examined whether the psychological toll evolved over time as a result of repeated lockdown extensions (Gopal et al., 2020). The COVID19 pandemic's unpredictability and uncertainty, the lockdowns, physical separation, and other containment measures that followed, as well as the subsequent economic collapse, may make mental health problems more likely and exacerbate health disparities.

So far, few studies have been conducted specifically addressing post COVID19 sleep impairment. Isolation, hospitalization, and stress are important factors, but the exact mechanisms behind COVID19 related sleep disturbances, as well as the duration of such manifestations, remain to be investigated. Therefore, this study will attempt to highlight the effects of COVID19 and its inter-relationship with Post-Traumatic Stress Disorder, Depression, Insomnia disorder and Obsessive-Compulsive Disorder, as well as their predictive associations among post COVID19 patients who were admitted at Zoram Medical College.

Objectives:

The available literature provided the epidemiology of diseases that affect psychological health; as such, the COVID19 pandemic effects have been investigated in some countries, which found that COVID19 has greatly affected the physical and psychological health, both directly and indirectly. The present study was trying to compare the four groups of patients, such as: (i) Mizo Male Adult post COVID19 patients, (ii) Mizo Female Adult post COVID19 patients, (iii) Mizo Male Adult non COVID19 patients, (iv) Mizo Female Adult non COVID19 patients. On counting all of those available kinds of literature, the following research objectives were outlined for the present study.

1. To examine any significant difference between post COVID19 patients and non COVID19 patients on PTSD, Depression, Insomnia and OCD.

2. To examine whether significant difference exists between Male and Female post COVID19 patients on PTSD, Depression, Insomnia and OCD.
3. To study any significant relationship between PTSD, Depression, Insomnia and OCD variables among samples.
4. To examine the independent effect of 'COVID19' and 'Gender' on the level of PTSD, Depression, Insomnia and OCD among the patients.
5. To study Interaction effect of 'COVID19' and 'Gender' on PTSD, Depression, Insomnia and OCD among the samples.
6. To examine the prediction of PTSD on Depression, Insomnia and OCD among the participants.

Hypotheses:

Based on the objectives set forth for the present study, the following Hypotheses were framed:

1. There will be a significant difference between post COVID19 patients and non COVID19 patients on PTSD, Depression, Insomnia and OCD.
2. There will be a significant difference between Male and Female post COVID19 patients on PTSD, Depression, Insomnia and OCD.
3. There will be a relationship between PTSD, Depression, Insomnia and OCD variables among the samples.
4. There will be an independent effect of the 'COVID19' and 'Gender' on PTSD, Depression, Insomnia and OCD among the patients.
5. There will be an interaction effect of 'Gender' and 'COVID19' on PTSD, Depression, Insomnia and OCD among the samples.
6. PTSD will have a significant predictability on Depression, Insomnia and OCD among the participants.

CHAPTER-4
METHOD AND PROCEDURES

Sample:

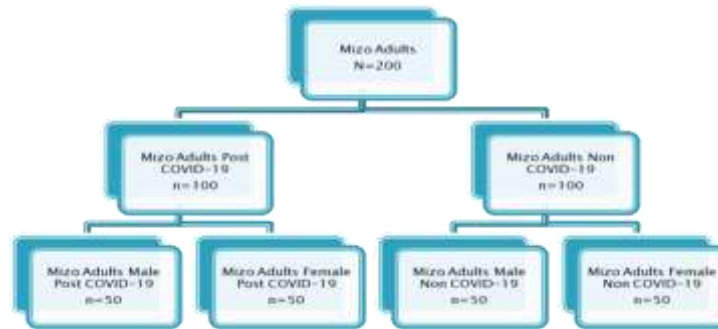
The sample was selected following a multi-stage sampling procedure. At the initial stage, 500 COVID19 patients who were admitted at Zoram Medical College for at least 10 days were identified. Finally, 200 Mizo Adults serve as sample in this study, consisting of 100 post COVID19 patients with equal representation of 50 females and 50 males from the list of post COVID19 patients maintained by the Integrated Disease Surveillance Project (IDSP) under the Government of Mizoram and 100 Mizo Adults who were not affected by COVID19 with equal representation of 50 females and 50 males; other necessary physical health records were obtained from hospitals where they underwent clinical evaluation including complete blood count, electrocardiogram and CT Scan for the post COVID19 patient samples.

List of post COVID19 patients who were admitted for at least 10 days at Zoram Medical College or Covid Care Centre maintained by Integrated Disease Surveillance Project (IDSP) under the Government of Mizoram was identified. Then, list of non COVID19 patients who were also admitted for at least 10 days due to chronic illness or other medical conditions like cancer, kidney failure, stroke, heart diseases etc. other than due to COVID19 at Zoram Medical College was identified as well. Other variables such as age level (18-60 years), gender of the sample (male or female), address of the sample, whether the patient has any hospitalization, if yes, its duration, any major illness and physical health condition were also obtained.

Design of the Study:

The study aims to compare male post COVID19 patients, female post COVID19 patients, male non COVID19 patients and female non COVID19 patients on Post-traumatic Stress Disorder, Depression, Insomnia and Obsessive Compulsive Disorder on the dependent variables. Design of the present study is 2 x 2 factorial representing 100 post COVID19 patients (50 male post COVID19 patients and 50 female post COVID19 patients) and 100 non COVID19 patients (50 male non COVID19 patients and 50 female non COVID19 patients).

Figure-1: Showing the 2 X 2 factorial design



Procedure:

Matching to the objectives collection of appropriate psychological test material of various scales was collected most of which were freely available on the website.

Appropriateness was test through pilot study and most of the reliability was above 80, so it was appropriate for the psychological evaluation of the targeted population.

The researcher constructed the socio-demographic profiles, constructed inform consent, proposed psychological scales as per the objectives and hypothesis, also any other scales which has relevance to the study.

Firstly, Initial permission was taken from the official authority for the conduction of the tests. Random selection of 200 samples each was done from post COVID19 patients who were admitted at Zoram Medical College for at least 10 days and whose name were maintained by Integrated Disease Surveillance Project (IDSP) under the Government of Mizoram and non COVID19 patients who were also admitted at Zoram Medical College for at least 10 days due to chronic illness or other medical conditions.

Secondly, Inform Consent was taken and the samples were well informed about the purpose of the study, and also ensures confidentiality of their identity as per ethical

standards (APA, 2013), made them understand that they can leave anytime they wish and only those who gave consent were included in the sample. Identification was done based on socio-demographic profiles and those who can read and understand English language were selected so translation of tools was not necessary reducing the samples to 130 each.

Finally, without any distractions, the administration of the psychological test was done in a single condition. Any doubts were clarified. The psychological scales were administered with strict observance of APA ethics for research (2002) within a well lit home settings in a comfortable set up; and the physical health conditions were screened through interviews and basic physiological assessment (vital signs, height and weight). Test conduction was done individually and all responses were checked for missing or wrong responses before collection, and ended with thanks. 200 samples with 100 post COVID19 patients and 100 non COVID19 patients with equal representation of 50 males and 50 females each were taken as final sample.

Psychological tools used:

1. **Socio-Demographic Profile (Vida Lalrinchhani, 2021):** It was specifically constructed by Vida Lalrinchhani (2021) for screening purposes for controlling confounding demographic variables- age, sex, address, duration of hospitalization, any major illness and test taken of the subjects.
2. **Informed Consent Form (Vida Lalrinchhani, 2021):** It was constructed by Vida Lalrinchhani (2021) to obtain consent from the samples after giving information about the present study.
3. **Demographic profile datasheet:** The demographic profile constructed by the researcher for the present study includes- age, sex, any major disease/illness, address, reason of hospitalization, duration of hospitalization, treatment taken, hospital record on treatment, discharge date and observation etc. This profile was utilized for finding sample to match the post COVID19 patients and non COVID19

patients for comparison.

4. PTSD Inventory (PTSD-8; Hansen et al., 2010). The scale was constructed by Hansen and colleagues, consisting of 8 items. The PTSD-8 is derived from the first sixteen items of the HTQ, which correspond to the DSM-IV criteria for PTSD. It covers all three symptom clusters of the DSM-IV PTSD diagnosis. The items are answered on a four-point Likert scale ('not at all (1), 'a little' (2), 'quite a bit (3), and 'all the time' (4)). The summed score provides a score for symptom severity. The PTSD-8 has shown good psychometric properties and can be used by various health professionals even those without trauma specialty as the internal consistency was Cronbach's $\alpha = 0.84$. The PTSD-8 represents a more precise yet brief measurement of PTSD than existing instruments such as the Patient Health Questionnaire (PHQ-9-Depression Severity Scale, Spitzer et al., 1999): The Patient Health Questionnaire (PHQ) is a self-administered version of the PRIME-MD diagnostic instrument for common mental disorders. The PHQ-9 is the depression module, which scores each of the 9 DSM-IV criteria as "0" (not at all) to "3" (nearly every day). The PHQ-9 is the nine-item depression scale of the Patient Health Questionnaire. It is one of the most validated tools in mental health and can be a powerful tool to assist clinicians with diagnosing depression and monitoring treatment response. It has advantages in that it is short, can be administered in person by a clinician through telephone or self-administered, facilitates diagnosis of major depression, provides an assessment of symptom severity, is well-validated and documented in a variety of populations, and can be used in adolescents as young as 12 years of age. The results of the PHQ-9 may be used to make a depression diagnosis according to DSM-IV criteria and it takes less than 3 minutes to complete. Reliability and tests found a Cronbach's α of 0.89 among 3,000 primary care patients and 0.86 among 3,000 OB-GYN patients. The result can be interpreted as depression Severity: 0-4 none, 5-9 mild, 10-14 moderate, 15-19 moderately severe, 20-27 severe.

5. The Beck Depression Inventory (BDI-13; Beck & Beck, 1972) includes 13 items, short form, 0-4 corresponds to none or minimal depression, 5-7 to mild

depression, 8–15 to moderate depression, and 16 or higher to severe depression. It has demonstrated test-retest and split-half reliability as well as concurrent validity with older adults (Gallagher, 1986). The BDI has a good efficiency in older medical outpatients (Rapp, Parisi, Walsh, & Wallace, 1988) and medical inpatients (Norris et al., 2004).

6. Insomnia Severity Index (Morin et al., 2011). 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. It is a brief self-report instrument measuring the patient's perception of both nocturnal and diurnal symptoms of insomnia. The ISI comprises seven items assessing the perceived severity of difficulties initiating sleep, staying asleep, and early morning awakenings, satisfaction with current sleep pattern, interference with daily functioning, noticeability of impairment attributed to the sleep problem, and degree of distress or concern caused by the sleep problem. It was developed as a patient-reported outcome measure intended both for screening purposes and for assessing the efficacy of treatment. The original items were generated based on concerns and issues of clinical relevance to patients seeking treatment for insomnia in a sleep disorders clinic. The standard model of administration is paper-and-pencil self-administration, i.e., completed by the patient. The seven answers are added up to get a total score: 0–7 = No clinically significant insomnia, 8–14 = Sub-threshold insomnia, 15–21 = Clinical insomnia (moderate severity), 22–28 = Clinical insomnia (severe).

7. Yale-Brown Obsessive-Compulsive Scale (Goodman et al, 1989): The scale was designed by Wayne K. Goodman and his colleagues, is used extensively in research and clinical practice to both determine the severity of OCD and to monitor improvement during treatment. The Y-BOCS is a semi-structured interview and consists of a checklist of common obsessions and compulsions and a 10-item measure of symptom severity, which determines symptom severity regardless of

symptom subtype. After reliability tests, Goodman concluded that it has excellent psychometric properties in assessing the presence and severity of obsessive-compulsive symptoms. Total scores on the measurement range from 0 to 40, with a score of 0–7 indicating subclinical symptoms, 8–15 mild symptoms, 16–23 moderate symptoms, 24–31 severe symptoms and 32–40 extreme symptoms. The Y-BOCS was originally developed for an adult population; however, an adaptation was later developed for use with a pediatric population.

Statistical Analysis: To test the hypotheses set forth to determine “Post COVID19 Mental Health: Post-traumatic Stress Disorder, Depression, Insomnia, and Obsessive-Compulsive Disorder”, the following statistical analysis was employed:

The psychometric properties of the items, scale, and sub-scales of the psychological measures were ascertained to warrant their applicability among the target population of the proposed study.

Descriptive statistics (Mean, Standard-Deviation, Skewness, Kurtosis, & graphical method) were employed to outline the general nature of the participants along with the ‘COVID19’ and ‘Gender’ on the psychological measures.

The assumptions underlying Univariate, bivariate, and multivariate statistics (like Logistic Regression Analysis) were ascertained and wherein necessary permissible transformation and standardization of the comprehensive score on the scale and sub-scales of psychological measures were performed.

Univariate, bivariate, and multivariate statistics, wherein applicable, were employed to investigate and test the occurrence of differences and relationships for drawing inferences.

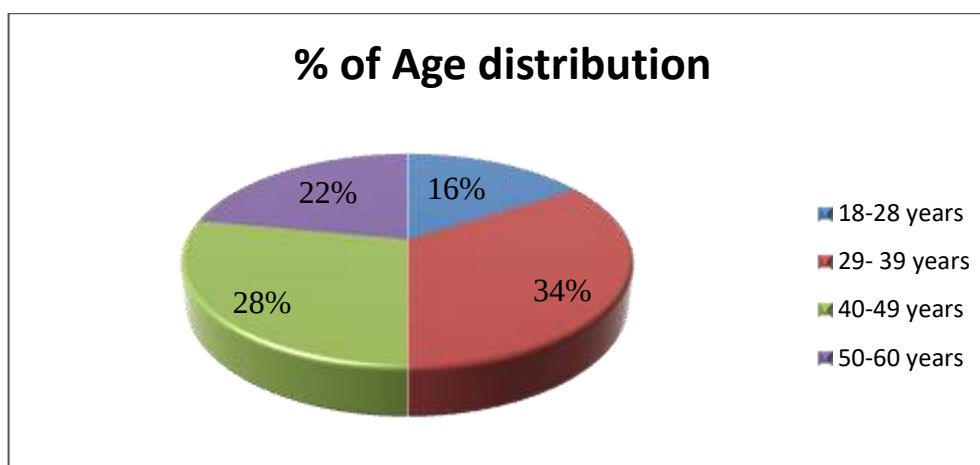
CHAPTER-5
RESULTS AND DISCUSSIONS

i) Demographic profiles of the samples: The demographic profile of the sample included Age, Birth-Place, Permanent address, Sex, Any major Illness, Any hospitalization, Duration of hospitalization, Admission date, Discharge date, Physical health conditions such as Hb level, Temperature and Blood Pressure of the patients (samples). The equal representation of **sex** (male and female) and **illness** (COVID19 and Non COVID19 patients) were taken being the independent variables. Other extraneous variables such as Age, Birth-Place, Permanent address, Any hospitalization, Duration of hospitalization, Admission date, Discharge date, Physical health conditions such as Hb level, Temperature and Blood Pressure were kept under control as same distribution was kept for COVID19 and Sex groups to prevent their effect on results which was done with the help of Socio-Demographic Profiles. The age distribution was kept as **34%** for 29-39 years, **28%** for 40-49 years, **22%** for 50-60 years and **16%** for 18-28 years. The number of hospitalization durations was distributed as **52%** for 10-15 days, **24%** for 16-20 days, **16%** for 21-25 days and **8%** for 26-30 days. On Hb level **80%** were under normal level whereas **20%** were under abnormal level. Temperature level was distributed as **99%** high temperature and **1%** abnormal temperature. Under Blood Pressure level distribution **60%** have normal blood pressure level whereas **40%** have abnormal blood pressure level. The demographic profiles such as birth place, permanent address and any major illness were having equal representation.

Table 1: Showing the age distribution, no of hospitalization, HB level, temperature and blood pressure

Age distribution (18 to 69 years)			
18-28 years	29- 39 years	40-49 years	50-60 years
32 (16%)	68 (34%)	56 (28%)	44 (22%)
Number of Hospitalization Durations Distribution			
10-15 days	16-20 days	21-25 days	26-30 days
104 (52%)	48 (24%)	32 (16%)	16 (8%)
Hb level distribution			
Normal HB		Abnormal HB	
160 (80%)		40 (20%)	
Temperature level distribution			
Normal Temperature		High/Abnormal Temperature	
2 (1%)		198 (99%)	
Blood Pressure Level			
Normal BP		High/Abnormal BP	
120 (60%)		80 (40%)	

Figure -2: Showing the age distribution in percentage for the four age groups.



ii) Raw Data checking: The Raw data collected on PTSD, Depression, Insomnia and OCD from COVID19 patients and Non COVID19 patients were entered in the excel sheet. The collected raw data were checked and no missing data values and outliers were detected. Then, the raw data were proceeded with for checking the appropriateness of the psychological scales used for the population under study.

iii) Psychometric Adequacy Check: The psychological tools used for the study were constructed for other cultures, and needed to be checked before obtaining information due to regional differences and cultural disparities. The preliminary check was done with a pilot study which resulted in high internal consistency warranting utilization among the target population. But to confirm and cross-check its applicability, the internal consistency was estimated for the final response again as shown in Table-1.

(iv) Reliability check: The reliability of the tools was checked for internal consistency using Cronbach's alpha. The results divulged a consistent pattern of response indicating that the four measurement tools had high reliability for PTSD ($\alpha=.80$), Depression ($\alpha=.78$), Insomnia ($\alpha=.89$) and OCD ($\alpha=.90$).

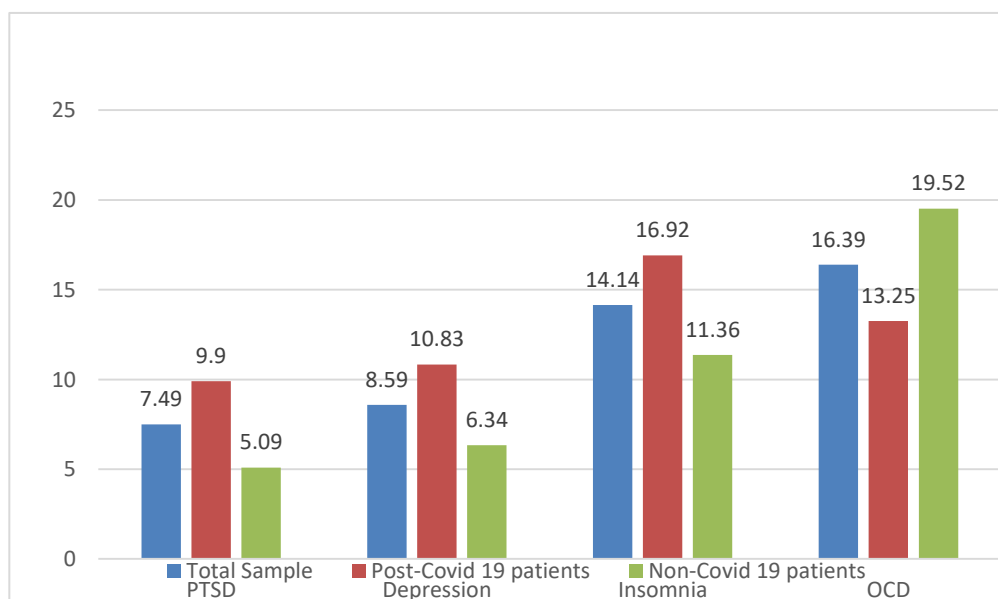
v) Homogeneity check: Homoscedasticity was checked using Levene's test to discern whether the distribution of variances in Post-Traumatic Stress Disorder (.24), Depression (.25), Insomnia (.27) and OCD (.21) between the Post COVID19 patient and non COVID19 patient groups were equal. The non-significant F statistic ($p>.05$) revealed that there is no significant difference between the variances of scores.

vi) Normality Check: The Mean and SD had good consistency; Kurtosis and Skewness were within the acceptable range (± 2) which indicated the normality of the variance. The reliability scores of the tools were all above .80 and the Homogeneity test was within an acceptable range (Levene's statistic are all non-significant) and brown Forsyth (all were significant) which showed the trustworthiness of the scales. The normality and homogeneity of variances for the tools were all within acceptable range, which also indicated parametric applicability for further analysis.

Table -2: Showing the Descriptive Statistics, Normality (Kurtosis, Skewness), Reliability (Cronbach's Alpha), and Homogeneity of variance (PTSD, Depression, and Insomnia, OCD).

Samples	Statistics	PTSD	Depression	Insomnia	OCD
Total Sample	Mean	7.49	8.59	14.14	16.39
	SD	2.3	2.9	3.5	3.7
	Skewness	-0.75	-0.80	-0.73	-0.78
	Kurtosis	-0.84	-0.83	-0.88	0.82
Post COVID19 patients	Mean	9.90	10.83	16.92	13.25
	SD	2.32	2.91	2.11	2.08
	Skewness	-0.93	-0.77	-0.71	-0.88
	Kurtosis	0.73	-0.73	-0.78	-0.70
Non COVID19 patients	Mean	5.09	6.34	11.36	19.52
	SD	1.37	1.79	2.186	3.13
	Skewness	-0.83	-0.89	-0.82	-0.75
	Kurtosis	0.78	-0.74	-0.78	0.82
Reliability (Alpha)		.80	.80	.89	.90
Homogeneity (Levene's)		.24	.25	.27	.21

Fig-3: Showing the mean difference between the whole sample, Post COVID19 patients and Non COVID19 patients on PTSD, Depression, Insomnia and OCD



The results of the study were analyzed sequentially following the sequence of the objectives of the study.

Objective -1: To examine any significant difference between COVID19 patients and non COVID19 patients on PTSD, Depression, Insomnia and OCD; and also any significant difference between male and female patients among the samples. The independent t-test was employed to discern any significant differences between the COVID19 patients and non COVID19 patients on PTSD, Depression, Insomnia and OCD among the samples, results are discussed below.

Results in Table 3 showed the independent t-test results for discerning differences between post COVID19 patients and non COVID19 patients on PTSD, Depression, Insomnia, and OCD among the samples.

a) ***Significant difference on PTSD:*** Results demonstrated that post COVID19 patients have more PTSD compared to non COVID19 patients and had higher rates of PTSD ($M=9.90, 5.09$; $t= 14.47$; $df= 1/198$; $p > .01$) at significant .01 level. The same results were found that patients with more severe COVID19 related symptoms have been found to have high rates of PTSD symptoms, and hospitalization is widely acknowledged as a risk factor for PTSD development (Di Giuseppe et al., 2020). It has been estimated that around 20-25% of such patients may develop PTSD symptoms. COVID19 survivors discharged from quarantine reported post-traumatic stress symptoms nearly 96.2% (Bo et al., 2021).

b) ***Significant difference on Depression:*** Results provided that the Post COVID19 patients scored higher in Depression ($M=10.83, 6.34$; $t= 17.13$; $df= 1/198$; $p > .01$) than non COVID19 patients. A study conducted by Mazza and colleagues (2020) resulted in a similar finding wherein 31% of adults who survived COVID19 had difficulty due to depression. Additionally, women suffered more on depression and anxiety. Three to four months following diagnosis or hospital discharge, the majority of studies assessed the frequency of depressive symptoms and clinically significant depression; nonetheless, Daher et al. (2021) found that 27% of people had

moderate depressive symptoms and 5% had severe depressive symptoms when it was measured 6.5 months ($\bar{x} = 197$ days) after hospital discharge. Research similar to the present design of the study found that COVID19 subjects had significantly higher depression scores compared to individual who were not exposed to SARS-CoV-2 (Mattioli et al., 2021). However, diversified results could emerge due to differences in design, the time of conducting the psychological tests etc. Between one and three months, six months, and twelve months following SARS-CoV-2 infection, roughly thirty to forty percent of patients had clinically significant depressive psychopathology (Mazza et al., 2021; Taquet et al., 2021; Baroiu et al., 2021). There are several factors that influence the surge in psychiatric illness not only due to getting infected, but the duration of lockdown which obstructed the normal day-to-day lives. Hawryluck et al. (2004) reported that the length and uncertainty of the lockdown contributed to higher levels of depression. Thus, the higher rates of depressive symptoms seen during the COVID19 outbreak may also be explained by the current lockdown measures implemented globally (Bueno-Notivol et al., 2021).

c) ***Significant difference on Insomnia:*** Results exposed that Post COVID19 patients were higher in Insomnia ($M=16.92, 11.36; t= 18.28; df= 1/198; p > .01$) than Non COVID19 patients. The findings of this study have been supported by a study conducted by Lin and colleagues (2021) that during the peak, 20% of their sample showed clinical insomnia and the symptoms were severe among participants living within Hubei Province which is the epicenter. This sleep disturbance is also common among the frontline workers and health care professionals. Using the Insomnia Severity Index, Orru et al, 2021 showed that individuals with extended COVID19 had a noteworthy incidence of sleeplessness and a general decline in their Quality of Life (QOL). There were more internet searches for insomnia during the early stages of the pandemic, which may indicate that the pandemic exacerbated symptoms of insomnia (Zitting, 2021). In comparison to pre-pandemic estimates, emerging research shows higher prevalence rates of insomnia and mental health symptoms like anxiety and depression (Voitsidis et al., 2020; Pappa et al., 2020; Mandelkorn et al., 2021; Lahiri et al., 2021; Li et al., 2020; Pieh, 2021). The emergence of sleep disturbances in response to major stressful events including natural disasters (eg,

wildfires, earthquakes, floods) or wartime has been documented (Belleville et al., 2019; Lavie, 2001).

d) **Significant difference on OCD:** Results evinced that Post COVID19 patients were found higher in OCD than non COVID19 patients ($M=19.52, 13.25$; $t= 20.58$; $df= 1/198$; $p < .01$) at significant at .01 level. The COVID19 pandemic has prompted global measures to prevent infection; regular hand washing has been introduced as the standard of prevention across the world, which resulted in 72 % of the participants reported an increase in OCD. With the outbreak of the COVID19 pandemic (WHO, 2020), a large percentage of the world's population has been exposed to multiple burdens, including immediate hazards such as the risk of infection as well as social isolation and economic insecurity. Based on the diathesis-stress model, which helps explain the development and maintenance of many mental disorders, these stresses may particularly affect people with pre-existing mental disorders (Pfefferbaum & North, 2020) and several studies find that may be the case (Fineberg et al., 2020; Fontenelle & Miguel, 2020; Benatti et al., 2020; Davide et al., 2020). Many patients and individuals in the general population experienced new obsessive-compulsive-like symptoms centered on COVID19. Self-reported rates of symptom exacerbation and COVID19 focused symptoms were consistently lower in studies that recruited patients from specialty clinics (Guzick et al., 2021). Although the effects of OCD is nullified in some regions, data based on other regions such as Liao et al. (2021) showed that female gender, concern about COVID19 and OCD symptoms severity at baseline were risk factors for exacerbation of OCD symptoms during early COVID19, while optimism, as one composite factor of resilience, was a protective factor against exacerbation of OCD symptoms both during early COVID19 and at follow-up. These studies showed that COVID19 had immediate and long-term impacts on the exacerbation of OCD symptoms, and interventions targeted at improving resilience are recommended.

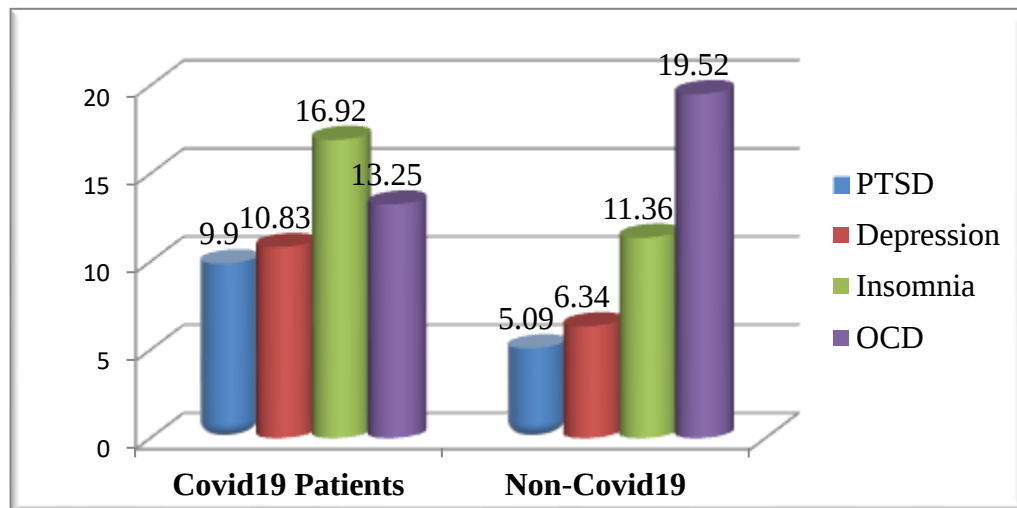
These results indicated that suffering from COVID19 had a serious impact on the stress experienced even after the recovery phase. Non COVID19 patients, albeit suffering from a disease show lower levels of stress compared to post COVID19

patients. The results were in aligned with earlier research findings that the COVID19 pandemic affected sleep and found a very high rate of clinically significant insomnia (20%), and depression (24.5%) among post-COVID19 patients (Lin et al., 2021). Results accepting hypothesis 1.

Table -3: Showing the mean difference (Mean, SD, Kurtosis, Skewness) and significant difference (independent t-test) in PTSD, Depression, Insomnia, and OCD.

Patients	Statistics	PTSD	Depression	Insomnia	OCD
Post COVID19 patients	Mean	9.90	10.83	16.92	19.52
	SD	2.32	2.91	2.11	2.08
	Kurtosis	-0.93	-0.77	-0.71	-0.88
	Skewness	0.73	-0.73	-0.78	-0.70
Non COVID19 patients	Mean	5.09	6.34	11.36	13.25
	SD	1.37	1.79	2.18	3.13
	Kurtosis	-0.83	-0.89	-0.82	-0.75
	Skewness	0.78	-0.74	-0.78	0.82
Difference between Post COVID19 and Non COVID19 patients (independent t-test)		14.47**	17.13**	18.28**	-20.58**
**= Significant at a.01 level					

Figure- 4: Showing the Mean Difference between Post COVID19 Patients and Non COVID19 patients on PTSD, Depression, Insomnia and OCD



Objective -2: To examine any significant difference between Male and Female post COVID19 patients on PTSD, Insomnia, Depression and OCD; The independent t-test was employed to discern any significant differences between male and female post COVID19 patients on PTSD, Insomnia, Depression and OCD among the samples, results are discussed below.

To find out any significant difference between male and female post COVID19 samples on PTSD, Insomnia, Depression and OCD, an independent t-test was computed, and the findings were presented in Table 4.

a) **Male and female significant difference on PTSD:** Results demonstrated that Female patients had higher rates of PTSD compared to male ((M=8.33, 6.66; $t= 3.62$; $df= 1/198$; $p < .01$) at significant .01 level. The same results were found by Mao et al. (2022) wherein female samples had higher gross score and higher score on all aspects of the Post-Traumatic Stress Checklist. Hierarchical regression analysis and a non-parametric test suggest that women reported significantly higher on the aspects of Post-Traumatic stress such as re-experiencing, negative alterations and hyper-arousal (Liu et al., 2020). Survey conducted on 6882 individuals showed that compared with men, women presented with higher levels of trauma-related distress

and are more vulnerable during the pandemic (Kolakowsky-Hayner et al., 2021) and that women had more PTSD symptoms than men, particularly when knowing someone is under quarantine (Wu et al., 2022). In another study among South Africans, female participants had higher PTSS scores compared to men and a higher odd of having PTSS. Interestingly, the effect of gender is nullified when factors such as access to emotional support and feeling of isolation are presented (Nzimande et al., 2022). Being female and having pre-existing mental disorders are established risk factors for PTSD. Multivariate Regression shows that being male acted as a protective factor (Tarsitani et al., 2021). The results of several studies suggested that the observed gender difference among these studies is due to differences in responding to traumatic events.

b) ***Male and female significant difference on Depression:*** Results exposed that female patients scored higher in Depression than male patients ($M=9.48, 7.69$; $t=4.55$; $df= 1/198$; $p > .01$) which revealed supporting evidence for COVID19 effect on Mental health. Some studies showed the prevalence of depression to be 13.25%, with females experiencing severe stress and depression which dissipates over time (Hou et al., 2020) although the prevalence may fluctuate among differing population. Among the Israeli adults, women reported higher levels of Depression and being a woman of younger age, who relies more on emotion focused coping with low level of resilience contributed a large portion of variation in acquiring psychiatric symptoms (Laufer & Bitton, 2021). Several other factors may contribute to this association stating the importance of developing a better model as inclusion of factors may show why some particular variables are worse or better in some cases.

c) ***Male and female significant difference on Insomnia:*** Results provided that female patients scored higher on Insomnia ($M=15.55, 12.73$; $t= 6.18$; $df= 1/198$; $p > .01$)) than male patients. Literatures regarding gender difference on Insomnia among COVID19 patients are not common albeit some studies have shown remarkable results. Pappa et al. (2022) assessed COVID19 patients after 1-2 months of discharge and established that Insomnia is the second highest prevalent psychiatric symptoms

(33%) and females reported more mental health symptoms such as Insomnia, etc. compared to males. On the other hand, Salfi et al. (2020) found men to show deterioration and sleep disturbances on the long run while females are more susceptible only at the initial period. They became more resilient and Insomnia decreases over time. Tsukamoto et al. (2021) investigated and established that females had higher score on Insomnia at the initial stage, but later observation i.e after 2-3 months, there was no gender difference between male and female on Insomnia.

d) **Male and female significant difference on OCD:** Results evinced that female patients scored higher on OCD than male patients ($M=18.10, 14.67$; $t= 7.18$; $df= 1/198$; $p > . 01$) significant at .01 level. Jalalifar et al (2023) conducted a meta-analysis of the researches and the results revealed 41.2% overall prevalence of OCD during the COVID19 pandemic and 47.1% and 39.1% OCD prevalence for female and male genders respectively. Another study also suggested that 20% average prevalence of OCS during the pandemic, with very high heterogeneity among the included studies ($I^2 99.6\%$). The highest prevalence of OCS was found in pregnant women (36%, $n = 5$), followed by individuals diagnosed with COVID19 (22%, $n = 4$) and general population (22%, $n = 19$), undergraduates (21%, $n = 5$), and healthcare workers (5%, $n = 5$) (Pozza et al., 2024).

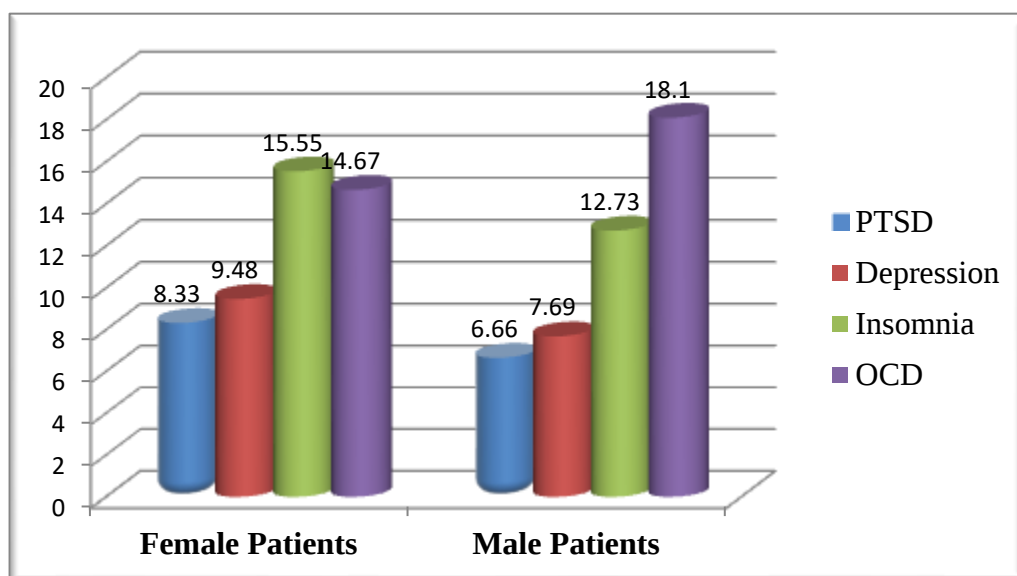
This result indicates that given the current COVID19 pandemic, it is critical to comprehend the variables influencing the differences in health outcomes and healthcare access between men and women. Initial reports from China in 2020 indicated a gender disparity in COVID19 death and case rates, with men dying from the virus at a higher rate (Guan et al., 2020). Subsequent research presented an alternative picture as more data became available. According to a study conducted across 21 developed nations, the proportion of deaths caused by COVID19 increased similarly for men and women. However, later in the pandemic, the balance of excess deaths shifted from being dominated by men to being equal or dominated by women (Kontis et al., 2020). In spite of this, the data covered in this paper indicates a significant disparity in some regions of the world, with men

apparently accounting for a larger proportion of COVID19 cases and fatalities than women. The purpose of this study is to look into the variables causing these differences across 133 nations (Aleksanyan & Weinman, 2022).

Table -4: Showing the Mean difference (Mean, SD, Kurtosis, Skewness) and significant level (independent t-test) in PTSD, Depression, Insomnia, and OCD between male and female patients.

Gender	Statistics	PTSD	Depression	Insomnia	OCD
Male	Mean	6.66	7.69	12.73	14.67
	SD	2.00	2.65	3.01	3.34
	Kurtosis	-0.78	-0.83	-0.76	-0.92
	Skewness	-0.80	0.74	0.81	-0.78
Female	Mean	8.33	9.48	15.55	18.10
	SD	1.29	2.89	3.42	3.41
	Kurtosis	-0.75	-0.98	-0.93	-0.89
	Skewness	-0.72	0.71	0.82	0.77
Difference between male and female COVID19 patients (independent t-test)		3.62**	4.55**	6.18**	-7.18**

Figure-5: Showing the mean difference between Male and Female patients on PTSD, Depression, Insomnia, and OCD.



Objective -3: To study any significant relationship between PTSD, Depression, Insomnia and OCD among samples.

To examine the relationship between PTSD, Depression Insomnia and OCD, *Pearson's Correlation* was employed and the results were presented in Table-5.

Table -5: Showing the Relationship (Pearson's Correlation) between PTSD, Depression, Insomnia and OCD.

Variable	PTSD	Depression	Insomnia	OCD
PTSD	-	.75**	.72**	.67**
Depression		-	.77**	.76**
Insomnia			-	-.79**
OCD				-

(a) PTSD relation to Depression:

PTSD had a significant positive relationship with Depression ($r=.75$; $p<.01$) at .01 level which showed that there is a moderate strength of relationship between the two variables. This relationship suggests that increased PTSD symptoms may cause increments on Depression and vice versa. A positive strong correlation was found between depression and perceived stress and other psychiatric symptoms correlate each other highly (Coefficient: 0.33, p-value: 0.001) (Zandifar et al., 2020). Adjusting for covariates, Depression and COVID19 induced PTSD had a significant association (Liyanage-Don et al., 2022). Although this study and several others did find positive correlation, some study found that symptoms of Depression is not intensified by having PTSD (Golinska et al., 2021).

(b) PTSD relation to Insomnia: PTSD had a significant positive relationship with Insomnia ($r=.72$; $p<.01$) which may be explained as a high PTSD may restrict sleeping or create sleep disturbances. Longitudinal study suggests a high degree of correlation between PTSD and Insomnia among COVID19 survivors along with high correlation among symptom domains within participants (Kyzar et al., 2021). Meta-

analysis also demonstrated that symptoms of insomnia are common among individual with PTSD/PTSS with an aggregate frequency of 63% indicating a strong association between the two variables (Ahmadi et al., 2022).

(c) **PTSD relation to OCD:** PTSD had a significant positive relationship with OCD ($r=.67$; $p<.01$) which may be explained as a high PTSD may restrict the activities of a person. The association between PTSD and OCD or any anxiety symptoms resulted in a diverse conclusion. Stress responses and symptoms were significantly associated with Obsessive-Compulsive symptoms which are also associated with suicidal ideation (Khosravani et al., 2021). Apart from this study, an investigation done by Hodayuni (2023) found that there was significant positive correlations in support to the present finding summoning the importance of a deeper insight into this relation.

(d) **Depression relation to Insomnia and OCD:**

Depression had a significant positive relationship with Insomnia ($r=.77$; $p<.01$) whereas a negative relation with OCD ($r=-.76$; $p>.01$) at a .01 significant level. Insomnia, anxiety, and depression were very prevalent during the pandemic. Anxiety and depression were more severe in the insomnia than in the non-insomnia group, and insomnia and mental health are closely related (Huang, Fietze, & Penzel, 2022). Insomnia and Depression severity intensified which backed up the result indicating a positive correlation (Klimkiewicz et al., 2021).

(e) **Insomnia relation to OCD:**

Insomnia had a negative significant relationship with OCD ($r=-.79$; $p<.01$). Although studies regarding the relationship between Insomnia and OCD are scarce, some studies did find that OC symptoms increases (Cox & Olatunji, 2021). The model they use is a bit different as they had baseline data on Insomnia before the pandemic.

The findings supported that the diagnostic criteria for PTSD include sleep disturbances (APA, 2013) and depression (Breslau et al., 1997) which increase distress and dysfunction (Giosan et al., 2015); and also reported that 47.9% of men

and 48.5% of women with PTSD also had major depression experience (Kessler et al., 1995). Results suggested accepting hypothesis 2.

Objective -4: To examine the independent effect of ‘COVID19’ and ‘Gender’ on the level of PTSD, Depression, Insomnia and OCD among patients.

To study the independent effect of ‘COVID19’ and ‘Gender’ on PTSD, Depression, and Insomnia, OCD, One-way ANOVA was used and the results were presented in Table-6.

(i) ***Independent effect of ‘COVID19’ on PTSD, Depression, Insomnia and OCD among samples:***

- a) Independent COVID19 effect on PTSD: The COVID19 infection had a 31% significant independent effect at .01 level on PTSD among the samples ($F=209.91$; $\eta^2=.31$; $p > .001$) and the same trend was found by earlier research that PTSD, or post-traumatic stress disorder, is another one of the possible long-term effects of COVID19 (Schou et al., 2021; Bajoulvand et al., 2022). Being in contact with infectious diseases, the COVID19 pandemic presents a distinct and multifaceted severe stressor that can be categorized into multiple sources: direct (such as a potentially fatal physical discomfort experience) and indirect (such as exposure to seeing others battle the illness; experiencing exclusion and stigmatization (Xiao et al., 2020). COVID19 can cause traumatic experiences to the patients and caregivers that may lead to PTSD and/or psychological disorders (Liu et al., 2020). It has been estimated that around 20- 25% of such patients may develop PTSD symptoms. COVID19 survivors discharged from quarantine reported post-traumatic stress symptoms nearly 96.2% (Bo et al., 2021).

- b) Independent COVID19 effect on Depression: The COVID19 infection had a 31% significant independent effect at .01 level on PTSD among the samples ($F=293.270$; $\eta^2=.32$; $p >.001$) and the same trend was found by earlier research on adults surviving COVID19 evinced that 28% for PTSD, 31% for depression, 42% for anxiety, 20% for OC symptoms, and 40% for insomnia, females suffered more for both anxiety and depression (Mazza et al., 2020). Three to four months following diagnosis or hospital discharge, the majority of studies assessed the frequency of depressive symptoms and clinically significant depression; nonetheless, Daher et al. (2021) found that 27% of people had moderate depressive symptoms and 5% had severe depressive symptoms when it was measured 6.5 months ($\bar{x} = 197$ days) after hospital discharge. The COVID19 subjects had significantly higher depression scores ($\bar{x} = 3$ vs. $\bar{x} = 1$ on the DASS-21 depression scale, $p = 0.036$) in one study that included a control group that was not exposed to SARS-CoV-2 (Mattioli et al., 2021).
- c) Independent COVID19 effect on Insomnia: The COVID19 infection had a 33% significant independent effect at .01 level on Insomnia among the samples ($F=333.964$; $\eta^2=.33$; $p >.001$). The percentage of independency posits that COVID19 had high impact on sleep disturbances among the survivors. The emergence of sleep disturbances in response to major stressful events including natural disasters (eg, wildfires, earthquakes, floods) or wartime has been documented (Belleville et al., 2019; Lavie, 2001). A study conducted by Lin and colleagues (2021) suggested a 37% increase in the rates of clinical insomnia ranging from 14.6% to 20% between before and peak of COVID19 pandemic. There were more internet searches for insomnia during the early stages of the pandemic, which may indicate that the pandemic exacerbated symptoms of insomnia (Zitting, 2021). In comparison to pre-pandemic estimates, emerging research shows higher prevalence rates of insomnia and mental health conditions like anxiety and depression (Voitsidis et al., 2020; Pappa et al., 2020; Mandelkorn et al., 2021; Lahiri et al., 2021; Li et al., 2020; Pieh, 2021).

d) Independent COVID19 effect on OCD: The COVID19 infection had a 37% significant independent effect at .01 level on OCD among the samples ($F=440.413$; $\eta^2=.37$; $p >.001$) In comparison to pre-pandemic estimates, emerging research shows higher prevalence rates of insomnia and mental health conditions like anxiety and depression (Voitsidis et al., 2020; Pappa et al., 2020; Mandelkorn et al., 2021; Lahiri et al., 2021; Li et al., 2020; Pieh, 2021). Research evinced the exacerbation of OCD symptoms due to the COVID19 pandemic (Benatti et al., 2020; Prestia et al., 2020) in approximately one-third of their sample, and the first lockdown increased OCD symptoms. Evidence on OCD during the start of the COVID19 pandemic showed increased OCD in Italy (Benatti et al., 2020; Davide et al., 2020). Chakraborty and Karmakar (2020) studied patients who contracted COVID19 and are currently diagnosed with OCD and their findings showed that although 5 patients of 84 showed exacerbated symptoms the rest were not particularly affected by the COVID19 regarding their hand-washing compulsion.

(ii) *Independent effect of ‘Gender’ on PTSD, Depression, Insomnia and OCD among samples:*

a) Independent ‘Gender’ effect on PTSD: The ‘Gender’ had a 31% significant independent effect at .01 level on PTSD among the samples ($F=13.094$; $\eta^2=.31$; $p >.001$). Hierarchical regression analysis and a non-parametric test suggest that women reported significantly higher on the aspects of Post-Traumatic stress such as re-experiencing, negative alterations and hyper-arousal (Liu et al., 2020). Survey conducted on 6882 individuals showed that compared with men, women presented with higher levels of trauma-related distress and are more vulnerable during the pandemic (Kolakowsky-Hayner et al., 2021).

b) Independent ‘Gender’ effect on Depression: The ‘Gender’ had a 34% significant independent effect at .01 level on PTSD among the samples ($F=20.75$; $\eta^2=.34$; $p >.001$). Some studies showed the prevalence of depression to be 13.25%, with females experiencing severe stress and depression which dissipate over time (Hou et al., 2020) although the prevalence may fluctuate among differing

population. Among the Israeli adults, women reported higher levels of Depression and being a woman of younger age, who relies more on emotion focused coping with low level of resilience contributed a large portion of variation in acquiring psychiatric symptoms (Laufer & Bitton, 2021).

- c) Independent ‘Gender’ effect on Insomnia: The ‘Gender’ had a 30% significant independent effect at .01 level on Insomnia among the samples ($F=38.135$; $\eta^2=.30$; $p >.001$). Pappa et al. (2020) assessed COVID19 patients after 1-2 months of discharge and established that Insomnia is the second highest prevalent psychiatric symptoms (33%) and females reported more mental health symptoms such as Insomnia etc. compared to males. On the other hand, Salfi et al. (2020) found men to show deterioration and sleep disturbances on the long run while females are more susceptible only during the initial period.
- d) Independent ‘Gender’ effect on OCD: The ‘Gender’ had a 39% significant independent effect at .01 level on OCD among the samples ($F=51.511$; $\eta^2=.39$; $p >.001$) Jalalifar et al (2023) conducted a meta-analysis of the researches and the results revealed 41.2% overall prevalence of OCD during the COVID19 pandemic and 47.1% and 39.1% OCD prevalence for female and male genders respectively. Another study also suggested that 20% average prevalence of OCS during the pandemic, with very high heterogeneity among the included studies ($I^2 99.6\%$). The highest prevalence of OCS was found in pregnant women (36%, $n = 5$), followed by individuals diagnosed with COVID19 (22%, $n = 4$) and general population (22%, $n = 19$), undergraduates (21%, $n = 5$), and healthcare workers (5%, $n = 5$) (Pozza et al., 2024).

The results of the Independent effect of ‘COVID19’ and ‘Gender’ suggested accepting hypothesis 4.

Table -6: Showing the Independent effect (Two-Way ANOVA) of COVID19 and Gender on PTSD, Depression, Insomnia and OCD.

Dependent Variables	Independent Variables	Sum of Squares	df	Mean Square	F	Sig.	Eta Squared
PTSD	COVID19	1156.8	1	1156.8	209.9	0.001	.31
	Gender	139.4	1	139.4	13.0	0.002	.31
Depression	COVID19	1008.0	1	1008.0	293.2	0.003	.32
	Gender	160.2	1	160.2	20.7	0.011	.34
Insomnia	COVID19	1545.6	1	1545.6	333.9	0.001	.33
	Gender	397.6	1	397.6	38.1	0.001	.30
OCD	COVID19	1965.6	1	1965.6	440.4	0.001	.37
	Gender	588.2	1	588.2	51.5	0.002	.39

Objective -5: To study the Interaction effect of ‘COVID19 and Gender’ on PTSD, Depression, Insomnia and OCD among the samples.

To study the Interaction effect of ‘COVID19 and Gender’ on PTSD, Depression, Insomnia and OCD, the Two-way ANOVA was used and the results are presented in Table - 7.

- (i) **Interaction effect of ‘COVID19 and Gender’ on PTSD:** The ‘COVID19 and Gender’ had a 36 % significant interaction effect at .01 level on PTSD among the samples ($F=126.527$; $\eta^2=.36$; $p > .003$) and the same trend was found by earlier research that men and women show different rates of PTSD and Depression, whereas no Insomnia is found in both males and females. Besides gender, education, living conditions, direct exposure to COVID19, the post mental and the physical health condition is related to PTSD, Depression, and Insomnia (Liu et al., 2020; Arcand et al., 2023).

- (ii) ***Interaction effect of ‘COVID19 and Gender’ on Depression:*** The ‘COVID19 and Gender’ had a 29 % significant interaction effect at .01 level on Depression among the samples ($F=147.023$; $\eta^2=.29$; $p >.010$). The combination of being COVID19 patient with a specific gender had a significant effect on developing depression and other stress symptoms, there was an increase in depressive symptoms for all sexes and gender during the pandemic (Seens et al., 2021). On the other hand gender does not have significant impact on depression while it has for anxiety (Arcand et al., 2023).
- (iii) ***Interaction effect of COVID19 and Gender’ on Insomnia:*** The ‘COVID19 and Gender’ had a 38 % significant interaction effect at .01 level on Insomnia among the samples ($F=245.704$; $\eta^2=.38$; $p >.010$). The interaction effect between COVID19 and Gender has significant impact on individual’s development of symptoms of Insomnia (Liu et al., 2021). Although several factors intervened with this interaction, gender still plays a significant role in progressing sleep disturbance. Multiple regression analyses showed that variables, including sex, age, income level, and worry score, contributed to the significant regression equation for insomnia but not for daytime sleepiness. Specifically, the female, younger, lower income, and highly worried populations contributed significantly more than the male, elderly, higher income, and less worried populations, respectively, to the prediction of insomnia (Bajaj et al., 2020).
- (iv) ***Interaction effect of COVID19 and Gender’ on OCD:*** The ‘COVID19 and Gender’ had a 32 % significant interaction effect significant at .01 level on OCD among the samples ($F=565.582$; $\eta^2=.32$; $p >.010$) and the same trend was found by earlier research that gender does interact with COVID19 in developing Obsessive-Compulsive Disorder behavior wherein females are more prone to develop symptoms than male (Javed et al., 2021). Although significant, the involvement of other factors must be put to consideration as they would interact with these variables.

The results of the interaction effect of ‘COVID19 and Gender’ and the supporting literatures suggested accepting hypothesis 5.

Table -7: Showing the Interaction effect (Two-Way ANOVA) of COVID19 and Gender on PTSD, Depression, Insomnia and OCD.

Dependent Variables	Interaction Variables	Sum of Squares	df	Mean Square	F	Sig.	Eta Squared
PTSD	COVID19 and Gender	1482.49	3	494.16	126.52	0.003	.36
Depression	COVID19 and Gender	1169.05	3	389.68	147.02	0.010	.29
Insomnia	COVID19 and Gender	1944.92	3	648.30	245.70	0.005	.38
OCD	COVID19 and Gender	2554.29	3	851.43	565.58	0.011	.32

Objective -6: To examine the prediction of PTSD on Depression, Insomnia and OCD among the participants.

To evince the PTSD prediction, the regression analysis was calculated and presented in Table 8.

(i) **Prediction of PTSD on Depression:** PTSD predicted 34% ($R^2 = .341$; $F = 259.298$; $p > .002$) on Depression which explained that PTSD invites Depression among the samples. The finding was supported by earlier research findings in other cultures that among COVID19 survivors PTSD and Depression were highly prevalent and comorbid. Among the Irish there was a high level of comorbidity with generalized anxiety (49.5%) and depression (53.8%). Meeting the diagnostic requirement for COVID19 related PTSD was associated with younger age, male sex, living in a city, living with children, moderate and high perceived risk of COVID19 infection, and screening positive for anxiety or depression (Karatzias et al., 2020).

(ii) **Prediction of PTSD on Insomnia:** PTSD predicted 32% ($R^2 = .323$; $F = 216.970$; $p > .001$) on Insomnia which made it clear that PTSD promoted insomnia among the sample. The recent finding suggests that 32% of variation within Insomnia is explained by having symptoms of PTSD incites a large portion of variation. Self-reported PTSD and Depression were associated with sleep disturbance and sleep deprivation (Wang et al., 2022). Some studies had model which inversely predicted PTSD from Insomnia which found a high predictability (Wright et al., 2011) shedding some light on the current findings although the models are inversed.

(iii) **Prediction of PTSD on OCD:** PTSD predicted 24% ($R^2 = .245$; $F = 160.396$; $p > .010$) on OCD which explained that PTSD was with OCD among the samples. Anxiety, depression, PTSD, and Obsessive-Compulsive symptoms are common among the COVID19 survivors and that underscores the need to diagnose and manage mental health morbidities among these survivors long after their recovery from COVID19 (Dar et al., 2021). Patients with comorbid PTSD showed no significant improvements in OCD and depression symptoms. OCD and depression symptoms improved significantly more in patients without comorbid PTSD than in patients with comorbid PTSD (Gershuny et al., 2002). Those with a current diagnosis of PTSD were 3.62 times more likely to have OCD, whereas those with a current diagnosis of OCD were not at greater risk of having PTSD leading some to speculate whether symptoms of PTSD serve as precipitating factors of OCD (Wadsworth et al., 2023).

The results of the prediction of PTSD on Insomnia, Depression and OCD were significant and the supporting literature suggested accepting hypothesis 6.

Table -8: Showing Prediction (linear regression) of PTSD on Insomnia, Depression and OCD.

Predictor	Criterion	R^2	F Change	df	Sig. F Change	Durbin-Watson
PTSD	Insomnia	.32	216.97	1/192	0.001	1.05
	Depression	.34	259.29		0.002	1.04
	OCD	.24	160.39		0.010	0.80

CHAPTER – 6
SUMMARY AND CONCLUSION

The dawn of the 21st century saw one of the greatest pandemics the world has experienced, due to its sheer amount of impact on the global economy along with the casualties and lives it claimed. The COVID19 outbreak has been classified by the World Health Organization as a public health emergency of global concern as of January 30, 2020. Millions of people have already experienced direct effects from the virus on their physical health, and it is also thought to be a major global threat to mental health (Talevi et al., 2020). Health inequalities and mental health problems may worsen due to the COVID19 pandemic's unpredictability and uncertainty, lockdowns, physical distancing, and other containment measures, as well as the subsequent economic collapse (Moreno et al., 2020). A number of guidelines have been released by the WHO Department of Mental Health to assist various population groups in maintaining their mental and psychosocial well-being (Ahuja et al., 2021).

Apart from all the medical research and findings, there is a need to better understand the effect it had on our society. Although there have been a lot of literatures that provide resourceful information about the COVID19, there is a higher need to understand the post effect of the COVID19 especially among people of different races. The post-pandemic crisis has certain problems posed to individuals from all over the world. Therefore this study endeavored in establishing a better insight into the post-pandemic effect on the target population. The study also highlights how it is important to address the situation from a different angle as it strongly affects the target population, especially among the female section.

This research was also conducted to study the impact of contracting COVID19 on several psychological issues; Post-Traumatic Stress, Depression, Insomnia and Obsessive-Compulsive behavior. Several objectives such as whether COVID19 affects Post-traumatic stress, Depression, Sleep disturbance and Obsessive-Compulsive behaviors, the relationship between these behaviors among COVID19 patients and the independent and interactive effects of COVID19 and Gender on the aforementioned behaviors.

The result and discussion of the analysis provide an insight into how COVID19 affected the mental health of its casualties. The analysis result of the first objective

clearly showed that COVID19 patients were traumatized when they came in contact with the disease. With all the social and legal proceeding requirements combined with the life-threatening condition, it was traumatizing. In support of these results, the level of depression was also much higher compared to those who were not in contact with COVID19. It was highly stressful as day-to-day activities halted and everyone stayed indoors, traumatized with fear of being in contact with the disease. In addition to these, individuals that are under-privileged and belonging to lower income sector who earns their daily living experience higher levels of stress. Sleep disturbance was also common, as most individuals cannot resume their daily life, the need for early to bed and early to rise was gradually decreasing. The result also revealed that COVID19 patients compared to normal healthy individuals have developed Insomnia and other sleep disturbances. One of the protective measures was sanitizing hands regularly, which could increase compulsive and excessive hand washing or sanitizing even though one is not in contact with an infected person. COVID19 patients were much worse on Obsessive-Compulsive behaviors compared to Non COVID19 patients.

The second objective endeavored investigating the effect of gender among COVID19 patients on Post-Traumatic Stress, Depression, Insomnia and Obsessive and compulsive behaviors. The results revealed an outcome that was in line with the expected outcome wherein males are less affected compared to females. Men experienced lower Post-traumatic stress, Depression, Insomnia and Obsessive-Compulsive disorder behaviors. Gender has a pivotal role in over-turning the impact of COVID19 on PTSD, Depression, Insomnia and OCD. Some men downplay the pandemic itself, which might protect them mentally from the psychological effects of COVID19.

The correlational analysis was done in hope of finding how the variables of interest are associated among COVID19 patients. These findings are expected to provide better insight which could aid in post-infection mental health treatment plans not only on COVID19 but also for other Severe Acute Respiratory diseases. Post-traumatic stress was positively correlated with Depression and Insomnia which is also a strong relationship. Since over the past decades, it has been proven that Post-

traumatic stress, depression and insomnia have an indelible relationship among different sections of population. The pandemic was a traumatic experience for many, at least during the primary stage. When fear of a disease or any other traumatic experience occurs, it is often accompanied by difficulty in sleep. Sleep deprivation or hypersomnia is the hallmark of stressful life events and PTSD. Depression and Insomnia also had a strong positive relationship among COVID19 patients. This meant that as Post-Traumatic Stress increases so do the depressive levels and sleep disturbance. PTSD was also positively associated with Obsessive-Compulsive behaviors which is quite common and highly expected resulting in compulsive sanitary behaviors. People showed compulsive hand-washing and sanitization during and after the pandemic subsided. The traumatic experience manifests the inner compulsion to sanitize and drive the individual to give paramount in such behavior like compulsive hand washing etc. It is also normal to expect these relationships in circumstances outside the pandemic as well.

The predictability of Insomnia, Depression and OCD from PTSD was also estimated based on the correlation between these variables. The predictability was strongest for Depression followed by Insomnia and OCD. These findings clearly highlight the significance of treating PTSD which could subsequently demote depression and sleep disturbance especially Insomnia.

Limitations:

The sample was determined and estimated to suffice the statistical tests in examining the variables. With that being said, the sample drawn was yet insufficient to represent the target population due to withdrawal of consent, incomplete and deceitful responses.

The second limitation would be the inability to comprise other factors such as personality, intelligence, etc. which were very much attempted to include in the study. These omitted factors could result in a more complex finding, but offer clarity on the relationships and outcome of the study. But due to financial constraints and overwhelming information, the present study opted to exclude it.

The study did not include demographic variables such as socioeconomic status, educational qualification, etc. which can affect psychological functions.

The study could not incorporate qualitative methods within the study due to lack of expertise and qualitative methods cannot get rid of subjectivity confounds. Therefore, crucial information and components may be left out.

Suggestion:

It would be more meaningful to increase sample size or coverage of a bigger sample size which can tap more information making generalizations about the psychological function of the target population.

It would be good to include some psychological variables including personality, IQ, etc. as independent variables to get more information about COVID19 effect on mental problems.

The inclusion of demographic variables such as socioeconomic status, age, educational qualification, etc. was suggested to get more information about the effects of COVID19 on psychological functions.

The inclusion of Qualitative methods was suggested for getting the unforeseen information to understand the COVID19 effects on mental health.

Significance of the study:

The study was meticulously designed and conducted following the systematic research methodology which provided authentic findings and has never been conducted in the target population including:

- (i) The differential prevalence of Psychological pathology between Post COVID19 and Non COVID19 along with gender differences,
- (ii) The relationship between PTSD , Insomnia, Depression and OCD variables;
- (iii) The Contribution (effect) of COVID19 and gender on PTSD, Insomnia, Depression and OCD variables;

- (iv) The joint contribution (Interaction effect of) COVID19 and gender on PTSD, Insomnia, Depression and OCD variables; and
- (v) The prediction of PTSD on Insomnia, Depression and OCD variables.

The results highlighted the COVID19 adverse effects on mental health which is worse than other critical physical illnesses and also highlighted the need to pay attention to COVID19 survival by giving psychological and physical support, especially female COVID19 survival.

APPENDICES

APPENDIX-I

Consent Form for research participation

You are invited to participate in research, topic on “Post COVID19 Mental Health: Post-Traumatic Stress Disorder, Depression, Insomnia and Obsessive-Compulsive Disorder”. This is a research project being conducted by Ms. Vida Lalrinchhani, PhD Scholar of Prof. Zokaitluangi, Department of Nursing, Mizoram University. It should take approximately 1 hour to complete.

Your participation in this research is voluntary. You may refuse to take part in the research or exit the research at any time without penalty. You are free to decline to answer any particular question you do not wish to answer for any reason.

You will receive no direct benefits from participating in this research study. However, your responses may help us learn more about psychological conditions based on which I can give you suggestions on how to cope with your problems, if there is any.

There are no foreseeable risks involved in participating in this study other than those encountered in day-to-day life. Some of the questions may be sensitive, some questions may cause emotional discomfort, some may be distressing to you as you think about your experiences.

Your answers will be stored in a password protected electronic format and identifying information such as your name, email address, or IP address will not be collected. Therefore, your responses will remain anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study.

If you have questions at any time about the study or the procedures, you may contact my research supervisor, Professor Zokaitluangi via phone at 9436151606 or via email _____ at _____ zktluangi.psy@mzu.edu.in.

You have read the above information, kindly give your response and agreement:

- You voluntarily agree to participate ☐ Agree ☐ Disagree
- You are 18 years of age or older

Signature:_____

Thank You

Investigator: Ms. Vida Lalrinchhani

SI No:_____

Phone :

APPENDIX-II

Socio-Demographic Data

1. Age : _____
2. Birth Place : _____
3. Permanent address : _____
4. Sex : _____
5. Any major Illness : _____
6. If, since, when : _____
7. Any hospitalization : _____
8. If, reason (s) : _____
9. If, Duration : _____
10. Admission date : _____
11. Discharge date : _____
12. Physical Health Condition:
 - a) Hb: : Normal/not normal
 - b) Temperature : Normal/not normal
 - c) BP : Normal/not normal
13. What test have you taken: rt-pcr test / rapid antigen test

APPENDIX-III

PTSD-8 INVENTORY (PTSD-8; Hensen et al, 2010)

Instruction: Read the instructions carefully.					
The following are symptoms that people sometimes have after experiencing, witnessing or being confronted with a traumatic event.					
Please read each one carefully and mark your answer with an X according to how much the symptoms have bothered you since the trauma (One X per question).					
Not at all=0 Rarely=1 Sometimes=2					
Most of the time=3					
Sl. No	Questions	Not at all	Rarely	Some times	Most of the time
1	Recurrent thoughts or memories of the event	0	1	2	3
2	Feelings as though the event is happening again	0	1	2	3
3	Recurrent nightmares about the event	0	1	2	3
4	Sudden emotional or physical reactions when reminded of the event	0	1	2	3
5	Avoiding activities that remind you of the event	0	1	2	3
6	Avoiding thoughts or feelings associated with the event	0	1	2	3
7	Feeling jumpy, easily startled	0	1	2	3
8	Feeling on guard	0	1	2	3

APPENDIX-IV

BECK DEPRESSION INVENTORY-13 (Beck & Beck, 1972)

Instruction: Read the instructions carefully.

The following are symptoms that people sometimes have after experiencing, witnessing or being confronted with a traumatic event in their life.

Please read each one carefully and mark your answer with an X according to how much it is appropriate to you.

1. 0 I do not feel sad.
 1 I feel sad
 2 I am sad all the time and I can't snap out of it.
 3 I am so sad and unhappy that I can't stand it.
2. 0 I am not particularly discouraged about the future.
 1 I feel discouraged about the future.
 2 I feel I have nothing to look forward to.
 3 I feel the future is hopeless and that things cannot improve.
3. 0 I do not feel like a failure.
 1 I feel I have failed more than the average person.
 2 As I look back on my life, all I can see is a lot of failures.
 3 I feel I am a complete failure as a person.
4. 0 I get as much satisfaction out of things as I used to.
 1 I don't enjoy things the way I used to.
 2 I don't get real satisfaction out of anything anymore.
 3 I am dissatisfied or bored with everything.
5. 0 I don't feel particularly guilty
 1 I feel guilty a good part of the time.
 2 I feel quite guilty most of the time.
 3 I feel guilty all of the time.
6. 0 I don't feel I am being punished.
 1 I feel I may be punished.
 2 I expect to be punished.

- 3 I feel I am being punished.
7. 0 I don't feel disappointed in myself.
1 I am disappointed in myself.
2 I am disgusted with myself.
3 I hate myself.
8. 0 I don't feel I am any worse than anybody else.
1 I am critical of myself for my weaknesses or mistakes.
2 I blame myself all the time for my faults.
3 I blame myself for everything bad that happens.
9. 0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.
10. 0 I don't cry any more than usual.
1 I cry more now than I used to.
2 I cry all the time now.
3 I used to be able to cry, but now I can't cry even though I want to.
11. 0 I am no more irritated by things than I ever was.
1 I am slightly more irritated now than usual.
2 I am quite annoyed or irritated a good deal of the time.
3 I feel irritated all the time.
12. 0 I have not lost interest in other people.
1 I am less interested in other people than I used to be.
2 I have lost most of my interest in other people. 3 I have lost all of my interest in other people.
13. 0 I make decisions about as well as I ever could.
1 I put off making decisions more than I used to.
2 I have greater difficulty in making decisions more than I used to.
3 I can't make decisions at all anymore.

APPENDIX-V

INSOMNIA SEVERITY INDEX (Morin, 2016)

Instruction: Read the instructions carefully. The following are symptoms that people sometimes have after experiencing, witnessing or being confronted with a traumatic event in their life. Please read each one carefully and mark your answer with an X according to how much it is appropriate to you.						
Sl. No	Insomnia Problem	None	Mild	Moderate	Severe	Very Severe
1	Difficulty falling asleep	0	1	2	3	4
2	Difficulty staying asleep	0	1	2	3	4
3	Problems waking up too early	0	1	2	3	4
4	How SATISFIED / DISSATISFIED are you with your CURRENT sleep pattern	Very Satisfied	Moderately Satisfied	Satisfied	Dissatisfied	Very Dissatisfied
5	How NOTICEABLE to others do you think your sleep problem is in terms of impairing the quality of your life?	Not at all noticeable	A Little noticeable	Somewhat noticeable	Much noticeable	Very Much Noticeable
6	How WORRIED/DISTRESSED are you about your current sleep problem?	Not at all worried	A Little worried	Somewhat worried	Much worried	Very Much Worried
7	To what extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) CURRENTLY?	Not at all interfering	A Little interfering	Somewhat interfering	Much interfering	Very Much Interfering

APPENDIX-VI

YALE-BROWN OBSESSIVE COMPULSIVE SCALE (Goodman, 1989)

Instruction: Read the instructions carefully. The following are symptoms that people sometimes have after experiencing witnessing or being confronted with a traumatic event in their life. Please think about the last seven days (including today) and mark your answer with an X according to how much it is appropriate to you.						
1	How much time do you spend on obsessive thoughts?	None	Less than 1 hour/day	1-3 hrs /day	Less than 3hrs-8 hrs/day	More than 8hrs/day
2	How much do your obsessive thoughts interfere with your personal, social, or work life?	No Interference	Mild, Slight Interference	Moderate, Definite Interference	Severe Interference	Extreme, Incapacitating Interference
3	How much do your obsessive thoughts distress you?	No Distress	Little Distress	Moderate but manageable	Severe Distress	Nearly Constant, disabling distress
4	How hard do you try to resist your Obsessive thoughts?	Always try	Try much of the time	Try some of the time	Rarely try, Often yield	Never try, Completely yield
5	How much control do you have over your Obsessive thoughts?	Complete control	Much control	Some control	Little control	No control
Compulsions are repetitive behaviors or mental acts that you have a strong urge to repeat that are aimed at reducing your anxiety or preventing some dreaded event.						
6	How much time do you spend performing compulsive behaviors?	None	0-1 hrs/ day	1-3 hrs/ day	3-8 hrs/ day	More than 8 hrs/day
7	How much did your compulsive behaviors interfere with your	No Interference	Mild, Slight Interference	Moderate, Definite Interference	Severe Interference	Extreme, Incapacitating Interference

	personal, social, or work life?					
8	How anxious would you feel if you were prevented from performing your compulsive behaviors?	Not anxious	Slightly anxious	Moderate anxiety but manageable	Severe anxiety	Extreme, Incapacitating anxiety
9	How hard do you try to resist your compulsive behaviors?	Always try	Try much of the time	Try some of the time	Rarely try, Often yield	Never try, Completely yield
10	How much control do you have over your compulsive behaviors?	Complete control	Much control	Some control	Little control	No control

REFERENCES

- Ager, A., Pasha, E., Yu, G., Duke, T., Eriksson, C., & Cardozo, B. L. (2012). Stress, mental health, and burnout in national humanitarian aid workers in Gulu, Northern Uganda. *Journal of traumatic stress*, 25(6), 713-720.
- Abramson, L. Y., Metalsky, G. I., & Alloy, L. B. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological review*, 96(2), 358.
- Agrawal, H., Das, N., Nathani, S., Saha, S., Saini, S., Kakar, S. S., & Roy, P. (2021). An assessment on impact of COVID19 infection in a gender specific manner. *Stem cell reviews and reports*, 17, 94-112.
- Ahmadi, R., Rahimi-Jafari, S., Olfati, M., Javaheripour, N., Emamian, F., Ghadami, M. R., ... & Sepehry, A. A. (2022). Insomnia and post-traumatic stress disorder: A meta-analysis on interrelated association (n= 57,618) and prevalence (n= 573,665). *Neuroscience & Biobehavioral Reviews*, 141, 104850.
- Ahorsu, D. K., Lin, C. Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The fear of COVID19 scale: development and initial validation. *International journal of mental health and addiction*, 1-9.
- Ahuja, P., Syal, G., & Kaur, A. (2021). Psychological stress: Repercussions of COVID-19 on gender. *Journal of Public Affairs*, 21(4), e2533.
- Aleksanyan, Y., & Weinman, J. P. (2022). Women, men and COVID19. *Social Science & Medicine*, 294, 114698.
- Alimoradi, Z., Broström, A., Tsang, H. W., Griffiths, M. D., Haghayegh, S., Ohayon, M. M., & Pakpour, A. H. (2021). Sleep problems during COVID19 pandemic and its' association to psychological distress: A systematic review and meta-analysis. *EClinicalMedicine*, 36.
- Altena, E., Baglioni, C., Espie, C. A., Ellis, J., Gavrilloff, D., Holzinger, B., ... & Riemann, D. (2020). Dealing with sleep problems during home confinement due to the COVID-19 outbreak: Practical recommendations from a task force of the European CBT-I Academy. *Journal of sleep research*, 29(4), e13052.

- Arcand, M., Bilodeau-Houle, A., Juster, R. P., & Marin, M. F. (2023). Sex and gender role differences on stress, depression, and anxiety symptoms in response to the COVID19 pandemic over time. *Frontiers in Psychology*, 14, 1166154.
- Baglioni, C., Battagliese, G., Feige, B., Spiegelhalder, K., Nissen, C., Voderholzer, U., ... & Riemann, D. (2011). Insomnia as a predictor of depression: a meta-analytic evaluation of longitudinal epidemiological studies. *Journal of affective disorders*, 135(1-3), 10-19.
- Bajaj, S., Blair, K. S., Schwartz, A., Dobbertin, M., & Blair, R. J. R. (2020). Worry and insomnia as risk factors for depression during initial stages of COVID19 pandemic in India. *PloS one*, 15(12), e0243527.
- Bajoulvand, R., Hashemi, S., Askari, E., Mohammadi, R., Behzadifar, M., & Imani-Nasab, M. H. (2022). Post-pandemic stress of COVID19 among high-risk groups: A systematic review and meta-analysis. *Journal of affective disorders*, 319, 638-645.
- Baroiu, L., Dumea, E., Năstase, F., Niculeț, E., Fotea, S., Ciubara, A. B., ... & Ciubara, A. (2021). Assessment of Depression in Patients with COVID19. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 12(2), 254-264.
- Bastug, A., Bodur, H., Erdogan, S., Gokcinar, D., Kazancioglu, S., Kosovali, B. D., & Yilmaz, F. M. (2020). Clinical and laboratory features of COVID19: Predictors of severe prognosis. *International immunopharmacology*, 88, 106950.
- Beck, A. T., & Beck, R. W. (1972). Screening depressed patients in family practice: A rapid technic. *Postgraduate medicine*, 52(6), 81-85.
- Belleville, G., Ouellet, M. C., & Morin, C. M. (2019). Post-traumatic stress among evacuees from the 2016 Fort McMurray wildfires: exploration of psychological

and sleep symptoms three months after the evacuation. *International journal of environmental research and public health*, 16(9), 1604.

Benatti, B., Albert, U., Maina, G., Fiorillo, A., Celebre, L., Girone, N., ... & Dell'Oso, B. (2020). What happened to patients with obsessive compulsive disorder during the COVID19 pandemic? A multicentre report from tertiary clinics in northern Italy. *Frontiers in psychiatry*, 11, 720.

Blekas, A., Voitsidis, P., Athanasiadou, M., Parlapani, E., Chatzigeorgiou, A. F., Skoupra, M., ... & Diakogiannis, I. (2020). COVID19: PTSD symptoms in Greek health care professionals. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12(7), 812.

Blog, I. M. F. (2020). The great lockdown, worst economic downturn since the great depression. Accessed on, 13, 2021.v

Bo, H. X., Li, W., Yang, Y., Wang, Y., Zhang, Q., Cheung, T., ... & Xiang, Y. T. (2021). Posttraumatic stress symptoms and attitude toward crisis mental health services among clinically stable patients with COVID19 in China. *Psychological medicine*, 51(6), 1052-1053.

Bohmwald, K., Gálvez, N. M., Ríos, M., & Kalergis, A. M. (2018). Neurologic alterations due to respiratory virus infections. *Frontiers in cellular neuroscience*, 12, 386.

Bonanno, G. A., Galea, S., Bucciarelli, A., & Vlahov, D. (2007). What predicts psychological resilience after disaster? The role of demographics, resources, and life stress. *Journal of consulting and clinical psychology*, 75(5), 671.

Bonnet, M. H., & Arand, D. L. (2010). Hyperarousal and insomnia: state of the science. *Sleep medicine reviews*, 14(1), 9-15.

Breslau, N., Davis, G. C., Andreski, P., Peterson, E. L., & Schultz, L. R. (1997). Sex differences in posttraumatic stress disorder. *Archives of general psychiatry*, 54(11), 1044-1048.

- Brewin, C. R., Andrews, B., Rose, S., & Kirk, M. (1999). Acute stress disorder and posttraumatic stress disorder in victims of violent crime. *American Journal of Psychiatry*, 156(3), 360-366.
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The lancet*, 395(10227), 912-920.
- Bryant, R. A. (2019). Post-traumatic stress disorder: a state-of-the-art review of evidence and challenges. *World psychiatry*, 18(3), 259-269.
- Bueno-Notivol, J., Gracia-García, P., Olaya, B., Lasheras, I., López-Antón, R., & Santabárbara, J. (2021). Prevalence of depression during the COVID19 outbreak: A meta-analysis of community-based studies. *International journal of clinical and health psychology*, 21(1), 100196.
- Carmassi, C., Bertelloni, C. A., Gesi, C., Conversano, C., Stratta, P., Massimetti, G., & Dell’Osso, L. (2017). New DSM-5 PTSD guilt and shame symptoms among Italian earthquake survivors: Impact on maladaptive behaviors. *Psychiatry research*, 251, 142-147.
- Carmassi, C., Foghi, C., Dell’Oste, V., Cordone, A., Bertelloni, C. A., Bui, E., & Dell’Osso, L. (2020). PTSD symptoms in healthcare workers facing the three coronavirus outbreaks: What can we expect after the COVID19 pandemic. *Psychiatry research*, 292, 113312.
- Carmassi, C., Rossi, A., Pedrinelli, V., Cremone, I. M., Dell’Oste, V., Stratta, P., ... & Dell’Osso, L. (2020). PTSD in the aftermath of a natural disaster: What we learned from the Pisa-L’Aquila Collaboration Project. *J Psychopathol*, 26(1), 99-106.
- Ceban, F., Nogo, D., Carvalho, I. P., Lee, Y., Nasri, F., Xiong, J., ... & McIntyre, R. S. (2021). Association between mood disorders and risk of COVID19 infection, hospitalization, and death: a systematic review and meta-analysis. *JAMA psychiatry*, 78(10), 1079-1091.

- Chakraborty, A., & Karmakar, S. (2020). Impact of COVID19 on obsessive compulsive disorder (OCD). *Iranian journal of psychiatry*, 15(3), 256.
- Cheng, S.K., Wong, C.W., & Tsang, J. (2004). Psychological distress and negative appraisals in survivors of a severe acute respiratory syndrome (SARS). *Psychol. Med*;34:1187–1195.
- Chew, Q. H., Wei, K. C., Vasoo, S., Chua, H. C., & Sim, K. (2020). Narrative synthesis of psychological and coping responses towards emerging infectious disease outbreaks in the general population: practical considerations for the COVID19 pandemic. *Singapore medical journal*, 61(7), 350.
- Choi, J. (2020). Taylor, S.(2019). The psychology of pandemics: Preparing for the next global outbreak of infectious disease. Newcastle upon Tyne, UK: Cambridge Scholars Publishing. *Asian Communication Research*, 17(2), 98-103.
- Chong, M. Y., Wang, W. C., Hsieh, W. C., Lee, C. Y., Chiu, N. M., Yeh, W. C., ... & Chen, C. L. (2004). Psychological impact of severe acute respiratory syndrome on health workers in a tertiary hospital. *The British journal of psychiatry*, 185(2), 127-133.
- Ciotti, M., Ciccozzi, M., Terrinoni, A., Jiang, W. C., Wang, C. B., & Bernardini, S. (2020). The COVID19 pandemic. *Critical reviews in clinical laboratory sciences*, 57(6), 365-388.
- Cleary, M., Kornhaber, R., Thapa, D. K., West, S., & Visentin, D. (2018). The effectiveness of interventions to improve resilience among health professionals: A systematic review. *Nurse education today*, 71, 247-263.
- Collaborators, G. B. D. (2018). Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017.

- Colville, G. A., Smith, J. G., Brierley, J., Citron, K., Nguru, N. M., Shaunak, P. D., ... & Perkins-Porras, L. (2017). Coping with staff burnout and work-related posttraumatic stress in intensive care. *Pediatric Critical Care Medicine*, 18(7), e267-e273.
- Cox, R. C., & Olatunji, B. O. (2021). Linking insomnia and OCD symptoms during the coronavirus pandemic: Examination of prospective associations. *Journal of anxiety disorders*, 77, 102341.
- Craparo, G., La Rosa, V. L., Marino, G., Vezzoli, M., Cinà, G. S., Colombi, M., & Mangiapane, E. (2022). Risk of post-traumatic stress symptoms in hospitalized and non-hospitalized COVID19 recovered patients. A cross-sectional study. *Psychiatry research*, 308, 114353.
- Craun, S. W., & Bourke, M. L. (2014). The use of humor to cope with secondary traumatic stress. *Journal of child sexual abuse*, 23(7), 840-852.
- Cullen, W., Gulati, G., & Kelly, B. D. (2020). Mental health in the COVID19 pandemic. *QJM: An International Journal of Medicine*, 113(5), 311-312.
- Daher, A., Cornelissen, C., Hartmann, N. U., Balfanz, P., Müller, A., Bergs, I., ... & Dreher, M. (2021). Six months follow-up of patients with invasive mechanical ventilation due to COVID19 related ARDS. *International Journal of Environmental Research and Public Health*, 18(11), 5861.
- Dantzer, R. (2017). Neuroimmune interactions: from the brain to the immune system and vice versa. *Physiological reviews*.
- Dar, S. A., Dar, M. M., Sheikh, S., Haq, I., Azad, A. M. U. D., Mushtaq, M., ... & Wani, Z. A. (2021). Psychiatric comorbidities among COVID19 survivors in North India: A cross-sectional study. *Journal of education and health promotion*, 10, 309.
- Davide, P., Andrea, P., Martina, O., Andrea, E., Davide, D., & Mario, A. (2020). The impact of the COVID19 pandemic on patients with OCD: Effects of contamination symptoms and remission state before the quarantine in a

- preliminary naturalistic study. *Psychiatry research*, 291, 113213.
- De Medeiros Carvalho, P. M., Moreira, M. M., de Oliveira, M. N. A., Landim, J. M. M., & Neto, M. L. R. (2020). The psychiatric impact of the novel coronavirus outbreak. *Psychiatry research*, 286, 112902.
- Deng, J., Zhou, F., Hou, W., Silver, Z., Wong, C. Y., Chang, O., ... & Zuo, Q. K. (2021). The prevalence of depression, anxiety, and sleep disturbances in COVID-19 patients: a meta-analysis. *Annals of the new York Academy of Sciences*, 1486(1), 90-111.
- Desforges, M., Le Coupanec, A., Dubeau, P., Bourgouin, A., Lajoie, L., Dubé, M., & Talbot, P. J. (2019). Human coronaviruses and other respiratory viruses: underestimated opportunistic pathogens of the central nervous system?. *viruses*, 12(1), 14.
- Di Giuseppe, M., Zilcha-Mano, S., Prout, T. A., Perry, J. C., Orrù, G., & Conversano, C. (2020). Psychological impact of coronavirus disease 2019 among Italians during the first week of lockdown. *Frontiers in psychiatry*, 11, 576597.
- Duan, L., & Zhu, G. (2020). Psychological interventions for people affected by the COVID19 epidemic. *The Lancet. Psychiatry*, 7(4), 300.
- Epstein, R. M., & Krasner, M. S. (2013). Physician resilience: what it means, why it matters, and how to promote it. *Academic Medicine*, 88(3), 301-303.
- Ettman, C. K., Abdalla, S. M., Cohen, G. H., Sampson, L., Vivier, P. M., & Galea, S. (2020). Prevalence of depression symptoms in US adults before and during the COVID19 pandemic. *JAMA network open*, 3(9), e2019686-e2019686.
- Fawaz, M., & Samaha, A. (2020). <? covid19?> COVID19 quarantine: Post-traumatic stress symptomatology among Lebanese citizens. *International journal of social psychiatry*, 66(7), 666-674.

- Fineberg, N. A., Van Ameringen, M., Drummond, L., Hollander, E., Stein, D. J., Geller, D., & Dell'Osso, B. (2020). How to manage obsessive-compulsive disorder (OCD) under COVID19: A clinician's guide from the International College of Obsessive Compulsive Spectrum Disorders (ICOCS) and the Obsessive-Compulsive and Related Disorders Research Network (OCRN) of the European College of Neuropsychopharmacology. *Comprehensive psychiatry*, 100, 152174.
- Fontenelle, L. F., & Miguel, E. C. (2020). The impact of coronavirus (COVID-19) in the diagnosis and treatment of obsessive-compulsive disorder. *Depression and anxiety*, 37(6), 510.
- Forte, G., Favieri, F., Tambelli, R., & Casagrande, M. (2020). COVID19 pandemic in the Italian population: validation of a post-traumatic stress disorder questionnaire and prevalence of PTSD symptomatology. *International journal of environmental research and public health*, 17(11), 4151.
- Gallagher, D. (1986). 8/The beck depression inventory and older adults: Review of its development and utility. *Clinical Gerontologist*, 5(1-2), 149-163.
- Gao, T., Hu, M., Zhang, X., Li, H., Zhu, L., Liu, H., ... & Cao, C. (2020). Highly pathogenic coronavirus N protein aggravates lung injury by MASP-2-mediated complement over-activation. *MedRxiv*, 2020-03.
- Gebhard, C., Regitz-Zagrosek, V., Neuhauser, H. K., Morgan, R., & Klein, S. L. (2020). Impact of sex and gender on COVID19 outcomes in Europe. *Biology of sex differences*, 11, 1-13.
- Gershuny, B. S., Baer, L., Jenike, M. A., Minichiello, W. E., & Wilhelm, S. (2002). Comorbid posttraumatic stress disorder: Impact on treatment outcome for obsessive-compulsive disorder. *American Journal of Psychiatry*, 159(5), 852-854.

- Giosan, C., Malta, L. S., Wyka, K., Jayasinghe, N., Evans, S., Difede, J., & Avram, E. (2015). Sleep disturbance, disability, and posttraumatic stress disorder in utility workers. *Journal of Clinical Psychology*, 71(1), 72-84.
- Goldman, L. S., Nielsen, N. H., Champion, H. C., & Council on Scientific Affairs, American Medical Association. (1999). Awareness, diagnosis, and treatment of depression. *Journal of general internal medicine*, 14(9), 569-580.
- Golińska, P. B., Cieślak, M., Hubert, O., & Bidzan, M. (2021). Mental Health and the Symptoms of PTSD in People with Depression and Anxiety Disorders during the COVID19 Pandemic. *International journal of environmental research and public health*, 18(11), 5542.
- Goodman, W. K., Price, L. H., Rasmussen, S. A., Mazure, C., Fleischmann, R. L., Hill, C. L., & Charney, D. S. (1989). The Yale-Brown obsessive compulsive scale: I. Development, use, and reliability. *Archives of general psychiatry*, 46(11), 1006-1011.
- Gopal, A., Sharma, A.J., Subramanyam, M.A. (2020). Dynamics of psychological responses to COVID19 in India: A longitudinal study. *A longitudinal study. PLOS ONE* 15(10).
- Goyal, K., Chauhan, P., Chhikara, K., Gupta, P., & Singh, M. P. (2020). Fear of COVID 2019: First suicidal case in India!. *Asian journal of psychiatry*, 49, 101989.
- Grinage, B. D. (2003). Diagnosis and management of post-traumatic stress disorder. *American Family Physician*, 68(12), 2401-2409.
- Guan, W. J., Ni, Z. Y., Hu, Y., Liang, W. H., Ou, C. Q., He, J. X., & Zhong, N. S. (2020). Clinical characteristics of coronavirus disease 2019 in China. *New England journal of medicine*, 382(18), 1708-1720.
- Guzick, A. G., Candelari, A., Wiese, A. D., Schneider, S. C., Goodman, W. K., & Storch, E. A. (2021). Obsessive–compulsive disorder during the COVID19 pandemic: a systematic review. *Current psychiatry reports*, 23, 1-10.

- Haber, Y. (2013). Predictors of professional quality of life among physicians in a conflict setting: the role of risk and protective factors. *Israel Journal of Psychiatry*, 50(3), 174.
- Hamid, A. A., & Musa, S. A. (2017). The mediating effects of coping strategies on the relationship between secondary traumatic stress and burnout in professional caregivers in the UAE. *Journal of mental health*, 26(1), 28-35.
- Hansen, M., Andersen, T. E., Armour, C., Elklit, A., Palic, S., & Mackrill, T. (2010). PTSD-8: a short PTSD inventory. *Clinical practice and epidemiology in mental health: CP & EMH*, 6, 101.
- Hatch, R., Young, D., Barber, V., Griffiths, J., Harrison, D. A., & Watkinson, P. (2018). Anxiety, depression and post traumatic stress disorder after critical illness: a UK-wide prospective cohort study. *Critical care*, 22, 1-13.
- Hawryluck, L., Gold, W. L., Robinson, S., Pogorski, S., Galea, S., & Styra, R. (2004). SARS control and psychological effects of quarantine, Toronto, Canada. *Emerging infectious diseases*, 10(7), 1206.
- Hazarika, M., Das, S., Bhandari, S. S., & Sharma, P. (2021). The psychological impact of the COVID19 pandemic and associated risk factors during the initial stage among the general population in India. *Open journal of psychiatry & allied sciences*, 12(1), 31.
- Hertenstein, E., Feige, B., Gmeiner, T., Kienzler, C., Spiegelhalder, K., Johann, A., & Baglioni, C. (2019). Insomnia as a predictor of mental disorders: a systematic review and meta-analysis. *Sleep medicine reviews*, 43, 96-105.
- Hirschtritt, M.E., Bloch, M.H., Mathews, C.A. (2017). Obsessive-Compulsive Disorder: Advances in Diagnosis and Treatment. *JAMA*. 317(13):1358–1367.
- Homayuni, A. (2023). Investigating the correlation between perceived stress and health anxiety with obsessive-compulsive disorder and quality of life during COVID19 pandemic. *BMC psychology*, 11(1), 54.

- Horn, M., Wathélet, M., Fovet, T., Amad, A., Vuotto, F., Faure, K., & Fabien, D. (2020). Is COVID19 associated with posttraumatic stress disorder?. *The Journal of clinical psychiatry*, 82(1), 9886.
- Hossain, M. M., Purohit, N., Sharma, R., Bhattacharya, S., McKyer, E. L. J., & Ma, P. (2020). Suicide of a farmer amid COVID19 in India: Perspectives on social determinants of suicidal behavior and prevention strategies. Center for Open Science, 1-6.
- Hossain, M. M., Tasnim, S., Sultana, A., Faizah, F., Mazumder, H., Zou, L., ... & Ma, P. (2020). Epidemiology of mental health problems in COVID19: a review. *F1000 Research*, 9, 636.
- Hou, Y. J., Okuda, K., Edwards, C. E., Martinez, D. R., Asakura, T., Dinnon, K. H., & Baric, R. S. (2020). SARS-CoV-2 reverse genetics reveals a variable infection gradient in the respiratory tract. *Cell*, 182(2), 429-446.
- Huang, C., Huang, L., Wang, Y., Li, X., Ren, L., Gu, X., Kang, L., Guo, L., Liu, M., Zhou, X., et al. (2021). 6-month consequences of COVID19 in patients discharged from hospital: A cohort study. *Lancet*, 397, 220–232.
- Huang, Y., Fietze, I., & Penzel, T. (2022). Analysis of the correlations between insomnia and mental health during the COVID19 pandemic in Germany. *Somnologie*, 26(2), 89-97.
- Huremović, D. (2019). Social distancing, quarantine, and isolation. *Psychiatry of pandemics: a mental health response to infection outbreak*, 85-94.
- Jahrami, H., BaHammam, A. S., Bragazzi, N. L., Saif, Z., Faris, M., & Vitiello, M. V. (2021). Sleep problems during the COVID19 pandemic by population: a systematic review and meta-analysis. *Journal of Clinical Sleep Medicine*, 17(2), 299-313.
- Jalalifar, E., Arad, A., Rastkar, M., & Beheshti, R. (2023). The COVID19 pandemic and obsessive-compulsive disorder: a systematic review of comparisons between males and females. *Acta Neuropsychiatrica*, 35(5), 270-291.

- Janiri, D., Carfi, A., Kotzalidis, G. D., Bernabei, R., Landi, F., Sani, G., & Post-Acute Care Study Group. (2021). Posttraumatic stress disorder in patients after severe COVID19 infection. *JAMA psychiatry*, 78(5), 567-569.
- Javed, H., Arjmand, A., Arshid, M., & Zahid, S. (2021). Gender difference in developing loneliness and obsession compulsion symptoms during COVID19 pandemic. *International Journal of Advance Research, Ideas and Innovations in Technology*, 7(3).
- Jiang, H. J., Nan, J., Lv, Z. Y., & Yang, J. (2020). Psychological impacts of the COVID19 epidemic on Chinese people: Exposure, post-traumatic stress symptom, and emotion regulation. *Asian Pacific Journal of Tropical Medicine*, 13(6), 252-259.
- Jin, J. M., Bai, P., He, W., Wu, F., Liu, X. F., Han, D. M., & Yang, J. K. (2020). Gender differences in patients with COVID19: focus on severity and mortality. *Frontiers in public health*, 8, 545030.
- Jutzeler, C. R., Bourguignon, L., Weis, C. V., Tong, B., Wong, C., Rieck, B., & Walter, M. (2020). Comorbidities, clinical signs and symptoms, laboratory findings, imaging features, treatment strategies, and outcomes in adult and pediatric patients with COVID19: A systematic review and meta-analysis. *Travel medicine and infectious disease*, 37, 101825.
- Kangxing, S., Tao, L., Dan, L., Fengsu, H., Fengying, B., Stratton, T. D., & Yang, J. (2020). Psychological stress and gender differences during COVID19 pandemic in Chinese population. *MedRxiv*, 2020-04.
- Karatzias, T., Shevlin, M., Murphy, J., McBride, O., Ben-Ezra, M., Bentall, R. P., & Hyland, P. (2020). Posttraumatic stress symptoms and associated comorbidity during the COVID-19 pandemic in Ireland: A population-based study. *Journal of traumatic stress*, 33(4), 365-370.

- Kaseda, E. T., & Levine, A. J. (2020). Post-traumatic stress disorder: A differential diagnostic consideration for COVID19 survivors. *The Clinical Neuropsychologist*, 34(7-8), 1498-1514.
- Kazmi, S. S. H., Hasan, D. K., Talib, S., & Saxena, S. (2020). COVID19 and lockdown: A study on the impact on mental health. Available at SSRN 3577515.
- Kessing, L. V. (2007). Epidemiology of subtypes of depression. *Acta Psychiatrica Scandinavica*, 115, 85-89.
- Kessler, R. C., Foster, C. L., Saunders, W. B., & Stang, P. E. (1995). Social consequences of psychiatric disorders, I: Educational attainment. *American journal of psychiatry*, 152(7), 1026-1032.
- Khan, S., Siddique, R., Li, H., Ali, A., Shereen, M. A., Bashir, N., & Xue, M. (2020). Impact of coronavirus outbreak on psychological health. *Journal of global health*, 10(1), 010331.
- Khosravani, V., Aardema, F., Ardestani, S. M. S., & Bastan, F. S. (2021). The impact of the coronavirus pandemic on specific symptom dimensions and severity in OCD: A comparison before and during COVID19 in the context of stress responses. *Journal of Obsessive-Compulsive and Related Disorders*, 29, 100626.
- Khraisat, B., Toubasi, A., AlZoubi, L., Al-Sayegh, T., & Mansour, A. (2022). Meta-analysis of prevalence: the psychological sequelae among COVID19 survivors. *International journal of psychiatry in clinical practice*, 26(3), 234-243.
- Killgore, W. D., Cloonan, S. A., Taylor, E. C., Fernandez, F., Grandner, M. A., & Dailey, N. S. (2020). Suicidal ideation during the COVID19 pandemic: the role of insomnia. *Psychiatry research*, 290, 113134.
- Kisely, S., Warren, N., McMahon, L., Dalais, C., Henry, I., & Siskind, D. (2020). Occurrence, prevention, and management of the psychological effects of

emerging virus outbreaks on healthcare workers: rapid review and meta-analysis. *bmj*, 369.

Klimkiewicz, A., Jasionowska, J., Schmalenberg, A., Klimkiewicz, J., Jasińska, A., & Silczuk, A. (2021). COVID19 pandemic-related depression and insomnia among psychiatric patients and the general population. *Journal of Clinical Medicine*, 10(15), 3425.

Kolakowsky-Hayner, S. A., Goldin, Y., Kingsley, K., Alzueta, E., Arango-Lasprilla, J. C., Perrin, P. B., & Constantinidou, F. (2021). Psychosocial impacts of the COVID19 quarantine: a study of gender differences in 59 countries. *Medicina*, 57(8), 789.

Kontis, V., Bennett, J. E., Rashid, T., Parks, R. M., Pearson-Stuttard, J., Guillot, M., & Ezzati, M. (2020). Magnitude, demographics and dynamics of the effect of the first wave of the COVID19 pandemic on all-cause mortality in 21 industrialized countries. *Nature medicine*, 26(12), 1919-1928.

Krystal, Andrew, D., Prather, Aric, A., Ashbrook, Liza H. (2019). The assessment and management of insomnia: an update. *World Psychiatry*, 18(3), 337–352.

Kukihara, H., Yamawaki, N., Uchiyama, K., Arai, S., & Horikawa, E. (2014). Trauma, depression, and resilience of earthquake/tsunami/nuclear disaster survivors of Hiroshima, Japan. *Psychiatry and clinical neurosciences*, 68(7), 524-533.

Kupfer, David, J., Reynolds, Charles, F. (1997). *Management of Insomnia*. *New England Journal of Medicine*, 336(5), 341 - 346.

Kyzer, E. J., Purpura, L. J., Shah, J., Cantos, A., Nordvig, A. S., & Yin, M. T. (2021). Anxiety, depression, insomnia, and trauma-related symptoms following COVID19 infection at long-term follow-up. *Brain, Behavior, & Immunity-Health*, 16, 100315.

- Lahiri, A., Jha, S. S., Acharya, R., Dey, A., & Chakraborty, A. (2021). Correlates of insomnia among the adults during COVID19 pandemic: evidence from an online survey in India. *Sleep medicine*, 77, 66-73.
- Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., ... & Hu, S. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA network open*, 3(3), e203976-e203976.
- Lakdawalla, Z., Hankin, B. L., & Mermelstein, R. (2007). Cognitive theories of depression in children and adolescents: A conceptual and quantitative review. *Clinical child and family psychology review*, 10, 1-24.
- Lam, M. H. B., Wing, Y. K., Yu, M. W. M., Leung, C. M., Ma, R. C., Kong, A. P., ... & Lam, S. P. (2009). Mental morbidities and chronic fatigue in severe acute respiratory syndrome survivors: long-term follow-up. *Archives of internal medicine*, 169(22), 2142-2147.
- Laufer, A., & Shechory Bitton, M. (2021). Gender differences in the reaction to COVID19. *Women & health*, 61(8), 800-810.
- Lavie, P. (2001). Sleep disturbances in the wake of traumatic events. *New England Journal of Medicine*, 345(25), 1825-1832.
- Lee, A. M., Wong, J. G., McAlonan, G. M., Cheung, V., Cheung, C., Sham, P. C., ... & Chua, S. E. (2007). Stress and psychological distress among SARS survivors 1 year after the outbreak. *The Canadian Journal of Psychiatry*, 52(4), 233-240.
- Li, T., Lu, H., Zhang, W. (2021). Clinical observation and management of COVID19 patients. *Emerging Microbes & Infections*, 9(1), 687–690.
- Li, Y., Qin, Q., Sun, Q., Sanford, L. D., Vgontzas, A. N., & Tang, X. (2020). Insomnia and psychological reactions during the COVID19 outbreak in China. *Journal of Clinical Sleep Medicine*, 16(8), 1417-1418.
- Liao, J., Liu, L., Fu, X., Feng, Y., Liu, W., Yue, W., & Yan, J. (2021). The immediate and long-term impacts of the COVID19 pandemic on patients with

obsessive-compulsive disorder: A one-year follow-up study. *Psychiatry research*, 306, 114268.

Liao, Y., Feng, Y., Wang, B., Wang, H., Huang, J., Wu, Y., ... & Sun, H. (2020). Clinical characteristics and prognostic factors of COVID19 patients progression to severe: a retrospective, observational study. *Aging (Albany NY)*, 12(19), 18853.

Lin, L. Y., Wang, J., Ou-Yang, X. Y., Miao, Q., Chen, R., Liang, F. X., ... & Wang, T. (2021). The immediate impact of the 2019 novel coronavirus (COVID19) outbreak on subjective sleep status. *Sleep medicine*, 77, 348-354.

Liu, C., Liu, D., Huang, N., Fu, M., Ahmed, J. F., Zhang, Y., & Guo, J. (2021). The combined impact of gender and age on post-traumatic stress symptoms, depression, and insomnia during COVID19 outbreak in China. *Frontiers in Public Health*, 8, 620023.

Liu, D., Baumeister, R. F., & Zhou, Y. (2021). Mental health outcomes of coronavirus infection survivors: A rapid meta-analysis. *Journal of Psychiatric Research*, 137, 542-553.

Liu, N., Zhang, F., Wei, C., Jia, Y., Shang, Z., Sun, L., & Liu, W. (2020). Prevalence and predictors of PTSS during COVID19 outbreak in China hardest-hit areas: Gender differences matter. *Psychiatry research*, 287, 112921.

Liyanage-Don, N. A., Winawer, M. R., Hamberger, M. J., Agarwal, S., Trainor, A. R., Quispe, K. A., & Kronish, I. M. (2022). Association of depression and COVID-induced PTSD with cognitive symptoms after COVID19 illness. *General Hospital Psychiatry*, 76, 45-48.

Logie, C. H., & Turan, J. M. (2020). How do we balance tensions between COVID19 public health responses and stigma mitigation? Learning from HIV research. *AIDS and Behavior*, 24, 2003-2006.

Lone, S. A., & Ahmad, A. (2020). COVID19 pandemic – an African perspective. *Emerging Microbes & Infections*, 9(1), 1300–1308.

- Longo, L., Shalev, A., Liberzon, I., Marmar, C . (2017). Post-Traumatic Stress Disorder. *New England Journal of Medicine*, 376(25), 2459–2469.
- Ma, Y. F., Li, W., Deng, H. B., Wang, L., Wang, Y., Wang, P. H., ... & Xiang, Y. T. (2020). Prevalence of depression and its association with quality of life in clinically stable patients with COVID19. *Journal of affective disorders*, 275, 145-148.
- Mak, I. W. C., Chu, C. M., Pan, P. C., Yiu, M. G. C., Ho, S. C., & Chan, V. L. (2010). Risk factors for chronic post-traumatic stress disorder (PTSD) in SARS survivors. *General hospital psychiatry*, 32(6), 590-598.
- Mamun, M. A., & Ullah, I. (2020). COVID19 suicides in Pakistan, dying off not COVID19 fear but poverty?–The forthcoming economic challenges for a developing country. *Brain, behavior, and immunity*, 87, 163-166.
- Mandelkorn, U., Genzer, S., Choshen-Hillel, S., Reiter, J., Meira e Cruz, M., Hochner, H., ... & Gileles-Hillel, A. (2021). Escalation of sleep disturbances amid the COVID19 pandemic: a cross-sectional international study. *Journal of Clinical Sleep Medicine*, 17(1), 45-53.
- Mao, J., Wang, C., Teng, C., Wang, M., Zhou, S., Zhao, K., & Wang, Y. (2022). Prevalence and associated factors of PTSD symptoms after the COVID19 epidemic outbreak in an online survey in China: the age and gender differences matter. *Neuropsychiatric Disease and Treatment*, 18, 761.
- Matalon, N., Dorman-Ilan, S., Hasson-Ohayon, I., Hertz-Palmor, N., Shani, S., Basel, D., & Gothelf, D. (2021). Trajectories of post-traumatic stress symptoms, anxiety, and depression in hospitalized COVID19 patients: A one-month follow-up. *Journal of psychosomatic research*, 143, 110399.
- Mattioli, F., Stampatori, C., Righetti, F., Sala, E., Tomasi, C., & De Palma, G. (2021). Neurological and cognitive sequelae of Covid19: a four month follow-up. *Journal of neurology*, 268(12), 4422-4428.

- Maunder, R.G., Lancee, W.J., Balderson, K.E., Bennett, J.P., Borgundvaag, B., Evans, S., Wasylenki, D.A., (2006). Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emerg. Infect. Dis.* 12 (12), 1924–1932.
- Mazza, M. G., Palladini, M., De Lorenzo, R., Bravi, B., Poletti, S., Furlan, R., & Benedetti, F. (2022). One-year mental health outcomes in a cohort of COVID19 survivors. *Journal of psychiatric research*, 145, 118-124.
- Mazza, M. G., Palladini, M., De Lorenzo, R., Magnaghi, C., Poletti, S., Furlan, R., ... & COVID19 BioB Outpatient Clinic Study group. (2021). Persistent psychopathology and neurocognitive impairment in COVID19 survivors: effect of inflammatory biomarkers at three-month follow-up. *Brain, behavior, and immunity*, 94, 138-147.
- Mazza, M.G., De Lorenzo, R., Conte, C., Poletti, S., Vai, B., Bollettini, I., Melloni, E., Furlan, R., Ciceri, F., Rovere-Querini, P., et al. (2020). Anxiety and depression in COVID19 survivors: Role of inflammatory and clinical predictors. *Brain Behav. Immun.*89, 594–600.
- Mc Lean, C.P., Asnaani, A., Litz, B.T., Hofmann, S.G., (2011). Gender differences in anxiety disorders: prevalence, course of illness, comorbidity and burden of illness. *J Psychiatr. Res.* 45 (8), 1027–1035.
- McDermott, L. M., & Ebmeier, K. P. (2009). A meta-analysis of depression severity and cognitive function. *Journal of affective disorders*, 119(1-3), 1-8.
- McGarry, S., Girdler, S., McDonald, A., Valentine, J., Lee, S. L., Blair, E., ... & Elliott, C. (2013). Paediatric health-care professionals: Relationships between psychological distress, resilience and coping skills. *Journal of paediatrics and child health*, 49(9), 725-732.
- Miller, A. H., & Raison, C. L. (2016). The role of inflammation in depression: from evolutionary imperative to modern treatment target. *Nature reviews immunology*, 16(1), 22-34.

- Miller, C. B., Bartlett, D. J., Mullins, A. E., Dodds, K. L., Gordon, C. J., Kyle, S. D., & Grunstein, R. R. (2016). Clusters of insomnia disorder: an exploratory cluster analysis of objective sleep parameters reveals differences in neurocognitive functioning, quantitative EEG, and heart rate variability. *Sleep*, 39(11), 1993-2004.
- Moreno, C., Wykes, T., Galderisi, S., Nordentoft, M., Crossley, N., Jones, N., & Arango, C. (2020). How mental health care should change as a consequence of the COVID19 pandemic. *The lancet psychiatry*, 7(9), 813-824.
- Morin, C. M., Belleville, G., Bélanger, L., & Ivers, H. (2011). The Insomnia Severity Index: psychometric indicators to detect insomnia cases and evaluate treatment response. *Sleep*, 34(5), 601-608.
- Najjar, S., Pearlman, D. M., Alper, K., Najjar, A., & Devinsky, O. (2013). Neuroinflammation and psychiatric illness. *Journal of neuroinflammation*, 10, 1-24.
- Nalbandian, A., Sehgal, K., Gupta, A., Madhavan, M. V., McGroder, C., Stevens, J. S., ... & Wan, E. Y. (2021). Post-acute COVID19 syndrome. *Nature medicine*, 27(4), 601-615.
- Narayan, K. G., Sinha, D. K., & Singh, D. K. (2025). *Handbook of Management of Zoonoses*. Springer.
- Netland, J., Meyerholz, D. K., Moore, S., Cassell, M., & Perlman, S. (2008). Severe acute respiratory syndrome coronavirus infection causes neuronal death in the absence of encephalitis in mice transgenic for human ACE2. *Journal of virology*, 82(15), 7264-7275.
- Nie, X. D., Wang, Q., Wang, M. N., Zhao, S., Liu, L., Zhu, Y. L., & Chen, H. (2021). Anxiety and depression and its correlates in patients with coronavirus disease 2019 in Wuhan. *International Journal of Psychiatry in Clinical Practice*, 25(2), 109-114.

- Norris, M. P., Arnau, R. C., Bramson, R., & Meagher, M. W. (2004). The efficacy of somatic symptoms in assessing depression in older primary care patients. *Clinical Gerontologist*, 27(1-2), 43-57.
- Nzimande, N. P., El Tantawi, M., Zuñiga, R. A. A., Opoku-Sarkodie, R., Brown, B., Ezechi, O. C., & Folayan, M. O. (2022). Sex differences in the experience of COVID19 post-traumatic stress symptoms by adults in South Africa. *BMC psychiatry*, 22(1), 238.
- Ochnik, D., Rogowska, A. M., Arzenšek, A., & Benatov, J. (2022). Longitudinal predictors of coronavirus-related PTSD among young adults from Poland, Germany, Slovenia, and Israel. *International journal of environmental research and public health*, 19(12), 7207.
- Offringa, R., Staples, L., Panic, P., Hakim, B., Van Elzaker, M., Carter, N., & Shin, L. M. (2012). Attenuated Differential Fear Conditioning is a Familial Risk Factor for PTSD. In *Biological Psychiatry* (Vol. 71, No. 8, pp. 304S-304S).
- Okusaga, O., Yolken, R. H., Langenberg, P., Lapidus, M., Arling, T. A., Dickerson, F. B., ... & Postolache, T. T. (2011). Association of seropositivity for influenza and coronaviruses with history of mood disorders and suicide attempts. *Journal of affective disorders*, 130(1-2), 220-225.
- Orrù, G., Bertelloni, D., Diolaiuti, F., Mucci, F., Di Giuseppe, M., Biella, M., ... & Conversano, C. (2021, May). Long-COVID syndrome? A study on the persistence of neurological, psychological and physiological symptoms. In *Healthcare* (Vol. 9, No. 5, p. 575). MDPI.
- Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. *Psychological bulletin*, 129(1), 52.
- Panchal, N., Kamal, R., Orgera, K., Cox, C., Garfield, R., Hamel, L., & Chidambaram, P. (2020). The implications of COVID19 for mental health and substance use. Kaiser family foundation, 21, 1-16.

- Pappa, S., Barmparessou, Z., Athanasiou, N., Sakka, E., Eleftheriou, K., Patrinos, S., & Katsaounou, P. (2022). Depression, insomnia and post-traumatic stress disorder in COVID19 survivors: role of gender and impact on quality of life. *Journal of Personalized Medicine*, 12(3), 486.
- Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V. G., Papoutsis, E., & Katsaounou, P. (2020). Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID19 pandemic: A systematic review and meta-analysis. *Brain, behavior, and immunity*, 88, 901-907.
- Passavanti, M., Argentieri, A., Barbieri, D. M., Lou, B., Wijayarathna, K., Mirhosseini, A. S. F., ... & Ho, C. H. (2021). The psychological impact of COVID19 and restrictive measures in the world. *Journal of affective disorders*, 283, 36-51.
- Paul, A., Nath, T. K., Mahanta, J., Sultana, N. N., Kayes, A. I., Noon, S. J., ... & Paul, S. (2021). Psychological and livelihood impacts of COVID19 on Bangladeshi lower income people. *Asia Pacific Journal of Public Health*, 33(1), 100-108.
- Peiris, J. S. M., Lai, S. T., Poon, L. L. M., Guan, Y., Yam, L. Y. C., Lim, W., ... & Yuen, K. Y. (2003). Coronavirus as a possible cause of severe acute respiratory syndrome. *The lancet*, 361(9366), 1319-1325.
- Pfefferbaum, B., & North, C. S. (2020). Mental health and the Covid19 pandemic. *New England journal of medicine*, 383(6), 510-512.
- Pieh, C., Budimir, S., Delgadillo, J., Barkham, M., Fontaine, J. R., & Probst, T. (2021). Mental health during COVID19 lockdown in the United Kingdom. *Biopsychosocial Science and Medicine*, 83(4), 328-337.
- Pinchoff, J., Santhya, K. G., White, C., Rampal, S., Acharya, R., & Ngo, T. D. (2020). Gender specific differences in COVID19 knowledge, behavior and health effects among adolescents and young adults in Uttar Pradesh and Bihar, India. *PloS one*, 15(12), e0244053.

- Pozza, A., Ragucci, F., Angelo, N. L., Pugi, D., Cuomo, A., Garcia-Hernandez, M. D., & Starcevic, V. (2024). Worldwide prevalence of obsessive-compulsive symptoms during the COVID19 pandemic: A systematic review and meta-analysis. *Journal of Psychiatric Research*.
- Prowse, R., Sherratt, F., Abizaid, A., Gabrys, R. L., Hellemans, K. G., Patterson, Z. R., & McQuaid, R. J. (2021). Coping with the COVID19 pandemic: examining gender differences in stress and mental health among university students. *Frontiers in psychiatry*, 12, 650759.
- Qiu, J., Shen, B., Zhao, M., Wang, Z., Xie, B., & Xu, Y. (2020). A nationwide survey of psychological distress among Chinese people in the COVID19 epidemic: implications and policy recommendations. *General psychiatry*, 33(2), e100213.
- Quan Li, L., Huang, T., qing Wang, Y., ping Wang, Z., Liang, Y., bi Huang, T., ... & ping Wang, Y. (2020). novel coronavirus patients' clinical characteristics, discharge rate and fatality rate of meta-analysis. *Journal of Medical Virology*, pages jmv, 25757-7.
- Rahat, S., Jabin, N., Sarwar, S., & Aziz, T. (2021). A Study on Anxiety, Facility, and Protective Measures of Health Professionals of Bangladesh. *Khazanah Sosial*, 3(3), 186-197.
- Ramani, C., Davis, E. M., Kim, J. S., Provencio, J. J., Enfield, K. B., & Kadl, A. (2020). Post-ICU COVID19 outcomes: a case series. *Chest*, 159(1), 215.
- Ramani, S. L., Samet, J., Franz, C. K., Hsieh, C., Nguyen, C. V., Horbinski, C., & Deshmukh, S. (2021). Musculoskeletal involvement of COVID19: review of imaging. *Skeletal Radiology*, 50, 1763-1773.
- Rapp, S. R., Parisi, S. A., Walsh, D. A., & Wallace, C. E. (1988). Detecting depression in elderly medical inpatients. *Journal of consulting and clinical psychology*, 56(4), 509.

- Renaud-Charest, O., Lui, L. M., Eskander, S., Ceban, F., Ho, R., Di Vincenzo, J. D., & McIntyre, R. S. (2021). Onset and frequency of depression in post-COVID19 syndrome: A systematic review. *Journal of psychiatric research*, 144, 129-137.
- Rodriguez-Besteiro, S., Tornero-Aguilera, J. F., Fernández-Lucas, J., & Clemente-Suárez, V. J. (2021). Gender differences in the COVID19 pandemic risk perception, psychology, and behaviors of Spanish university students. *International Journal of Environmental Research and Public Health*, 18(8), 3908.
- Rogers, J. P., Chesney, E., Oliver, D., Pollak, T. A., McGuire, P., Fusar-Poli, P., ... & David, A. S. (2020). Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections: a systematic review and meta-analysis with comparison to the COVID19 pandemic. *The Lancet Psychiatry*, 7(7), 611-627.
- Roth, T., & Roehrs, T. (2003). Insomnia: epidemiology, characteristics, and consequences. *Clinical cornerstone*, 5(3), 5-15.
- Ruzek, J. I., & Landes, S. J. (2014). Implementation of best practices for management of PTSD and other trauma-related problems.
- Sahebi, A., Nejati-Zarnaqi, B., Moayedi, S., Yousefi, K., Torres, M., & Golitaleb, M. (2021). The prevalence of anxiety and depression among healthcare workers during the COVID19 pandemic: An umbrella review of meta-analyses. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 107, 110247.
- Şahin, M. K., Aker, S., Şahin, G., & Karabekiroğlu, A. (2020). Prevalence of depression, anxiety, distress and insomnia and related factors in healthcare workers during COVID19 pandemic in Turkey. *Journal of community health*, 45(6), 1168-1177.

- Saidi, I., Koumeka, P. P., Batahar, S. A., & Amro, L. (2021). Factors associated with anxiety and depression among patients with Covid19. *Respiratory Medicine*, 186, 106512.
- Salfi, F., Lauriola, M., Tempesta, D., Calanna, P., Socci, V., De Gennaro, L., & Ferrara, M. (2020). Effects of total and partial sleep deprivation on reflection impulsivity and risk-taking in deliberative decision-making. *Nature and science of sleep*, 309-324.
- Sareen, J. (2014). Posttraumatic stress disorder in adults: impact, comorbidity, risk factors, and treatment. *The Canadian Journal of Psychiatry*, 59(9), 460-467.
- Sayed, A. Y., Deshpande, S., & Shukla, B. (2021). Severe childhood obsessive-compulsive disorder precipitated in COVID pandemic. *Bharati Vidyapeeth Medical Journal*, 1(4), 30-32.
- Schimmenti, A., Billieux, J., & Starcevic, V. (2020). The four horsemen of fear: An integrated model of understanding fear experiences during the COVID19 pandemic. *Clinical neuropsychiatry*, 17(2), 41.
- Schou, T. M., Joca, S., Wegener, G., & Bay-Richter, C. (2021). Psychiatric and neuropsychiatric sequelae of COVID19—A systematic review. *Brain, behavior, and immunity*, 97, 328-348.
- Seens, H., Modarresi, S., Fraser, J., MacDermid, J. C., Walton, D. M., & Grewal, R. (2021). The role of sex and gender in the changing levels of anxiety and depression during the COVID19 pandemic: a cross-sectional study. *Women's Health*, 17, 17455065211062964.
- Sekowski, M., Gambin, M., Hansen, K., Holas, P., Hyniewska, S., Wyszomirska, J., & Łojek, E. (2021). Risk of developing post-traumatic stress disorder in severe COVID19 survivors, their families and frontline healthcare workers: what should mental health specialists prepare for?. *Frontiers in psychiatry*, 12, 562899.

- Shah, A., Banner, N., Heginbotham, C., & Fulford, B. (2014). 7. American Psychiatric Association (2013) Diagnostic and Statistical Manual of Mental Disorders, 5th edn. American Psychiatric Publishing, Arlington, VA. 8. Bechara, A., Dolan, S. and Hindes, A.(2002) Decision-making and addiction (Part II): myopia for the future or hypersensitivity to reward? *Neuropsychologia*, 40, 1690–1705. 9. Office of Public Sector Information (2005) The Mental Capacity Act 2005. <http://www. Substance Use and Older People>, 21(5), 9.
- Shalev, A., Liberzon, I., & Marmar, C. (2017). Post-traumatic stress disorder. *New England journal of medicine*, 376(25), 2459-2469.
- Shigemura, J., Ursano, R. J., Morganstein, J. C., Kurosawa, M., & Benedek, D. M. (2020). Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psychiatry and clinical neurosciences*, 74(4), 281.
- Simonetti, V., Durante, A., Ambrosca, R., Arcadi, P., Graziano, G., Pucciarelli, G., & Cicolini, G. (2021). Anxiety, sleep disorders and self-efficacy among nurses during COVID-19 pandemic: A large cross-sectional study. *Journal of clinical nursing*, 30(9-10), 1360-1371.
- Smith, K. M., Renshaw, P. F., & Bilello, J. (2013). The diagnosis of depression: current and emerging methods. *Comprehensive psychiatry*, 54(1), 1-6.
- Sohrabi, C., Alsafi, Z., O'Neill, N., Khan, M., Kerwan, A., Al-Jabir, A., ... & Agha, R. (2020). World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID19). *International journal of surgery*, 76, 71-76.
- Spitzer, R. L., Kroenke, K., & Williams, J. B. (1999). Patient health questionnaire.
- Struyf, T., Deeks, J. J., Dinnes, J., Takwoingi, Y., Davenport, C., Leeftang, M. M., ... & Cochrane COVID19 Diagnostic Test Accuracy Group. (2022). Signs and symptoms to determine if a patient presenting in primary care or hospital

outpatient settings has COVID-19. Cochrane database of systematic reviews, (5).

Sumner, J. (2016). PTSD signs and symptoms. SCAD Alliance.

Talevi, D., Socci, V., Carai, M., Carnaghi, G., Faleri, S., Trebbi, E., ... & Pacitti, F. (2020). Mental health outcomes of the Covid19 pandemic. *Rivista di psichiatria*, 55(3), 137-144.

Tang, W., Hu, T., Hu, B., Jin, C., Wang, G., Xie, C., & Xu, J. (2020). Prevalence and correlates of PTSD and depressive symptoms one month after the outbreak of the COVID19 epidemic in a sample of home-quarantined Chinese university students. *Journal of affective disorders*, 274, 1-7.

Tanne, J. H., Hayasaki, E., Zastrow, M., Pulla, P., Smith, P., & Rada, A. G. (2020). Covid19: how doctors and healthcare systems are tackling coronavirus worldwide. *Bmj*, 368.

Taquet, M., Geddes, J. R., Husain, M., Luciano, S., & Harrison, P. J. (2021). 6-month neurological and psychiatric outcomes in 236 379 survivors of COVID19: a retrospective cohort study using electronic health records. *The Lancet Psychiatry*, 8(5), 416-427.

Taquet, M., Luciano, S., Geddes, J. R., & Harrison, P. J. (2021). Bidirectional associations between COVID19 and psychiatric disorder: retrospective cohort studies of 62 354 COVID19 cases in the USA. *The Lancet Psychiatry*, 8(2), 130-140.

Tarsitani, L., Vassalini, P., Koukopoulos, A., Borrazzo, C., Alessi, F., Di Nicolantonio, C., & d'Ettorre, G. (2021). Post-traumatic stress disorder among COVID19 survivors at 3-month follow-up after hospital discharge. *Journal of general internal medicine*, 36, 1702-1707.

Tsukamoto, R., Kataoka, Y., Mino, K., Ishibashi, N., Shibata, M., Matsuo, H., & Fujiwara, H. (2021). Gender differences in anxiety among COVID19 inpatients

- under isolation: a questionnaire survey during the first and second waves of the COVID19 pandemic in Japan. *Frontiers in public health*, 9, 708965.
- Vai, B., Mazza, M. G., Colli, C. D., Foiselle, M., Allen, B., Benedetti, F., ... & De Picker, L. J. (2021). Mental disorders and risk of COVID19-related mortality, hospitalisation, and intensive care unit admission: a systematic review and meta-analysis. *The Lancet Psychiatry*, 8(9), 797-812.
- Van Loo, H. M., De Jonge, P., Romeijn, J. W., Kessler, R. C., & Schoevers, R. A. (2012). Data-driven subtypes of major depressive disorder: a systematic review. *BMC medicine*, 10, 1-12.
- Vance, M. C., Kovachy, B., Dong, M., & Bui, E. (2018). Peritraumatic distress: A review and synthesis of 15 years of research. *Journal of Clinical Psychology*, 74(9), 1457-1484.
- Vance, M. C., Kovachy, B., Dong, M., & Bui, E. (2018). Peritraumatic distress: A review and synthesis of 15 years of research. *Journal of Clinical Psychology*, 74(9), 1457-1484.
- Vargas, I., Garland, S. N., Kloss, J. D., & Perlis, M. L. (2019). Insomnia and psychiatric disorders. In *Sleep and Health* (pp. 373-389). Academic Press.
- Varshney, M., Parel, J. T., Raizada, N., & Sarin, S. K. (2020). Initial psychological impact of COVID19 and its correlates in Indian Community: An online (FEEL-COVID) survey. *PloS one*, 15(5), e0233874.
- Verma, S., & Mishra, A. (2020). Depression, anxiety, and stress and socio-demographic correlates among general Indian public during COVID19. *International Journal of Social Psychiatry*, 66(8), 756-762.
- Vesga-Lopez, O., Blanco, C., Keyes, K., Olfson, M., Grant, B. F., & Hasin, D. S. (2008). Psychiatric disorders in pregnant and postpartum women in the United States. *Archives of general psychiatry*, 65(7), 805-815.

- Vindegaard, N., & Benros, M. E. (2020). COVID19 pandemic and mental health consequences: Systematic review of the current evidence. *Brain, behavior, and immunity*, 89, 531-542.
- Voitsidis, P., Gliatas, I., Bairachtari, V., Papadopoulou, K., Papageorgiou, G., Parlapani, E., ... & Diakogiannis, I. (2020). Insomnia during the COVID19 pandemic in a Greek population. *Psychiatry research*, 289, 113076.
- Wadsworth, L. P., Van Kirk, N., August, M., Kelly, J. M., Jackson, F., Nelson, J., & Luehrs, R. (2023). Understanding the overlap between OCD and trauma: Development of the OCD trauma timeline interview (OTTI) for clinical settings. *Current Psychology*, 42(9), 6937-6947.
- Wan, S., Xiang, Y. I., Fang, W., Zheng, Y., Li, B., Hu, Y., ... & Yang, R. (2020). Clinical features and treatment of COVID-19 patients in northeast Chongqing. *Journal of medical virology*, 92(7), 797-806.
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID19) epidemic among the general population in China. *International journal of environmental research and public health*, 17(5), 1729.
- Wang, D., Zhao, J., Zhai, S., Ye, H., Bu, L., & Fan, F. (2022). Does sleep disturbance predicts posttraumatic stress disorder and depression among college students during COVID19 lockdown? A longitudinal survey. *Frontiers in Public Health*, 10, 986934.
- Wang, P. S., Aguilar-Gaxiola, S., Alonso, J., Angermeyer, M. C., Borges, G., Bromet, E. J., ... & Wells, J. E. (2007). Use of mental health services for anxiety, mood, and substance disorders in 17 countries in the WHO world mental health surveys. *The Lancet*, 370(9590), 841-850.

- Warner, C. H., Warner, C. M., Appenzeller, G. N., & Hoge, C. W. (2013). Identifying and managing posttraumatic stress disorder. *American family physician*, 88(12), 827-834.
- Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). The ptsd checklist for dsm-5 (pcl-5).
- Winkel, A. F., Robinson, A., Jones, A. A., & Squires, A. P. (2019). Physician resilience: a grounded theory study of obstetrics and gynaecology residents. *Medical education*, 53(2), 184-194.
- World Health Organization. (2020). Mental health and psychosocial considerations during the COVID19 outbreak, 18 March 2020. In *Mental health and psychosocial considerations during the COVID19 outbreak*, 18 March 2020.
- Wrenn, G. L., Wingo, A. P., Moore, R., Pelletier, T., Gutman, A. R., Bradley, B., & Ressler, K. J. (2011). The effect of resilience on posttraumatic stress disorder in trauma-exposed inner-city primary care patients. *Journal of the National Medical Association*, 103(7), 560-566.
- Wright, K. M., Britt, T. W., Bliese, P. D., Adler, A. B., Picchioni, D., & Moore, D. (2011). Insomnia as predictor versus outcome of PTSD and depression among Iraq combat veterans. *Journal of clinical psychology*, 67(12), 1240-1258.
- Wu, K. K., Lee, D., Sze, A. M., Ng, V. N., Cho, V. W., Cheng, J. P., & Tsang, O. T. (2022). Posttraumatic stress, anxiety, and depression in COVID19 survivors. *East Asian Archives of Psychiatry*, 32(1), 5-10.
- Wu, Y., Fan, L., Xia, F., Zhou, Y., Wang, H., Feng, L., ... & Chen, L. (2024). Global, regional, and national time trends in incidence for depressive disorders, from 1990 to 2019: an age-period-cohort analysis for the GBD 2019. *Annals of General Psychiatry*, 23(1), 28.
- Wu, Y., Xu, X., Chen, Z., Duan, J., Hashimoto, K., Yang, L., ... & Yang, C. (2020). Nervous system involvement after infection with COVID19 and other coronaviruses. *Brain, behavior, and immunity*, 87, 18-22.

- Xiang, Y. T., Yang, Y., Li, W., Zhang, L., Zhang, Q., Cheung, T., & Ng, C. H. (2020). Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *The lancet psychiatry*, 7(3), 228-229.
- Xiao, S., Luo, D., & Xiao, Y. (2020). Survivors of COVID19 are at high risk of posttraumatic stress disorder. *Global health research and policy*, 5(1), 29.
- Ya'qoub, L., Elgendy, I. Y., & Pepine, C. J. (2021). Sex and gender differences in COVID19: More to be learned!. *American heart journal plus: cardiology research and practice*, 3, 100011.
- Yaryura-Tobias, J. A. (1998). The unified theory of obsessive-compulsive disorder. *CNS Spectrums*, 3(7), 54-60.
- Yehuda, R. (2002). Post-traumatic stress disorder. *New England journal of medicine*, 346(2), 108-114.
- Young, J. E., Klosko, J. S., & Weishaar, M. E. (2006). *Schema therapy: A practitioner's guide*. guilford press.
- Yunitri, N., Chu, H., Kang, X. L., Jen, H. J., Pien, L. C., Tsai, H. T., & Chou, K. R. (2022). Global prevalence and associated risk factors of posttraumatic stress disorder during COVID19 pandemic: A meta-analysis. *International journal of nursing studies*, 126, 104136.
- Zamarro, G., Perez-Arce, F., & Prados, M. J. (2020). Gender differences in the impact of COVID19. *KTLA*.
- Zandifar, A., Badrfam, R., Yazdani, S., Arzaghi, S. M., Rahimi, F., Ghasemi, S., & Qorbani, M. (2020). Prevalence and severity of depression, anxiety, stress and perceived stress in hospitalized patients with COVID19. *Journal of Diabetes & Metabolic Disorders*, 19, 1431-1438.
- Zitting, K. M., Lammers-Van Der Holst, H. M., Yuan, R. K., Wang, W., Quan, S. F., & Duffy, J. F. (2021). Google Trends reveals increases in internet searches for

insomnia during the 2019 coronavirus disease (COVID19) global pandemic.
Journal of Clinical Sleep Medicine, 17(2), 177-184.

BIO-DATA

1. Name : Vida Lalrinchhani
2. Father's Name : R. Lalsanglura
3. Mother's Name : R. Sanghnuni
4. Date of Birth : 18th February, 1988
5. Address : M-230, Mualpui Bethel,
Aizawl, Mizoram – 796005
6. Contact : 7030548520
7. Email : vidalalrinchhani@gmail.com
8. Professional Qualification :

B.Sc (N)	Mizoram College of Nursing Falkawn, Mizoram	2011
M.Sc(N)	Smt. Radhikabai Meghe Memorial College of Nursing, DMIMS DU, Sawangi, Wardha, Maharashtra	2016

9. Profession : Senior Nursing Officer, ZMC

RESEARCH EXPERIENCE

* International Conference on "Relevance of Psychology in Pandemic Condition & Its Impact on Well-Being in the Digital World" organized by Indian Academy of Applied Psychology (IAAP) at Mizoram 27th – 29th January, 2022.

* Best Paper Award for the paper titled “Insomnia and Depression among COVID19 Survivors: A Comparative study of COVID19 Victims and Non-COVID patients” at 57th National & 26th International Conference of Indian Academy of Applied Psychology (IAAP) organized by the Department of Clinical Psychology and Psychology, Mizoram University on 27th – 29th January, 2022.

* International Conference on "Emerging Trends in Psychological Interventions Future Prospects and Challenges" organized by School of Medical and Paramedical Sciences at Mizoram University, 14th - 16th November, 2023.

* International Conference on "Multidisciplinary Perspectives on Human Development and Learning: Navigating the Nexus of Education, Psychology, Business, Language and Philosophy organized by Assumption University of Thailand and Asia Pacific School Psychology Association at Assumption University, 28th – 30th, November, 2024.

* International Conference on "Substance Use Disorder: Global Perspectives, Local Challenges and Integrated Solutions organized by School of Medical and Paramedical Sciences, Mizoram University on 29th - 30th May, 2025.

RESEARCH PUBLICATION

* Vida Lalrinchhani & Geeta Das (2023). Insomnia and Depression among COVID19 Survivors: A Comparative Study of COVID19 Survivors and Non-COVID19 Patients. Contemporary Social Scientist (CSS) Journal, MZU. Vol. 15, Issue 2, ISSN No: 2230 – 956X, 2023.

* Vida Lalrinchhani & Geeta Das (2024). Prevalence and Correlates of Post-Traumatic Stress Disorder and Insomnia Disorder on Post- COVID19 Patients: A Comparative Study. Mizoram Education Journal, MZU (A National Refereed Journal) Vol. X, Issue 1, March, 2024 & Vol. X, Issue 2, June, 2024.



Certificate of Participation

This Certificate is presented to



Vida Lalrinchhani

for presenting a paper on the topic

Post-Traumatic Stress Disorder Prediction to Insomnia
and Depression among Post COVID-19 Patients

in the 6th APSPA International Conference held on 28th-30th November 2024,
Assumption University of Thailand, Bangkok, Thailand

Vichitorn Danyat

Dr. Kitikorn Dowpiset
Dean, Graduate School of Human Sciences,
Assumption University

Panch Ramalingam

Prof. Panch Ramalingam
President,
APSPA



57th NATIONAL & 26th INTERNATIONAL CONFERENCE
OF

INDIAN ACADEMY OF APPLIED PSYCHOLOGY (IAAP)

Virtual conference

Relevance of psychology in pandemic condition & it's impact on well-being in the digital world.

Certificate of Participation

This Certificate is awarded to

Dr/Mr/Mrs/ Ms Vida Lalrinchhani

For presenting paper, titled - Insomnia and Depression among COVID-19 Survivors: A Comparative study of COVID-19 victims and non-Covid patients

Co-authored by Prof. Zokaitluangi

in the 57th National & 26th International Conference
of the Indian Academy of Applied Psychology (RCI - Accredited), organised jointly by
the Department of Clinical Psychology and Department of Psychology, Mizoram University,
from 27th January to 29th January, 2022.


Prof MVR Raju
President
IAAP


Dr. Surendran Veeraiah
Secretary
IAAP


Dr. Thiyan Kiran Singh
Organising Chairperson


Dr. Laxmi Narayan Rathore
Organising Secretary



Rehabilitation Council of India

Insomnia and Depression among COVID-19 Survivors: A Comparative Study of COVID-19 Survivors and Non-COVID-19 Patients

¹ Vida Lalrinchhani

² Geeta Das

Abstract

The uncertainty, predictability, and lack of effective treatment with medical facilities of COVID-19 capture a reasonable cognitive response to COVID-19 patients, and mortality trends add up to a health crisis. The sudden outbreak of Coronavirus-19 disease (COVID-19) is transforming the psychology and interpersonal relationships across the country which can be overwhelming and gradually move towards negative emotions such as stress, anxiety and depression resulting in social discontent and mental health illness (Shigemura et al., 2020) including Insomnia, Post-traumatic Stress Disorder, Depression, and obsessive-compulsive disorder among the COVID-19 survivors. The present study examined the COVID-19 effects, and gender differences on depression and insomnia, and a positive correlation between insomnia and depression was found. Data was collected from 100 COVID-19 survivors and 100 non-COVID Patients comprised of an equal number of males and females; COVID-19 survivors and 100 non-COVID Patients shared the same demographic variable as far as possible; the Patient Health Questionnaire (PHQ-9-Depression Severity Scale, Spitzer et al., 1999) and Insomnia Severity Index (Morin, C.M, 2016) were employed. Results highlighted the COVID-19 effects and gender effects on depression and insomnia and positive correlation between insomnia and depression. Results evinced the need for psychological care for COVID-19 survivors.

Keywords: COVID-19, physical health, mental health, depression, trauma, etc.

¹Vida Lalrinchhani, Ph D Research Student in the Department of Clinical Psychology, Mizoram University.

² Prof. Geeta Das, Principal, Regional College of Nursing, Gwahati.

Introduction: Coronavirus disease 2019 (COVID-19) is an ongoing 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 include Fever, Cough, Fatigue, Shortness of breath, Expectoration, Myalgia, Rhinorrhea, Sore throat, Diarrhea, Anosmia or Ageusia preceding the onset of respiratory symptoms. Older people and immune-suppressed

patients in particular may present with atypical symptoms such as fatigue, reduced alertness, reduced mobility, diarrhoea, loss of appetite, delirium, and absence of fever. Children might not have reported fever or cough as frequently as adults. All viruses, including SARS-CoV-2, which 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. Till now, five variants of COVID-19 have been defined by WHO.

The first COVID-19 case in Mizoram, India was declared on 26th March 2020 while the first fatality was reported on 28th October 2020. The first outbreak of COVID-19 in Mizoram started in 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 October and as of 26th November 2020, it is still an ongoing outbreak with a trend declining of active cases.

Relevant studies:

The COVID-19 pandemic resulting an economic recession that negatively affected many people's mental health, about 4 in 10 adults in the U.S. have reported symptoms of anxiety or depressive disorder; also found that many adults are reporting difficulty in sleeping (36%) or eating at 32% (Panchal et al., 2021)

Depression is recognized as one of the main factors that lead to disability in contemporary societies (Dong et al., 2020; Nuggerud-Galeas et al., 2020) especially among people who experienced epidemics or natural disasters (Lee et al., 2018; Mak et al., 2009; Morganstein & Ursano, 2020). Experiencing harsh events in life predicted anxiety, stress, and depression (Zou et al., 2018).

The World Health Organization (WHO) named the disease Corona Virus Disease 2019 (COVID-19; Wu et al., 2020) was first discovered in the city of Wuhan (China) in 2019 with remarkable rapid expansion around the world reaching a pandemic level (Rothan & Byrareddy, 2020). This pathogen has become the worst health, social, and economic problems for the world (Nicola et al., 2020) has invited several studies to look at its impact on psychological disorders such as depression (Duan & Zhu, 2020; Gao et al., 2020; Huang

& Zhao, 2020). Depression is a disorder made up of symptoms associated with low morale—despair, sadness, self-depreciation, and worthlessness—leading to reduced self-esteem and lack of interest in life. The disorder is closely linked to a lower probability of achieving significant life goals for those who suffer from it, with worsening health and suicide attempts (Antúnez & Vinet, 2012; Roh et al., 2020; Siegrist & Wege, 2020; Zhuo et al., 2020). The uncertainty about how it is spread, its evolution or the immunity of patients who have been infected, or the absence of a vaccine to counter the disease, have led to an increased feeling of fear (Orellana & Orellana, 2020; Ornell et al., 2020; Rodríguez-Rey et al., 2020) with its severe global threat affects human survival, health, well-being, and development. Many studies observed that fear of COVID-19 associated received through the media initiates the development of mood disorders (Duan & Zhu, 2020; Gao et al., 2020) which was evidenced by the Chinese researcher's findings of moderate and severe symptoms of anxiety, stress, and depression in the Chinese population (Huang & Zhao, 2020). The symptoms of anxiety and depression is increased by social distancing and lockdown laws (Chen et al., 2020a; Mazza et al., 2020; Santini et al., 2020). A few similar studies were carried out in other countries which show women to be more vulnerable to these disorders (Huang & Zhao, 2020; Sandín et al., 2020). Depression was directly and positively related by stress levels and indirectly through fear of COVID-19 and stress, mediated by the level of anxiety (Ahorsu et al., 2020; Alyami et al., 2020; Tzur Bitan et al., 2020); and diagnosed with COVID 19 had greater insomnia compared to those without such a diagnosis (Taylor et al., 2021); and insomnia is common in subjects with depression as it usually follows depressive illness and its duration is positively correlates with duration and frequency of depressive episodes (Gupta & Lahan, 2011).

Objectives:

Looking the needs and situation of the targeted population and the studies provided, the present study aims to examine:

- 1) The different levels of depression and insomnia among the COVID-19 survivors than non-COVID-19 patients.
- 2) Any relationship between depression and insomnia,
- 3) Any significant effects of COVID-19 and gender on depression and insomnia.

Hypothesis:

To meet the objectives of the present study, the following hypotheses were framed:

- 1) The COVID-19 survivors will have a higher depression and insomnia than non-COVID-19 patients
- 2) There will be a positive relationship between depression and insomnia,
- 3) There will be an independent significant effect of COVID-19 and gender on depression and insomnia.

Methodology: The present study followed the following methodology for carrying out.

Sample: Samples comprises of 100 COVID-19 survivors and 100 non-COVID-19 patients having equal representation of male and female (50 female and 50 male). The COVID-19 survivors who were identified from ZMC run by the Government of Mizoram, age range between 25 to 60 years who have taken treatment at the hospital for more than 10 days served as samples. The non-COVID-19 patients matched the COVID-19 survivors on demographic variables except for those not affected by COVID-19 but admitted to the same hospital for other physical illnesses and taken treatments for more than 10 days served as control group for the comparison with the COVID-19 survival patients.

Tool used: The present study used:

- 1) The Patient Health Questionnaire (PHQ-9-Depression Severity Scale, Spitzer et al., 1999)
- 2) Insomnia Severity Index (Morin, C.M, 1993) to ascertain the psychological condition of the samples.

Research Design: The present study employed 2 x 2 factorial design which represents 2 types of patients (100 COVID-19 Survivors and 100 non-COVID-19 patients) and 2 gender (100 male and 100 female)

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

Results: The raw data was screened for missing and outlier, and psychometric properties for the targeted population. Results provided that the skewness, and kurtosis (range between -.68 to .22) were within the normal range, high reliability ($\alpha=.82$; .90), and Levene's Test of homogeneity (.00**) was significant which indicates that parametric statistics can be used for further analysis of the results.

The mean difference between the groups showed that Female COVID-19 survivors scored highest on Depression ($M=27.30$) followed by Male COVID-19 survivors ($M=22.26$), Female non COVID-19 patients ($M=20.50$) and Male non COVID-19 patients ($M=19.00$). The same trend was found in Insomnia Female COVID-19 survivors scored the highest ($M=26.38$) followed by Male COVID-19 survivors ($M=23.17$), Female non COVID-19 patients ($M=21.46$) and Male non COVID-19 patients ($M=20.00$). The findings were in line with the first hypothesis of the study as COVID-19 survivors had higher depression and insomnia (Duan and Zhu, 2020; Gao et al., 2020) as founded by Chinese researchers that high anxiety, stress, and depression in the Chinese population (Huang and Zhao, 2020).

Pearson's correlation was calculated to examine the relationship-dependent variables- Depression and Insomnia that showed a positive significant relationship ($r=.78^{**}$) indicating depression was accompanied by insomnia. This finding was inconsistent with the earlier findings that Depression was directly and positively related to stress levels and indirectly through fear of COVID-19 and stress, mediated by the level of anxiety (Ahorsu et al., 2020; Alyami et al., 2020; Tzur Bitan et al., 2020); and women are more vulnerable to these disorders (Huang and Zhao, 2020; Sandín et al., 2020).

Two-way ANOVA results revealed the effects of COVID-19 on depression with 39% ($\text{Eta sq}=.39^{**}$) significant at .01 level and on Insomnia. 22 % ($\text{Eta sq}=.22^{**}$) significant at .01 level; Gender effects on Insomnia was 25% ($\text{Eta sq}=.25^{**}$) significant at .01 level and on Depression was 46% ($\text{Eta sq}=.46^{**}$) significant at .01 level. The effects of COVID-19 and Gender on depression and Insomnia were also found that many adults are reporting difficulty in sleeping (36%) or eating (32%) (Panchal et al., 2021).

Table: Showing descriptive, reliability, correlation and ANOVA on dependent Depression and Insomnia variables for the samples.				
COVID-19	Gender	Statistics	Depression	Insomnia
COVID19 Survivor	Female COVID19 survivor	Mean	27.30	26.38
		SD	2.92	2.09
		Skewness	-0.22	-0.06
		Kurtosis	-0.84	-0.38
	Male COVID19 Survivor	Mean	22.26	23.17
		SD	2.90	2.99
		Skewness	-0.13	-0.27
		Kurtosis	-0.48	-0.93
Non COVID Patient	Female Non COVID Patients	Mean	20.50	21.46
		SD	2.62	1.62
		Skewness	-0.15	-0.62
		Kurtosis	0.07	-0.12
	Male Non COVID Patients	Mean	19.00	20.00
		SD	4.03	3.08
		Skewness	0.22	0.05
		Kurtosis	-0.55	-0.68
Reliability Alpha (α)			.82	.90
Homogeneity test (Levene's Test)			.00	.00
Pearson's Correlation between Depression and Insomnia			r =.78**	
ANOVA	IV	DV		
	COVID19	Depression	F=131.81; Eta sq =.35**	
	Gender		F=332.60; Eta sq=25**	
	COVID19	Insomnia	F=110.14; Eta sq = 22**	
	Gender		F=341.52; Eta sq =.46**	
**= significant at .01level; *=significant at .05 level				

Discussion:

The present study entitled, “Insomnia and Depression among COVID-19 Survivors: A Comparative Study of COVID-19 Survivors and non-COVID-19Patients” was conducted to examine (i) The different levels of depression and insomnia among the COVID-19 survivors than non COVID-19 patients (ii)Any relationship between depression and insomnia (iii)Any significant effects of COVID-19 and gender on depression and insomnia with having hypotheses: (i) The COVID-19 survivors will have a higher depression and insomnia than non COVID-19 patients (ii) There will be a positive relationship between depression and insomnia (iii)There will be an independent significant effects of COVID-19 and gender on depression and insomnia. Two hundred samples which comprised of 100 COVID-19

survivors and 100 non-COVID-19 patients having equal representation of male and female (50 female and 50 male) each served as samples. Selected Psychological tools; (i) The Patient Health Questionnaire (PHQ-9-Depression Severity Scale, Spitzer et al., 1999) and (ii) Insomnia Severity Index (Morin, C.M, 2016) were used. The design was a 2 x 2 factorial design which represents 2 types of patients (100 COVID-19 Survivors and 100 non-COVID-19 patients) and 2 genders (100 male and 100 female). Results accepted the hypotheses and met the objectives of the study that COVID-19 survivors scored highest on Depression and Insomnia than non-COVID-19 patients; Depression and Insomnia showed a positive significant relationship: and the independent effects of COVID-19 and gender on depression with 39% was found. The results portrayed the psychological condition of the COVID-19 survivors which suggested their need for Psychological interventions on depression and insomnia.

Significance of the study: The present study contributed to the academic knowledge on COVID-19-related Psychological problems, especially on the level of depression and insomnia and the high need for psychological interventions for the same; and also provided the lack of authentic research findings.

Limitation: The present study was not able to take a large sample and more psychological and demographic variables which are very much needed due to time constraints.

Acknowledgement: The researchers felt their indebtedness to the participants and authorities knowing through their help only this present study could be done and completed.

Ethical consideration: The research strictly followed the APA research ethics (2002; 2017) and got clearance from the Mizoram University Human Ethics Committee.

Declaration: The present study is an extract of PhD thesis of Vida Lalrinchhani who is the main author, not published in any form for any other purposes.

Reference:

- Ahorsu, D. K., Lin, C. Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The Fear of COVID-19 Scale: development and initial validation. *Int. J. Ment. Heal. Addict.* 1–9.

- Alyami, M., Henning, M., Krägeloh, C. U., & Alyami, H. (2020). Psychometric evaluation of the Arabic version of the Fear of COVID-19 Scale. *Int. J. Ment. Heal. Addict.* 1–14.
- Antúnez, Z., & Vinet, E. V. (2012). *Escalas de depresión, ansiedad y Estrés (DASS-21): Validación de la Versión abreviada en Estudiantes Universitarios Chilenos*. Ter. Psicol. 30, 49–55.
- Dong, L., Freedman, V. A., and de Leon, C. F. M. (2020). The association of comorbid depr
- Beck A. T., & Beck R. W. (1972). Screening depressed patients in family practice. A rapid technique. *Postgraduate Medicine*. 1972;52:81–85.
- Disorder Checklist for DSM-5 (PCL-5): Development and initial psychometric evaluation. *Journal of Traumatic Stress*, 28, 489–498.
- Duan, L., and Zhu, G. (2020). Psychological interventions for people affected by the COVID-19 epidemic. *Lancet Psychiatry* 7, 300–302.
- Gao, J., Zheng, P., Jia, Y., Chen, H., Mao, Y., Chen, S., et al. (2020). *Mental health problems and social media exposure during COVID-19 outbreak*. PLoS One 15:e0231924. doi: 10.1371/journal.pone.0231924.
- Gupta, R & Lahan, V. (2011). Insomnia associated with depressive disorder: primary, secondary, or mixed?. *Indian J Psychol Med*. 2011 Jul;33(2):123-8.
- Huang, Y., & Zhao, N. (2020). Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. *Psychiatry Res*. 288:112954. doi: 10.1016/j.psychres.2020.112954
- Lee, S. M., Kang, W. S., Cho, A. R., Kim, T., & Park, J. K. (2018). Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. *Compr. Psychiatry* 87, 123–127.
- Mak, I. W. C., Chu, C. M., Pan, P. C., Yiu, M. G. C., & Chan, V. L. (2009). Long-term psychiatric morbidities among SARS survivors. *Gen. Hosp. Psychiatry* 31, 318–326.
- Morin CM. (1993) *Insomnia: Psychological assessment and management*. New York: Guilford Press.
- Morganstein, J. C., & Ursano, R. J. (2020). Ecological disasters and mental health: causes, consequences, and interventions. *Front. Psychol.* 11:1.
- Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., et al. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): a review. *Int. J. Surg.* 78, 185–193
- NubMed Abstract | CrossRef Full Text | Google Scholar Orellana, C. I., & Orellana, L. M. (2020). Predictores de síntomas emocionales durante la cuarentena domiciliar por pandemia de COVID-19 en El Salvador. *Actual. Psicol.* 34, 103–120.
- Nuggerud-Galeas, S., Oliván Blázquez, B., Perez Yus, M. C., Valle-Salazar, B., Agular-Latorre, A., & Magallón Botaya, R. (2020). Factors associated with depressive episode recurrences in primary care: a retrospective, descriptive study. *Front. Psychol.* 11:1230.
- Ornell, F., Schuch, J. B., Sordi, A. O., & Kessler, F. H. P. (2020). “Pandemic fear” and COVID-19: mental health burden and strategies. *Braz. J. Psychiatry* 42, 232–235.
- Panchal, N., Kamal, R., Co, C., & Garfield, R. (2021). The Implications of COVID-19 for Mental Health and Substance Use, <https://www.kff.org/coronavirus-covid-19>.

- Rodriguez-Morales, A. J., Gallego, V., Escalera-Antezana, J. P., Méndez, C. A., Zambrano, L. I., Franco-Paredes, C., et al. (2020). *COVID-19 in Latin America: the implications of the first confirmed case in Brazil*. *Travel Med. Infect. Dis.* 35:101613.
- Rodríguez-Rey, R., Garrido-Hernansaiz, H., & Collado, S. (2020). Psychological impact and associated factors during the initial stage of the Coronavirus (COVID-19) pandemic among the general population in Spain. *Front. Psychol.* 11:1540.
- Roh, S. C., Kim, J. S., Kim, S., Kim, Y., & Lee, S. H. (2020). Frontal alpha asymmetry moderated by suicidal ideation in patients with major depressive disorder: a comparison with healthy individuals. *Clin. Psychopharmacol. Neurosci.* 18:58.
- Rothan, H. A., & Byrareddy, S. N. (2020). The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J. Autoimmun.* 109:102433. doi: 10.1016/j.jaut.2020.102433
- Sandín, B., Valiente, R. M., García-Escalera, J., & Chorot, P. (2020). Impacto psicológico de la pandemia de COVID-19: Efectos negativos y positivos en población española asociados al periodo de confinamiento nacional. *Rev. de Psicopatol. y Psicol. Clin.* 25:1–22.
- Siegrist, J., & Wege, N. (2020). Adverse psychosocial work environments and depression—a narrative review of selected theoretical models. *Front. Psychol.* 66:11.
- Slavich, G. M., & Irwin, M. R. (2014). From stress to inflammation and major depressive disorder: a social signal transduction theory of depression. *Psychol. Bull.* 140, 774–815.
- Spitzer, R.L., Kroenke, K., & Williams, J.B.W. (1999). Patient Health Questionnaire Study Group. Validity and utility of a self-report version of PRIME-MD: the PHQ Primary Care Study. *JAMA.* 1999;282:1737–44
- Taylor, E., Cloonan, S., Grandner, M., & Killgore, W. (2021). Insomnia in Those Diagnosed with COVID-19. *Sleep*, Volume 44, Issue Supplement_2, May 2021, Pages A280–A281, <https://doi.org/10.1093/sleep/zsab072.717>.
- Tzur Bitan, D., Grossman-Giron, A., Bloch, Y., Mayer, Y., Shiffman, N., & Mendlovic, S. (2020). Fear of COVID-19 Scale: psychometric characteristics, reliability and validity in the Israeli population. *Psychiatry Res.* 289:113100.
- Zhuo, L. B., Yao, W., Yan, Z., Giron, M. S., Pei, J. J., & Wang, H. X. (2020). Impact of effort reward imbalance at work on suicidal ideation in ten European countries: the role of depressive symptoms. *J. Affect. Disord.* 260, 214–221.
- Zou, P., Sun, L., Yang, W., Zeng, Y., Chen, Q., Yang, H., et al. (2018). Associations between negative life events and anxiety, depressive, and stress symptoms: a cross-sectional study among Chinese male senior college students. *Psychiatry Res.* 270, 26–33

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

¹ Vida Lalrinchhani

² Geeta Das

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 study in 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 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; Hensen et al, 2010) and (ii) Insomnia Severity Index (Morin, C.M, 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 as well as 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 that the dreadfulness of the COVID-19 pandemic and the survivors need psychological support much more than other patients.

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

¹ Vida Lalrinchhani, Ph.D. Scholar, Department of Clinical Psychology, Mizoram University.

² Geeta Das, Principal, Regional College of Nursing, Guwahati.

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 include Fever, Cough, Fatigue, Shortness of breath, Expectoration, Myalgia, Rhinorrhea, Sore throat, Diarrhea, Anosmia or Ageusia preceding the onset of respiratory symptoms. Older people and immune-suppressed patients in particular may present with atypical symptoms such as fatigue, reduced alertness, reduced mobility, diarrhoea, loss of appetite, delirium, and absence of fever. Children might not have 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 book mainly describes the incidence of COVID-19 in Mizoram between 26th March 2020 to 26th November 2020. The first outbreak of COVID-19 in Mizoram started in 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 October and as of 26th November 2020, it is still an ongoing outbreak with a trend declining of active cases.

Due to its swift growth and high death rate, the current coronavirus disease 2019 (COVID-19) outbreak has caused major disruptions and is considered a global emergency. The total number of afflicted by coronavirus 2 (SARS-CoV2), continues to propagate quickly across the world due to severe acute respiratory syndrome. COVID-19 patients can 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 are admitted to the hospital is worrying. Especially, female and those having mental disorders are at a greater risk for acquiring this Post-Traumatic Stress Disorder. Health personnel who are treating COVID-19 patients should consider screening for Post-Traumatic Stress Disorder while performing assessments in patients before discharge (Tarsitani et al., 2021). As, neuropsychiatric clinical manifestations, especially those that are related with Post-Traumatic Stress Disorder may aggravate as time goes by in post COVID-19 patients (Kyzar et al., 2021)

Trauma-exposed disturbed sleep and greater rates than the general population (Milanek et al., 2019; Neylan et al., 1998) which include difficulty initiating and maintaining sleep (Neylan et al., 1998) sleep-disruptive behaviours (Mysliwiec et al., 2018), recurrent nightmares (Davis et al., 2007), and frequent awakenings (Mellman et al., 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 all were associated with sleep disorder. Their nightmares occurs frequently and makes it harder to fall asleep again compared to the non- Post-Traumatic Stress Disorder insomnia group who does 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 et al., 1990).

Sleep disturbances are closely related to Post-Traumatic Stress Disorder with associated distress and impairment, and the closed 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 et al., 2015) and complicate recovery (Smith et al., 2005). Sleep disturbances and Post-Traumatic Stress Disorder (Harvey et al., 2003;

Spoormaker et al., 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 et al., 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 are common in trauma-exposed samples (Krakow et al., 2014; Mellman et al., 1995) Older people, lonely relationships, not being supported by relatives and those having mental health problems are the common factors affecting the patients' insomnia. So, adults recovering from COVID 19 should be screened for sleep disturbances and managed as well (Huynh et al., 2022) as it was found that at various time points after being discharge from the hospital due to COVID-19 pneumonia, several sleep disorder were observed (Kalamara et al., 2022).

Statement of the Problem:

According to Shalev et 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 has 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, may make mental health problems more likely and exacerbate health disparities. So far, 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-19 related sleep disturbances, as well as the duration of such manifestations, remain to be investigated. Therefore, this study will attempt to highlight the effects of COVID-19 on recovered patients admitted at Zoram Medical College about 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 in Post-COVID-19 patients: A comparative study and the objectives were as follows:

- 1) To examine the applicability of *the PTSD Inventory (PTSD-8; Hansen et al, 2010) and Insomnia Severity Index (Morin, C.M, 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 et al, 2010) and Insomnia Severity Index (Morin, C.M, 2016) will have applicability in the targeted population.*

- 2) It was expected that *post-COVID-19 patients would have higher scores than non-COVID-19 patients as well as Female Patients would 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 Insomnia variables among the samples.

Methodology

Sample: The proposed study sample consists of 80 post-COVID-19 patients and 80 non-COVID-19 patients having equal representation of male and female (80 female and 80 male). A purposive sampling technique was employed. Permission was taken from the authorities, and informed consent was obtained from the participants after making them known about the nature and risk of the study.

Inclusion Criteria:

- 1) The post COVID-19 patients who were identified from Zoram Medical College run by the Government of Mizoram
- 2) Age range between 28 to 67 years
- 3) COVID-19 patients who have taken treatment at the hospital for more than 10 days served as samples.
- 4) The non-COVID-19 patients well matching of 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 taken treatments for more than 10 days served as a control 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 67 years old.
- 3) COVID-19 patients who have taken treatment at the hospital for less than 10 days
- 4) The non-COVID-19 patients did not match the post COVID-19 patients on demographic variables but were not affected by COVID-19 and were admitted to the same hospital for other physical illnesses and taken treatments less than 10 days.

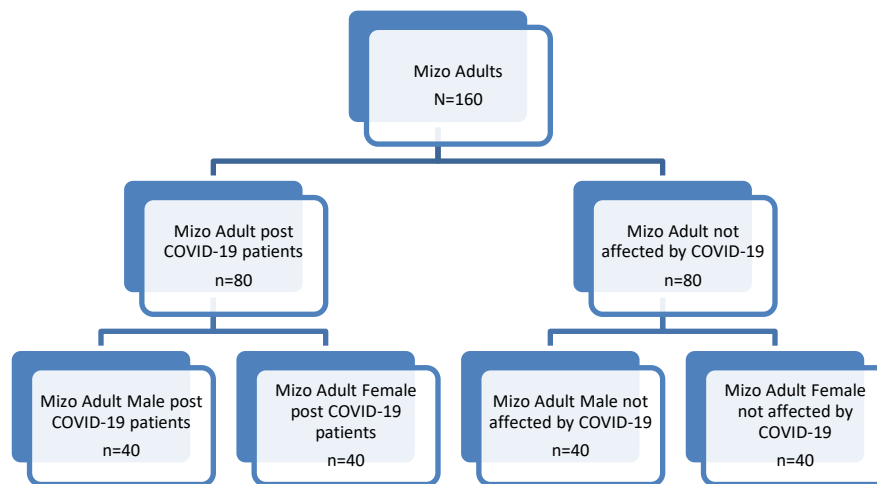
Tool used: The present study used are:

- 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 may be used to make a depression diagnosis according to DSM-IV criteria and takes 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 can be 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, C.M, 2016):* The Insomnia Severity Index (ISI) is 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 sociodemographic profiles including 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 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 male and 80 female).



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 make copies for ready administration. Samples as per design to meet the objectives for the study were identified, took necessary permission from authorities and consent 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 data and outliers data, and were not found, then proceeded for further analysis following the sequence of the objective of the study.

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

Table -1: Showing the Psychometric Properties of i) <i>PTSD Inventory (PTSD-8; Hansen et al, 2010)</i> and (ii) <i>Insomnia Severity Index (Morin, C.M, 2016)</i> 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)	.73	.77
Test of Homogeneity of Variances	.18	.21

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 to parametric statistics for further analysis, and the result accepted hypothesis no 1 as it demonstrated the COVID-19-PTSD questionnaire's strong convergent validity and good internal consistency (Forte et al., 2020) and found that the insomnia severity index had high scores (13.01±4.9) (Sayed et al., 2021)

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.

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
<i>post-COVID-19 survivor patients</i>	Mean	26.35	34.92
<i>non-COVID-19 patients</i>	Mean	20.02	29.65
<i>Female Patients</i>	Mean	24.91	34.02
<i>Male Patients</i>	Mean	21.47	30.56
t-test between <i>post-COVID-19 survivor patients and non-COVID-19 patients</i>		3.93**	2.41 **
t-test between <i>Female Patients and Male patients</i>		4.46**	2.73**

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 et al., 2022) and despite the less severe course of their illness, female patients had significantly higher rates of depression, anxiety, traumatic stress, and insomnia (Pappa et al., 2022).

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

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)		

The results showed significant positive correlation between PTSD and Insomnia ($r=.38$; $p>.01$) which accepted hypothesis no 3 of the study. Insomnia was related with post-traumatic stress disorder (Pedrozo-pupo et al., 2022)

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

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	0.00	1.01

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, S.S., 2016)

Discussion:

The present study entitled, “Prevalence and Correlates of Post-Traumatic Stress Disorder and Insomnia Disorder on Post- COVID-19 Patients: A Comparative Study” was conducted to examine (i) To examine the applicability of the PTSD Inventory (PTSD-8; Hansen et al, 2010) and Insomnia Severity Index (Morin, C.M, 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, C.M, 2016) will have applicability in the targeted population. (ii) It was expected that post-COVID-19 patients would have higher scores than non-COVID-19 patients as well as Female Patients would 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 Insomnia variables among the samples. 160 samples which comprised of 80 post COVID-19 patients and 80 non-COVID-19 patients having equal representation of male and female

(80 female and 80 male) served as samples. Selected Psychological tools; (i) PTSD Inventory (PTSD-8; Hansen et al, 2010) (ii) The Insomnia Severity Index (Morin, C.M, 2016) (iii) The socio-demographic profiles (Lalrinchhiani, 2021) and (iv) Informed Consent Form (Lalrinchhiani, 2022). The design 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 male and 80 female). 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, C.M, 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 to 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 disorder and also highlighted that the dreadfulness of the COVID-19 pandemic and the survivors need psychological support much more than other patients.

Significance of the study: The present study contributed 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 need for psychological interventions for the same; and also provided 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 did not able to take a large sample and more psychological and demographic variables which are very much needed due to time constraints.

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.

References:

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5. Arlington, VA: American Psychiatric Publishing; 2013
- Bastien, C.H., Vallières, A., & Morin, C.M. (2001). Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Medicine*, 01 Jul 2001, 2(4):297- 307
- Bisson, J. I., Cosgrove, S., Lewis, C., & Roberts, N. P. (2015). Post-traumatic stress disorder. *Bmj*, 351.
- Davis JL, Byrd P, Rhudy JL, Wright DC: Characteristics of chronic nightmares in a trauma-exposed treatment-seeking sample. *Dreaming* 2007, 17:187–198.
- Davis JL, Byrd P, Rhudy JL, Wright DC: Characteristics of chronic nightmares in a trauma-exposed treatment-seeking sample. *Dreaming* 2007, 17:187–198.
- Forte, G., Favieri, F., et al., (2020). COVID-19 pandemic in the Italian Population: Validation of a Post-Traumatic Stress Disorder Questionnaire and Prevalence of PTSD Symptomatology. *Int. J. Environ. Res. Public Health*, 17(11), 4151.
- Giosan C, Malta LS, Wyka K, et al. Sleep disturbance, disability, and posttraumatic stress disorder in utility workers. *J Clin Psychol*. 2015;71(1):72–84.
- Hansen, M., Andersen, T. E., Armour, C., Elklit, A., Palic, S., & Mackrill, T. (2010). PTSD-8: A short PTSD inventory. *Clinical Practice and Epidemiology in Mental Health*, 6, Article 101-108.

- Harvey AG, Jones C, Schmidt DA. Sleep and posttraumatic stress disorder: A review. *Clin Psychol Rev.* 2003;23(3):377–407.
- Huynh, G., Nguyen, H. V., Vo, L. Y., Le, N. T., & Nguyen, H. T. N. (2022). Assessment of insomnia and associated factors among patients who have recovered from COVID-19 in Vietnam. *Patient preference and adherence*, 1637-1647.
- Inman, D. J., Silver, S. M., & Doghramji, K. (1990). Sleep disturbance in post-traumatic stress disorder: a comparison with non-PTSD insomnia. *Journal of Traumatic Stress*, 3, 429-437.
- Kalamara, E., Pataka, A., Boutou, A., Panagiotidou, E., Georgopoulou, A., Ballas, E., ... & Pitsiou, G. (2022). Persistent sleep quality deterioration among post-COVID-19 patients: results from a 6-month follow-up study. *Journal of Personalized Medicine*, 12(11), 1909.
- Krakow BJ, Ulibarri VA, Moore BA, McIver ND. Posttraumatic stress disorder and sleep-disordered breathing: a review of comorbidity research. *Sleep Med Rev.* 2014;24C:37–45.
- Kyzar, E. J., Purpura, L. J., Shah, J., Cantos, A., Nordvig, A. S., & Yin, M. T. (2021). Anxiety, depression, insomnia, and trauma-related symptoms following COVID-19 infection at long-term follow-up. *Brain, Behavior, & Immunity-Health*, 16, 100315.
- Leskin GA, Woodward SH, Young HE, Sheikh JI. Effects of comorbid diagnoses on sleep disturbance in PTSD. *J Psychiatr Res.* 2002;36(6):449–452.
- Liang, X., Zhu, Y., & Fang, Y. (2020). COVID-19 and post-traumatic stress disorder: A vicious circle involving immunosuppression. *CNS Neuroscience & Therapeutics*, 26(8), 876.
- Mellman TA, David D, Kulick-Bell R, Hebding J, Nolan B: Sleep disturbance and its relationship to psychiatric morbidity after Hurricane Andrew. *Am J Psychiatry* 1995, 152:1659–1663
- Mellman TA, Kulick-Bell R, Ashlock LE, Nolan B. Sleep events among veterans with combat-related posttraumatic stress disorder. *Am J Psychiatry.* 1995;152(1):110–115.
- Milanak ME, Zuromski KL, Cero I, Wilkerson AK, Resnick HS, Kilpatrick DG: Traumatic event exposure, posttraumatic stress disorder, and sleep disturbances in a national sample of US adults. *J Trauma Stress* 2019, 32:14–22.
- Moreno, C., Wykes, T., Galderisi, S., Nordentoft, M., Crossley, N., Jones, N., ... & Arango, C. (2020). How mental health care should change as a consequence of the COVID-19 pandemic. *The lancet psychiatry*, 7(9), 813-824.
- Morin, C. M., Drake, C. L., Harvey, A. G., Krystal, A. D., Manber, R., Riemann, D., & Spiegelhalder, K. (2015). Insomnia disorder. *Nature reviews Disease primers*, 1(1), 1-18.
- Mysliwiec V, Brock MS, Creamer JL, O'Reilly BM, Germain A, Roth BJ: Trauma associated sleep disorder: a parasomnia induced by trauma. *Sleep Med Rev* 2018, 37:94–104
- Neylan TC, Marmar CR, Metzler TJ, et al. Sleep disturbances in the Vietnam generation: Findings from a nationally representative sample of male Vietnam veterans. *Am J Psychiatry.* 1998;155(7):929–933.
- Pappa, S., Barmpareassou, Z., Athanasoiu, an., Sakka, E., et al., (2022). Depression, Insomnia and Post-Traumatic Stress Disorder in COVID-19 Survivors: Role of Gender and Impact on Quality of Life. *J. Pers Med*, 12(3).
- Pedrozo-Pupo, C.J., Caballero-Dominguez, C.C., & Campo-Arias, A., (2022). Prevalence and variables associated with insomnia among COVID-19 survivors in Colombia. *Acta Biomed*, 93(1).
- Roth,T., & Roehrs, T. (2003). Insomnia: epidemiology, characteristics, and consequences. *Clinical cornerstone*, 5(3), 5-15.
- Sayed, E.S., Gomaa, S., et al., (2021). Sleep in post-COVID-19 recovery period and its impact on different domains of quality of life. *The Egyptian Journal of Neurology, Psychiatry and Neurosurgery.* Volume 57, Article number 172.
- Shigemura, J., Ursano, R. J., Morganstein, J. C., Kurosawa, M., & Benedek, D. M. (2020). Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psychiatry and clinical neurosciences*, 74(4), 281.
- Sinha, S. S., (2016). Trauma-induced insomnia: A novel model for trauma and sleep research. *Sleep Medicine Reviews.* Volume 25, February, Pages 74-83.
- Smith MT, Huang MI, Manber R. Cognitive behavior therapy for chronic insomnia occurring within the context of medical and psychiatric disorders. *Clin Psychol Rev.* 2005;25(5):559–592.

- Spoormaker VI, Montgomery P. Disturbed sleep in post-traumatic stress disorder: Secondary symptom or core feature? *Sleep Med Rev.* 2008;12(3):169–184.
- Tarsitani, L., Vassalini, P., Koukopoulos, A., Borrazzo, C., Alessi, F., Di Nicolantonio, C., ... & d'Ettorre, G. (2021). Post-traumatic stress disorder among COVID-19 survivors at 3-month follow-up after hospital discharge. *Journal of general internal medicine*, 36, 1702-1707.
- Tedjasukamana, R., Budikayanti, A., et al., (2023). Sleep disturbance in post COVID-19 conditions: Prevalence and quality of life. *Front. Neurol.*, 09 January, Volume 13.
- Yang, L., Liu, S., Liu, J., Zhang, Z., Wan, X., Huang, B., ... & Zhang, Y. (2020). COVID-19: immunopathogenesis and Immunotherapeutics. *Signal transduction and targeted therapy*, 5(1), 128.



Mizoram University, Aizwal

Certificate of Plagiarism Check for Thesis

Author Name	Vida Lalrinchhani
Course of Study	Ph. D
Name of Guide	Prof. Zokaitluangi
Department	Department of Nursing
Acceptable Maximum Limit	10 
Submitted By	lib.mzu@gmail.com
Paper Title	Post COVID-19 Mental Health: Post-traumatic Stress Disorder, Depression, Insomnia and Obsessive-Compulsive Disorder
Similarity	9%
Paper ID	3988939
Total Pages	135
Submission Date	2025-06-27 14:02:44

Signature of Student

Signature of Guide

Head of the Department

University Librarian

Director of Post Graduate Studies

VIDA LALRINCHHANI RENTHLEI

<https://orcid.org/0009-0005-3599-8186>

Employment (1)

Government of Mizoram: Aizawl, Mizoram, IN
Employment

Source:VIDA LALRINCHHANI RENTHLEI

Record last modified Dec 10, 2025, 6:59:40 AM

PARTICULARS OF THE CANDIDATE

Name of Candidate : **Ms. VIDA LALRINCHHANI**

Degree : Doctor of Philosophy

Department : Nursing

Title of Thesis : **Post COVID19 Mental Health: Post-traumaticStress Disorder, Depression, Insomnia and Obsessive-Compulsive Disorder**

Date of Admission : 07.12.2020

Approval of Research Proposal

1. DRC : 15.04.2021

2. BOS : 20.04.2021

3. School Board : 29.04.2021

MZU Registration No. : 2100002

Ph.D Registration No. : MZU/Ph.D/1669 of 07.12.2020

Extension (if any) : Nil

(Prof. C LALFAMKIMA VARTE)
Head
Department of Nursing
Mizoram University
Aizawl-796004.

ABSTRACT

POST COVID19 MENTAL HEALTH: POST-TRAUMATIC STRESS DISORDER, DEPRESSION, INSOMNIA, AND OBSESSIVE-COMPULSIVE DISORDER

**AN ABSTRACT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF
PHILOSOPHY**

VIDA LALRINCHHANI

MZU REGISTRATION NO.: 2100002

Ph.D. REGISTRATION NO.: MZU/Ph.D./1669 of 07.12.2020



**DEPARTMENT OF NURSING
SCHOOL OF MEDICAL AND PARAMEDICAL SCIENCES
DECEMBER, 2025**

**POST COVID19 MENTAL HEALTH: POST-TRAUMATICSTRESS
DISORDER, DEPRESSION, INSOMNIA, AND OBSESSIVE-COMPULSIVE
DISORDER**

BY
VIDA LALRINCHHANI
Department of Nursing

Supervisor: Prof. Zokaitluangi
Joint-Supervisor: Prof. Geeta Das

Submitted
In partial fulfillment of the requirement of the Degree of Doctor of Philosophy
in Nursing of Mizoram University, Aizawl

INTRODUCTION

COVID19

In Wuhan, Hubei Province, China, an outbreak of pneumonia with an unclear cause was reported in December 2019. Epidemiological evidence connected cases of pneumonia to the Huanan Seafood Wholesale Market. After respiratory samples were injected into Vero E6 and Huh7 cell lines of human airway epithelial cells, a novel respiratory virus was isolated. Genome analysis of the virus revealed that it was a novel coronavirus related to SARS-CoV, and it was thus named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Ciotti et al., 2020) that has caused a highly contagious disease known as Coronavirus Disease 2019 (COVID19) (Lone & Ahmad, 2020).

The COVID19 outbreak has been classified by the World Health Organization as a public health emergency of global concern as of January 30, 2020. Millions of people have already experienced direct effects from the virus on their physical health, and it is also thought to be a major global threat to mental health (Talevi et al., 2020).

The sudden outbreak of Coronavirus 19 disease (COVID19) is transforming the psychology and interpersonal relationships across the country, initial emotional response to a pandemic which can be overwhelming and gradually move towards negative emotions such as stress, anxiety and depression that can lead to social discontent and mental health illness (Shigemura et al., 2020) including Post-traumatic Stress Disorder, Depression, Insomnia and Obsessive-Compulsive Disorder among the COVID19 survivors.

SARS-CoV-2 is regarded as a "crowd disease," much like influenza and SARS-CoV-1, and it spreads most readily in situations where people are closely confined to one another. Phylogenetic evidence suggests a zoonotic origin (Narayan, 2025). It can cause a wide range of symptoms, from infection without any symptoms to pneumonia and potentially fatal outcomes. If the disease is present, symptoms like fever, coughing, or loss of taste or smell (ageusia or anosmia) can help identify it early on (Struyf et al., 2022). Fever, cough, myalgia or fatigue, expectoration, and

dyspnea were the most common clinical symptoms among COVID19 patients. Headache or vertigo, diarrhea, nausea, and vomiting, are examples of minor symptoms. According to the laboratory results, leukocytopenia, elevated lactate dehydrogenase, lymphocytopenia, and an increase in C-reactive protein were more common (Li et al., 2020).

Many patients had underlying medical conditions, mainly diabetes, hypertension, cardiovascular disease, and cancer. All patients had bilateral patchy shadows or ground glass opacity in their lungs on chest computed tomography scans. Antibiotic therapy, corticosteroids, and antiviral therapy were administered to all patients. (Wan, et al., 2020). Low molecular weight heparin (LMWH) anticoagulation therapy and early intravenous immunoglobulin (IVIG) administration are critical. (Li, et al., 2020). The fatality rate and the amount of medical resources used are determined by the severity of the COVID19. (Liao, 2020). Individuals requiring intensive care unit treatment are the most susceptible to mortality in COVID19. (Bastug et al., 2020).

India is also facing a difficult situation as the number of positive and infected cases rises daily. Fear and uncertainty are among the many psychological and emotional reactions that the Indian people are experiencing as a result of the government's stringent preventive measures and restrictions, which include a nationwide lockdown (Kazmi et al., 2020). To stop the spread of the new coronavirus disease (COVID19) among its 1.3 billion citizens, India imposed a nationwide lockdown on March 24, 2020 (Pinchoff et al., 2020).

POST-TRAUMATIC STRESS DISORDER:

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 COVID19, it is important to take into account the trauma survivors have endured. On the other hand, not much information on possible psychological impacts has been revealed (Longo et al., 2017).

The symptoms of PTSD include:

1) Reliving the occasion:

Recalling the traumatic events is one of the symptoms. They have the ability to resurface at any time of day or night (for example, in the form of nightmares). Occasionally, people may even experience flashbacks, which are the sensation of experiencing the event again.

2) Steer clear of reminders of the incident:

Sometimes people try to stay away from people or places that bring up memories of the traumatic experience. They might also attempt to keep the incident from coming to mind or from coming up in conversation.

3) Negative alterations in sentiments and beliefs:

Changes in one's thoughts and feelings about oneself, other people, and the outside world are part of these symptoms. People might, for instance, stop feeling love for other people or believe that the world is an extremely dangerous place.

4) Being energized:

After a traumatic event, people may become highly sensitive and vigilant about potential threats. They might have trouble sleeping, have trouble focusing, or startle easily (jumping at the sound, for example) (Sumner, 2016).

DEPRESSION

Depression is a common illness worldwide, with more than 264 million people affected (Wu et al., 2024). A long-lasting and with moderate or severe intensity, depression may become a serious threat to health conditions with poor function at work, at school and in the family, at the worst case may lead to suicide. Although there are known effective treatments for mental disorders at 76% to 85% of people in

low and middle income countries receive no treatment for their disorder (Wang et al., 2007); the common barriers include a lack of resources, lack of trained healthcare providers, the social stigma associated with mental disorders, and inaccurate assessment. People who are depressed are often not correctly diagnosed, and others who do not have the disorder are too often misdiagnosed and prescribed antidepressants.

INSOMNIA

Insomnia is a sleep disorder in which a person has trouble falling and/or staying asleep, habitual sleeplessness; inability to sleep. The condition can be short-term (acute) or can last a long time (chronic). It may also come and go. Acute insomnia lasts from 1 night to a few weeks. Insomnia is chronic when it happens at least 3 nights a week for 3 months or more.

OBSESSIVE-COMPULSIVE DISORDER

OCD comes in many forms, but most cases fall into at least one of four general categories:

- Checkings, such as locks, alarm systems, ovens, or light switches, or think that you have a medical condition like pregnancy or schizophrenia.
- Contamination, a fear of things that might be dirty or a compulsion to clean. Mental contamination involves feeling like you've been treated like dirt.
- Symmetry and order, the need to have things lined up in a certain way
- Ruminations and intrusive thoughts, an obsession with a line of thought. Some of these thoughts might be violent or disturbing.

REVIEW OF LITERATURE

COVID19 and Post-Traumatic Stress Disorder

PTSD, or post-traumatic stress disorder, is another one of the possible long-term effects of COVID19 (Schou et al., 2021; Bajoulvand et al., 2022). Being in contact with infectious diseases, the COVID19 pandemic presents a distinct and multifaceted severe stressor that can be categorized into multiple sources: direct (such as a potentially fatal physical discomfort experience) and indirect (such as exposure to seeing others battle the illness; experiencing exclusion and stigmatization (Xiao et al., 2020). Though it's debatable whether or not some of these incidents qualify as traumatic stressors because they don't endanger the person's life or integrity (Sekowski et al., 2021) all of these situations may lead to the development of protracted symptoms that are either the same or very similar to those of post-traumatic stress disorder (PTSD), including persistent intrusion, heightened awareness, avoidance behaviour, and negative impacts on mood and cognition linked to the traumatic stimuli (Ochnik et al., 2022).

COVID 19 and depression

Three to four months following diagnosis or hospital discharge, the majority of studies assessed the frequency of depressive symptoms and clinically significant depression; nonetheless (Daher et al., 2021) found that 27% of people had moderate depressive symptoms and 5% had severe depressive symptoms when it was measured 6.5 months ($\bar{x} = 197$ days) after hospital discharge. The COVID19 subjects had significantly higher depression scores ($\bar{x} = 3$ vs. $\bar{x} = 1$ on the DASS-21 depression scale, $p = 0.036$) in the one study that included a control group that was not exposed to SARS-CoV-2 (Mattioli et al., 2021). However, not all patients met the criteria for post COVID19 syndrome because the time of assessment in that study varied from 12 to 215 days after diagnosis. There was significant heterogeneity in the tools used to assess depression and the time points of assessment after COVID19 diagnosis, so a meta-analysis was not conducted (Renaud-Charest et al., 2021).

COVID 19 and Insomnia

Alimoradi and colleagues (2021) conducted a systematic review and meta-analysis which estimated the magnitude of sleep problems during the COVID19 pandemic and its relationship with psychological distress. The results come from 168 cross-sectional, four case-control, and five longitudinal design papers comprising 345,270 participants from 39 countries were identified. The corrected pooled estimated prevalence of sleep problems were 31% among healthcare professionals, 18% among the general population, and 57% among COVID19 patients (all p -values < 0.05). Sleep problems were associated with depression among healthcare professionals, the general population, and COVID19 patients, with Fisher's Z scores of -0.28, -0.30, and -0.36, respectively. Sleep problems were positively (and moderately) associated with anxiety among healthcare professionals, the general population, and COVID19 patients, with Fisher's z scores of 0.55, 0.48, and 0.49, respectively. Sleep problems appear to have been common during the ongoing COVID19 pandemic. Moreover, sleep problems were found to be associated with higher levels of psychological distress. With the use of effective programs treating sleep problems, psychological distress may be reduced. Vice versa, the use of effective programs treating psychological distress, sleep problems may be reduced.

COVID 19 and Obsessive Compulsive Disorder

Severe Infection pandemic triggered perturbation in the immune system which can be associated with psychiatric implications. The Severe Acute Respiratory Syndrome Coronavirus (COVID19) pandemic triggered perturbation of the immune system provoked psychiatric sequelae were investigated among the survivors including post-traumatic stress disorder (PTSD), depression, anxiety, insomnia, and obsessive-compulsive (OC) symptomatology, and the results indicated 28% of psychiatric sequelae for PTSD, 31% for depression, 42% for anxiety, 20% for OC symptoms, and 40% for insomnia; females suffered more for both anxiety and depression (Mazza et al., 2020).

Male and Female differences on effect of COVID19:

The COVID19 pandemic has affected millions of patients across the globe. Multiple studies, national and international governmental data have shown important sex and gender differences in the incidence and outcomes of patients with COVID19. These differences are not only attributed to the differences in age and comorbid conditions but likely a combination of factors, including hormonal differences, immune response, inflammatory markers and behavioral attitudes, among others. In this review, we discuss the studies addressing sex- and gender-specific differences in COVID19 infections with a focus on the potential pathophysiological mechanisms of these differences (Ya'qoub et al., 2021).

The actual COVID19 pandemic scenario has generated a context of uncertainty, helplessness, and inequality. Yet, the perception of COVID19 risk has influenced nutritional, psychological, and physical activity patterns depending on gender. Results of this study showed that females presented a higher perception of danger to the COVID19 virus than males but showed no differences in how the pandemic has affected personal lives. Females showed higher values of anxiety, conscientiousness, neuroticism, and openness to experience, while males presented higher values of extraversion. Nutritionally, males presented greater consumption of soft drinks, meat, and pasta or rice, and lower buccal hygiene. Yet, no differences were found regarding physical activity patterns. Results from this study could be used by various educational institutions to implement multidisciplinary interventions to reduce the stress and risk perception (Rodriguez-Besteiro et al., 2021).

STATEMENT OF THE PROBLEM

The COVID19 pandemic resulted in an economic recession and fear that negatively affected the mental health of the masses. About 4 in 10 adults in the U.S. have reported symptoms of anxiety or depressive disorder; also found that many adults are reporting difficulty in sleeping (36%) or eating at 32% (Panchal et al., 2021). People are experiencing numerous psychological issues as they adapt to the lifestyle of locking up and in dealing with fear of the disease during which the world attended to testing, finding a cure, and preventing transmission (Varshney et al., 2020). Although speculations could be made regarding the devastating impact of the pandemic, the gravity was intense beyond expectations. It was an all-round recession affecting the economics, social life, psychological and emotional aspects. Since these variables are related and affect each other, the magnitude of the pandemic heightens.

Marginalised sections of the society such as those living in poverty and daily wagers were seriously affected. All usual activities were shut down and with no proper income, a lot of people were in turmoil leading to various psychological problems. On top of that, when an individual contracted the disease, they were automatically inflicted with fear, which deeply affected their mental health. During the lockdown period, it was observed that the population of India was inclined to depression, anxiety, and stress. In addition to the meticulous steps taken to cease the spread of COVID19, the Indian government and mental health professionals must give full attention to their citizens' mental health (Verma et al., 2020).

This pandemic has a high mental health burden, as evidenced by the cases from Bangladesh, Pakistan, and India that demonstrate how people have attempted suicide as a result of their perceived vulnerability and fear of contracting the virus. (Hossain et al., 2020).

There have been records of several plagues down the history which are often the result of insanitary living conditions. Therefore, the situations and impact might not be comparable with COVID19, but even with the advancement in mental health and technologies, the world was not prepared for a devastating repercussion. So, to help individuals affected by the COVID19, it is important to know the distinctions between the two groups of populations; those who contracted the disease and those who did not. Difference exists between the two as fear of the disease is only psychological whereas actually contracting the disease combined both psychological and physiological distress.

Therefore, the effect of the COVID19 could be different between those who actually contracted the disease and those who did not. In order to clarify it, we need to study whether differences actually exist from the research point of view and to what degree. Understanding of the relations between the two groups could provide insight into observing the details, further providing the basis for action plans and collaterals.

In terms of mental health status, men and women are significantly different due to factors like genetics, hardiness, hormones, etc. Due to such diversities, the impact and consequences of the pandemic were not similar among men and women. Therefore, the present study attempted to disclose the results in mental health as a consequence of contracting COVID19. If the results support the objectives, it could have a profound impact on the process of dealing with mental health.

Although recent research has demonstrated the psychological toll that the pandemic took on Indians, no study has examined whether the psychological toll evolved over time as a result of repeated lockdown extensions (Gopal et al., 2020). The COVID19 pandemic's unpredictability and uncertainty, the lockdowns, physical separation, and other containment measures that followed, as well as the subsequent economic collapse, may make mental health problems more likely and exacerbate health disparities.

So far, few studies have been conducted specifically addressing post COVID19 sleep impairment. Isolation, hospitalization, and stress are important factors, but the exact mechanisms behind COVID19 related sleep disturbances, as well as the duration of such manifestations, remain to be investigated. Therefore, this study will attempt to highlight the effects of COVID19 and its inter-relationship with Post-Traumatic Stress Disorder, Depression, Insomnia disorder and Obsessive-Compulsive Disorder, as well as their predictive associations among post COVID19 patients who were admitted at Zoram Medical College.

Objectives:

The present study was trying to compare the four groups of patients, such as ; (i) Mizo Male Adult post COVID19 patient, (ii) Mizo Female Adult post COVID19 patient, (iii) Mizo Male Adult non COVID19 patient, (iv) Mizo Female Adult non COVID19 patient. On counting all of those available kinds of literature, the following research objected was outlined for the present study.

1. To examine any significant difference between post COVID19 patients and non COVID19 patients on PTSD, Depression, Insomnia and OCD.
2. To examine whether significant difference exists between Male and Female post COVID19 patients on PTSD, Depression, Insomnia and OCD.
3. To study any significant relationship between PTSD, Depression, Insomnia and OCD variables among samples.
4. To examine the independent effect of 'COVID19' and 'Gender' on the level of PTSD, Depression, Insomnia and OCD among the patients.
5. To study Interaction effect of 'COVID19' and 'Gender' on PTSD, Depression, Insomnia and OCD among the samples.
6. To examine the prediction of PTSD on Depression, Insomnia and OCD

among the participants.

Hypotheses:

Based on the objectives set forth for the present study, the following Hypotheses were framed:

1. There will be a significant difference between post COVID19 patients and non COVID19 patients on PTSD, Depression, Insomnia and OCD.
2. There will be a significant difference between Male and Female post COVID19 patients on PTSD, Depression, Insomnia and OCD.
3. There will be a relationship between PTSD, Depression, Insomnia and OCD variables among the samples.
4. There will be an independent effect of the 'COVID19' and 'Gender' on PTSD, Depression, Insomnia and OCD among the patients.
5. There will be an interaction effect of 'Gender' and 'COVID19' on PTSD, Depression, Insomnia and OCD among the samples.
6. PTSD will have a significant predictability on Depression, Insomnia and OCD among the participants.

METHOD AND PROCEDURES

Sample:

The sample was selected following a multi-stage sampling procedure. At the initial stage, 500 COVID19 patients who were admitted at Zoram Medical College for at least 10 days were identified. Finally, 200 Mizo Adults serve as sample in this study, consisting of 100 post COVID19 patients with equal representation of 50 females

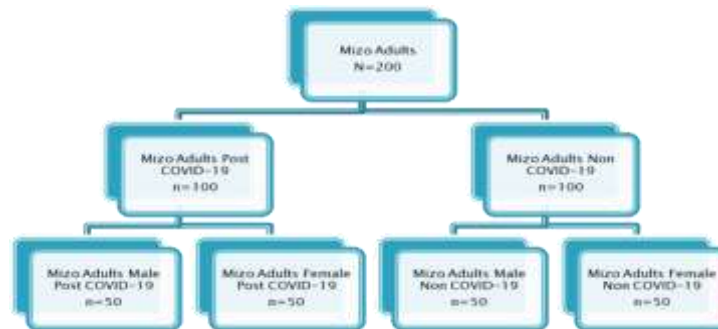
and 50 males from the list of post COVID19 patients maintained by the Integrated Disease Surveillance Project (IDSP) under the Government of Mizoram and 100 Mizo Adults who were not affected by COVID19 with equal representation of 50 females and 50 males; other necessary physical health records were obtained from hospitals where they underwent clinical evaluation including complete blood count, electrocardiogram and CT Scan for the post COVID19 patient samples.

List of post COVID19 patients who were admitted for at least 10 days at Zoram Medical College or Covid Care Centre maintained by Integrated Disease Surveillance Project (IDSP) under the Government of Mizoram was identified. Then, list of non COVID19 patients who were also admitted for at least 10 days due to chronic illness or other medical conditions like cancer, kidney failure, stroke, heart diseases etc. other than due to COVID19 at Zoram Medical College was identified as well. Other variables such as age level (18-60 years), gender of the sample (male or female), address of the sample, whether the patient has any hospitalization, if yes, its duration, any major illness and physical health condition were also obtained.

Design of the Study:

The study aims to compare male post COVID19 patients, female post COVID19 patients, male non COVID19 patients and female non COVID19 patients on Post-traumatic Stress Disorder, Depression, Insomnia and Obsessive Compulsive Disorder on the dependent variables. Design of the present study is 2 x 2 factorial representing 100 post COVID19 patients (50 male post COVID19 patients and 50 female post COVID19 patients) and 100 non COVID19 patients (50 male non COVID19 patients and 50 female non COVID19 patients).

Figure-1: Showing the 2 X 2 factorial design



Procedure:

The researcher constructed the socio-demographic profiles, constructed inform consent, proposed psychological scales as per the objectives and hypothesis, also any other scales which has relevance to the study.

Firstly, Initial permission was taken from the official authority for the conduction of the tests. Random selection of 200 samples each was done from post COVID19 patients who were admitted at Zoram Medical College for at least 10 days and whose name were maintained by Integrated Disease Surveillance Project (IDSP) under the Government of Mizoram and non COVID19 patients who were also admitted at Zoram Medical College for at least 10 days due to chronic illness or other medical conditions.

Secondly, Inform Consent was taken and the samples were well informed about the purpose of the study, and also ensures confidentiality of their identity as per ethical standards (APA, 2013), made them understand that they can leave anytime they wish and only those who gave consent were included in the sample. Identification was done based on socio-demographic profiles and those who can read and understand English language were selected so translation of tools was not necessary reducing the samples to 130 each.

Finally, without any distractions, the administration of the psychological test was done in a single condition. Any doubts were clarified. The psychological scales were administered with strict observance of APA ethics for research (2002); and the physical health conditions were screened through interviews and basic physiological assessment (vital signs, height and weight), all responses were checked for missing or wrong responses before collection, and ended with thanks. 200 samples with 100 post COVID19 patients and 100 non COVID19 patients with equal representation of 50 males and 50 females each were taken as final sample.

Psychological tools used:

1. Demographic profile datasheet: The demographic profile constructed by the researcher for the present study includes- age, sex, any major disease/illness, address, reason of hospitalization, duration of hospitalization, treatment taken, hospital record on treatment, discharge date and observation etc. This profile was utilized for finding sample to match the post COVID19 patients and non COVID19 patients for comparison.

2. PTSD Inventory (PTSD-8; Hansen et al., 2010). The scale was constructed by Hansen and colleagues, consisting of 8 items. The PTSD-8 is derived from the first sixteen items of the HTQ, which correspond to the DSM-IV criteria for PTSD. It covers all three symptom clusters of the DSM-IV PTSD diagnosis. The items are answered on a four-point Likert scale ('not at all (1), 'a little' (2), 'quite a bit (3), and 'all the time' (4)).

3. The Beck Depression Inventory (BDI-13; Beck & Beck, 1972) includes 13 items, short form, 0–4 corresponds to none or minimal depression, 5–7 to mild depression, 8–15 to moderate depression, and 16 or higher to severe depression. It has demonstrated test-retest and split-half reliability as well as concurrent validity with older adults (Gallagher, 1986). The BDI has a good efficiency in older medical outpatients (Rapp, Parisi, Walsh, & Wallace, 1988) and medical inpatients (Norris et al., 2004).

4. Insomnia Severity Index (Morin et al., 2011): The ISI is one of the most widely used assessment instruments in clinical and observational studies of insomnia. It is a brief self-report instrument measuring the patient's perception of both nocturnal and diurnal symptoms of insomnia. The ISI comprises seven items assessing the perceived severity of difficulties initiating sleep, staying asleep, and early morning awakenings, satisfaction with current sleep pattern, interference with daily functioning, noticeability of impairment attributed to the sleep problem, and degree of distress or concern caused by the sleep problem.

5. Yale-Brown Obsessive-Compulsive Scale (Goodman et al, 1989): The Y-BOCS is a semi-structured interview and consists of a checklist of common obsessions and compulsions and a 10-item measure of symptom severity, which determines symptom severity regardless of symptom subtype.

Statistical Analysis: To test the hypotheses set forth to determine “Post COVID19 Mental Health: Post-traumatic Stress Disorder, Depression, Insomnia, and Obsessive-Compulsive Disorder”, the following statistical analysis was employed:

The psychometric properties of the items, scale, and sub-scales of the psychological measures were ascertained to warrant their applicability among the target population of the proposed study.

Descriptive statistics (Mean, Standard-Deviation, Skewness, Kurtosis, & graphical method) were employed to outline the general nature of the participants along with the ‘COVID19’ and ‘Gender’ on the psychological measures.

The assumptions underlying Univariate, bivariate, and multivariate statistics (like Logistic Regression Analysis) were ascertained and wherein necessary permissible transformation and standardization of the comprehensive score on the scale and sub-scales of psychological measures were performed.

Univariate, bivariate, and multivariate statistics, wherein applicable, were employed to investigate and test the occurrence of differences and relationships for drawing inferences.

RESULTS AND DISCUSSIONS

i) Demographic profiles of the samples: The demographic profile of the sample included Age, Birth-Place, Permanent address, Sex, Any major Illness, Any hospitalization, Duration of hospitalization, Admission date, Discharge date, Physical health conditions such as Hb level, Temperature and Blood Pressure of the patients (samples). The equal representation of **sex** (male and female) and **illness** (COVID19 and Non COVID19 patients) were taken being the independent variables. Other extraneous variables such as Age, Birth-Place, Permanent address, Any hospitalization, Duration of hospitalization, Admission date, Discharge date, Physical health conditions such as Hb level, Temperature and Blood Pressure were kept under control as same distribution was kept for COVID19 and Sex groups to prevent their effect on results which was done with the help of Socio-Demographic Profiles. The age distribution was kept as **34%** for 29-39 years, **28%** for 40-49 years, **22%** for 50-60 years and **16%** for 18-28 years. The number of hospitalization durations was distributed as **52%** for 10-15 days, **24%** for 16-20 days, **16%** for 21-25 days and **8%** for 26-30 days. On Hb level **80%** were under normal level whereas **20%** were under abnormal level. Temperature level was distributed as **99%** high temperature and **1%** abnormal temperature. Under Blood Pressure level distribution **60%** have normal blood pressure level whereas **40%** have abnormal blood pressure level. The demographic profiles such as birth place, permanent address and any major illness were having equal representation.

ii) Raw Data checking: The Raw data collected on PTSD, Depression, Insomnia and OCD from COVID19 patients and Non COVID19 patients were entered in the excel sheet. The collected raw data were checked and no missing data values and outliers were detected. Then, the raw data were proceeded with for checking the appropriateness of the psychological scales used for the population under study.

iii) Psychometric Adequacy Check: The psychological tools used for the study were constructed for other cultures, and needed to be checked before obtaining information due to regional differences and cultural disparities. The preliminary check was done with a pilot study which resulted in high internal consistency

warranting utilization among the target population. But to confirm and cross-check its applicability, the internal consistency was estimated for the final response again as shown in Table-1.

(iv) Reliability check: The reliability of the tools was checked for internal consistency using Cronbach's alpha. The results divulged a consistent pattern of response indicating that the four measurement tools had high reliability for PTSD ($\alpha=.80$), Depression ($\alpha=.78$), Insomnia ($\alpha=.89$) and OCD ($\alpha=.90$).

v) Homogeneity check: Homoscedasticity was checked using Levene's test to discern whether the distribution of variances in Post-Traumatic Stress Disorder (.24), Depression (.25), Insomnia (.27) and OCD (.21) between the Post COVID19 patient and non COVID19 patient groups were equal. The non-significant F statistic ($p>.05$) revealed that there is no significant difference between the variances of scores.

vi) Normality Check: The Mean and SD had good consistency; Kurtosis and Skewness were within the acceptable range (± 2) which indicated the normality of the variance. The reliability scores of the tools were all above .80 and the Homogeneity test was within an acceptable range (Levene's statistic are all non-significant) and brown Forsyth (all were significant) which showed the trustworthiness of the scales. The normality and homogeneity of variances for the tools were all within acceptable range, which also indicated parametric applicability for further analysis.

The results of the study were analyzed sequentially following the sequence of the objectives of the study.

Objective -1: To examine any significant difference between COVID19 patients and non COVID19 patients on PTSD, Depression, Insomnia and OCD; and also any significant difference between male and female patients among the samples. The independent t-test was employed to discern any significant differences between the COVID19 patients and non COVID19 patients on PTSD, Depression, Insomnia and OCD among the samples, results are discussed below.

a) ***Significant difference on PTSD:*** Results demonstrated that post COVID19 patients have more PTSD compared to non COVID19 patients and had higher rates of PTSD ($M=9.90, 5.09$; $t= 14.47$; $df= 1/198$; $p > .01$) at significant .01 level. The same results were found that patients with more severe COVID19 related symptoms have been found to have high rates of PTSD symptoms, and hospitalization is widely acknowledged as a risk factor for PTSD development (Giuseppe et al., 2022). It has been estimated that around 20-25% of such patients may develop PTSD symptoms. COVID19 survivors discharged from quarantine reported post-traumatic stress symptoms nearly 96.2% (Bo et al., 2021).

b) ***Significant difference on Depression:*** Results provided that the Post COVID19 patients scored higher in Depression ($M=10.83, 6.34$; $t= 17.13$; $df= 1/198$; $p > .01$) than non COVID19 patients. A study conducted by Mazza and colleagues (2020) resulted in a similar finding wherein 31% of adults who survived COVID19 had difficulty due to depression. Additionally, women suffered more on depression and anxiety. Three to four months following diagnosis or hospital discharge, the majority of studies assessed the frequency of depressive symptoms and clinically significant depression; nonetheless, Daher et al. (2021) found that 27% of people had moderate depressive symptoms and 5% had severe depressive symptoms when it was measured 6.5 months ($\bar{x} = 197$ days) after hospital discharge. Research similar to the present design of the study found that COVID19 subjects had significantly higher depression scores compared to individual who were not exposed to SARS-CoV-2 (Mattioli et al., 2021). However, diversified results could emerge due to differences in design, the time of conducting the psychological tests etc. Between one and three months, six months, and twelve months following SARS-CoV-2 infection, roughly thirty to forty percent of patients had clinically significant depressive psychopathology (Mazza et al., 2021; Taquet et al., 2021; Baroiu et al., 2021). There are several factors that influence the surge in psychiatric illness not only due to getting infected, but the duration of lockdown which obstructed the normal day-to-

day lives. Hawryluck et al. (2004) reported that the length and uncertainty of the lockdown contributed to higher levels of depression. Thus, the higher rates of depressive symptoms seen during the COVID19 outbreak may also be explained by the current lockdown measures implemented globally (Bueno-Notivol et al., 2021).

c) **Significant difference on Insomnia:** Results exposed that Post COVID19 patients were higher in Insomnia ($M=16.92, 11.36$; $t= 18.28$; $df= 1/198$; $p > .01$) than Non COVID19 patients. The findings of this study have been supported by a study conducted by Lin and colleagues (2021) that during the peak, 20% of their sample showed clinical insomnia and the symptoms were severe among participants living within Hubei Province which is the epicenter. This sleep disturbance is also common among the frontline workers and health care professionals. Using the Insomnia Severity Index, Orru et al, 2021 showed that individuals with extended COVID19 had a noteworthy incidence of sleeplessness and a general decline in their Quality of Life (QOL). There were more internet searches for insomnia during the early stages of the pandemic, which may indicate that the pandemic exacerbated symptoms of insomnia (Zitting, 2021). In comparison to pre-pandemic estimates, emerging research shows higher prevalence rates of insomnia and mental health symptoms like anxiety and depression (Voitsidis et al., 2020; Pappa et al., 2020; Mandelkorn et al., 2021; Lahiri et al., 2021; Li et al., 2020; Pieh, 2021). The emergence of sleep disturbances in response to major stressful events including natural disasters (eg, wildfires, earthquakes, floods) or wartime has been documented (Belleville et al., 2019; Lavie, 2001).

d) **Significant difference on OCD:** Results evinced that Post COVID19 patients were found higher in OCD than non COVID19 patients ($M=19.52, 13.25$; $t= 20.58$; $df= 1/198$; $p < .01$) at significant at .01 level. The COVID19 pandemic has prompted global measures to prevent infection; regular hand washing has been introduced as the standard of prevention across the world, which resulted in 72 % of the participants, reported an increase in OCD. With the outbreak of the COVID19 pandemic (WHO, 2020), a large percentage of the world's population has been

exposed to multiple burdens, including immediate hazards such as the risk of infection as well as social isolation and economic insecurity. Based on the diathesis-stress model, which helps explain the development and maintenance of many mental disorders, these stresses may particularly affect people with pre-existing mental disorders (Pfefferbaum & North, 2020) and several studies find that may be the case (Fineberg et al., 2020; Fontenelle & Miguel, 2020; Benatti et al., 2020; Davide et al., 2020). Many patients and individuals in the general population experienced new obsessive-compulsive-like symptoms centered on COVID19. Self-reported rates of symptom exacerbation and COVID19 focused symptoms were consistently lower in studies that recruited patients from specialty clinics (Guzick et al., 2021). Although the effects of OCD is nullified in some regions, data based on other regions such as Liao et al. (2021) showed that female gender, concern about COVID19 and OCD symptoms severity at baseline were risk factors for exacerbation of OCD symptoms during early COVID19, while optimism, as one composite factor of resilience, was a protective factor against exacerbation of OCD symptoms both during early COVID19 and at follow-up. These studies showed that COVID19 had immediate and long-term impacts on the exacerbation of OCD symptoms, and interventions targeted at improving resilience are recommended.

These results indicated that suffering from COVID19 had a serious impact on the stress experienced even after the recovery phase. Non COVID19 patients, albeit suffering from a disease show lower levels of stress compared to post COVID19 patients. The results were in aligned with earlier research findings that the COVID19 pandemic affected sleep and found a very high rate of clinically significant insomnia (20%), and depression (24.5%) among post-COVID19 patients (Lin et al., 2021). Results accepting hypothesis 1.

Objective -2: To examine any significant difference between Male and Female post COVID19 patients on PTSD, Insomnia, Depression and OCD; The independent t-test was employed to discern any significant differences between male and female post COVID19 patients on PTSD, Insomnia, Depression and OCD among the samples,

results are discussed below.

a) ***Male and female significant difference on PTSD:*** Results demonstrated that Female patients had higher rates of PTSD compared to male (($M=8.33$, 6.66 ; $t= 3.62$; $df= 1/198$; $p < .01$) at significant .01 level. The same results were found by Mao et al. (2022) wherein female samples had higher gross score and higher score on all aspects of the Post-Traumatic Stress Checklist. Hierarchical regression analysis and a non-parametric test suggest that women reported significantly higher on the aspects of Post-Traumatic stress such as re-experiencing, negative alterations and hyper-arousal (Liu et al., 2020). Survey conducted on 6882 individuals showed that compared with men, women presented with higher levels of trauma-related distress and are more vulnerable during the pandemic (Kolakowsky-Hayner et al., 2021) and that women had more PTSD symptoms than men, particularly when knowing someone is under quarantine (Wu et al., 2022). In another study among South Africans, female participants had higher PTSS scores compared to men and a higher odd of having PTSS. Interestingly, the effect of gender is nullified when factors such as access to emotional support and feeling of isolation are presented (Nzimande et al., 2022). Being female and having pre-existing mental disorders are established risk factors for PTSD. Multivariate Regression shows that being male acted as a protective factor (Tarsitani et al., 2021). The results of several studies suggested that the observed gender difference among these studies is due to differences in responding to traumatic events.

b) ***Male and female significant difference on Depression:*** Results exposed that female patients scored higher in Depression than male patients ($M=9.48$, 7.69 ; $t= 4.55$; $df= 1/198$; $p > .01$) which revealed supporting evidence for COVID19 effect on Mental health. Some studies showed the prevalence of depression to be 13.25%, with females experiencing severe stress and depression which dissipates over time (Hou et al., 2020) although the prevalence may fluctuate among differing population. Among the Israeli adults, women reported higher levels of Depression and being a woman of

younger age, who relies more on emotion focused coping with low level of resilience contributed a large portion of variation in acquiring psychiatric symptoms (Laufer & Bitton, 2021). Several other factors may contribute to this association stating the importance of developing a better model as inclusion of factors may show why some particular variables are worse or better in some cases.

c) **Male and female significant difference on Insomnia:** Results provided that female patients scored higher on Insomnia ($M=15.55, 12.73$; $t= 6.18$; $df= 1/198$; $p > .01$) than male patients. Literatures regarding gender difference on Insomnia among COVID19 patients are not common albeit some studies have shown remarkable results. Pappa et al. (2022) assessed COVID19 patients after 1-2 months of discharge and established that Insomnia is the second highest prevalent psychiatric symptoms (33%) and females reported more mental health symptoms such as Insomnia, etc. compared to males. On the other hand, Salfi et al. (2020) found men to show deterioration and sleep disturbances on the long run while females are more susceptible only at the initial period. They became more resilient and Insomnia decreases over time. Tsukamoto et al. (2021) investigated and established that females had higher score on Insomnia at the initial stage, but later observation i.e after 2-3 months, there was no gender difference between male and female on Insomnia.

d) **Male and female significant difference on OCD:** Results evinced that female patients scored higher on OCD than male patients ($M=18.10, 14.67$; $t= 7.18$; $df= 1/198$; $p > .01$) significant at .01 level. Jalalifar et al (2023) conducted a meta-analysis of the researches and the results revealed 41.2% overall prevalence of OCD during the COVID19 pandemic and 47.1% and 39.1% OCD prevalence for female and male genders respectively. Another study also suggested that 20% average prevalence of OCS during the pandemic, with very high heterogeneity among the included studies ($I^2 99.6\%$). The highest prevalence of OCS was found in pregnant women (36%, $n = 5$), followed by individuals diagnosed with COVID19 (22%,

$n = 4$) and general population (22%, $n = 19$), undergraduates (21%, $n = 5$), and healthcare workers (5%, $n = 5$) (Pozza et al., 2024).

This result indicates that given the current COVID19 pandemic, it is critical to comprehend the variables influencing the differences in health outcomes and healthcare access between men and women. Initial reports from China in 2020 indicated a gender disparity in COVID19 death and case rates, with men dying from the virus at a higher rate (Guan et al., 2020). Subsequent research presented an alternative picture as more data became available. According to a study conducted across 21 developed nations, the proportion of deaths caused by COVID19 increased similarly for men and women. However, later in the pandemic, the balance of excess deaths shifted from being dominated by men to being equal or dominated by women (Kontis et al., 2020). In spite of this, the data covered in this paper indicates a significant disparity in some regions of the world, with men apparently accounting for a larger proportion of COVID19 cases and fatalities than women. The purpose of this study is to look into the variables causing these differences across 133 nations (Aleksanyan & Weinman, 2022).

Objective -3: To study any significant relationship between PTSD, Depression, Insomnia and OCD among samples.

To examine the relationship between PTSD, Depression, and Insomnia, OCD, *Pearson's Correlation* was employed.

(a) PTSD relation to Depression:

PTSD had a significant positive relationship with Depression ($r=.75$; $p<.01$) at .01 level which showed that there is a moderate strength of relationship between the two variables. This relationship suggests that increased PTSD symptoms may cause increments on Depression and vice versa. A positive strong correlation was found between depression and perceived stress and other psychiatric symptoms correlate each other highly (Coefficient: 0.33, p-value: 0.001) (Zandifar et al., 2020). Adjusting for covariates, Depression and COVID19 induced PTSD had a significant

association (Liyanage-Don et al., 2022). Although this study and several others did find positive correlation, some study found that symptoms of Depression are not intensified by having PTSD (Golinska et al., 2021).

(b) ***PTSD relation to Insomnia:*** PTSD had a significant positive relationship with Insomnia ($r=.72$; $p<.01$) which may be explained as a high PTSD may restrict sleeping or create sleep disturbances. Longitudinal study suggests a high degree of correlation between PTSD and Insomnia among COVID19 survivors along with high correlation among symptom domains within participants (Kyzar et al., 2021). Meta-analysis also demonstrated that symptoms of insomnia are common among individual with PTSD/PTSS with an aggregate frequency of 63% indicating a strong association between the two variables (Ahmadi et al., 2022).

(c) ***PTSD relation to OCD:*** PTSD had a significant positive relationship with OCD ($r=.67$; $p<.01$) which may be explained as a high PTSD may restrict the activities of a person. The association between PTSD and OCD or any anxiety symptoms resulted in a diverse conclusion. Stress responses and symptoms were significantly associated with Obsessive-Compulsive symptoms which are also associated with suicidal ideation (Khosravani et al., 2021). Apart from this study, an investigation done by Hodayuni (2023) found that there were significant positive correlations in support to the present finding summoning the importance of a deeper insight into this relation.

(d) Depression relation to Insomnia and OCD:

Depression had a significant positive relationship with Insomnia ($r=.77$; $p<.01$) whereas a negative relation with OCD ($r=-.76$; $p>.01$) at a .01 significant level. Insomnia, anxiety, and depression were very prevalent during the pandemic. Anxiety and depression were more severe in the insomnia than in the non-insomnia group,

and insomnia and mental health are closely related (Huang, Fietze, & Penzel, 2022). Insomnia and Depression severity intensified which backed up the result indicating a positive correlation (Klimkiewicz et al., 2021).

(e) *Insomnia relation to OCD:*

Insomnia had a negative significant relationship with OCD ($r=-.79$; $p<.01$). Although studies regarding the relationship between Insomnia and OCD are scarce, some studies did find that OC symptoms increase (Cox & Olatunji, 2021). The model they use is a bit different as they had baseline data on Insomnia before the pandemic.

The findings supported that the diagnostic criteria for PTSD include sleep disturbances (APA, 2013) and depression (Breslau et al., 1997) which increase distress and dysfunction (Giosan et al., 2015); and also reported that 47.9% of men and 48.5% of women with PTSD also had major depression experience (Kessler et al., 1995). Results suggested accepting hypothesis 2.

Objective -4: To examine the independent effect of ‘COVID19’ and ‘Gender’ on the level of PTSD, Depression, Insomnia and OCD among patients.

To study the independent effect of ‘COVID19’ and ‘Gender’ on PTSD, Depression, and Insomnia, OCD, One-way ANOVA was used and the results were presented in Table-6.

(i) *Independent effect of ‘COVID19’ on PTSD, Depression, Insomnia and OCD among samples:*

- a) Independent COVID19 effect on PTSD: The COVID19 infection had a 31% significant independent effect at .01 level on PTSD among the samples ($F=209.91$; $\eta^2=.31$; $p>.001$) and the same trend was found by earlier research that PTSD, or post-traumatic stress disorder, is another one of the possible long-term effects of COVID19 (Schou et al., 2021; Bajoulvand et al., 2022). Being in contact with infectious diseases, the COVID19 pandemic presents a distinct and multifaceted

severe stressor that can be categorized into multiple sources: direct (such as a potentially fatal physical discomfort experience) and indirect (such as exposure to seeing others battle the illness; experiencing exclusion and stigmatization (Xiao et al., 2020). COVID19 can cause traumatic experiences to the patients and caregivers that may lead to PTSD and/or psychological disorders (Liu et al., 2020). It has been estimated that around 20- 25% of such patients may develop PTSD symptoms. COVID19 survivors discharged from quarantine reported post-traumatic stress symptoms nearly 96.2% (Bo et al., 2021).

- b) Independent COVID19 effect on Depression: The COVID19 infection had a 31% significant independent effect at .01 level on PTSD among the samples ($F=293.270$; $\eta^2=.32$; $p > .001$) and the same trend was found by earlier research on adults surviving COVID19 evinced that 28% for PTSD, 31% for depression, 42% for anxiety, 20% for OC symptoms, and 40% for insomnia, females suffered more for both anxiety and depression (Mazza et al., 2020). Three to four months following diagnosis or hospital discharge, the majority of studies assessed the frequency of depressive symptoms and clinically significant depression; nonetheless, Daher et al. (2021) found that 27% of people had moderate depressive symptoms and 5% had severe depressive symptoms when it was measured 6.5 months ($\bar{x} = 197$ days) after hospital discharge. The COVID19 subjects had significantly higher depression scores ($\bar{x} = 3$ vs. $\bar{x} = 1$ on the DASS-21 depression scale, $p = 0.036$) in one study that included a control group that was not exposed to SARS-CoV-2 (Mattioli et al., 2021).
- c) Independent COVID19 effect on Insomnia: The COVID19 infection had a 33% significant independent effect at .01 level on Insomnia among the samples ($F=333.964$; $\eta^2=.33$; $p > .001$). The percentage of independency posits that COVID19 had high impact on sleep disturbances among the survivors. The emergence of sleep disturbances in response to major stressful events including natural disasters (eg, wildfires, earthquakes, floods) or wartime has been documented (Belleville et al., 2019; Lavie, 2001). A study conducted by Lin and colleagues (2021) suggested a 37% increase in the rates of clinical insomnia ranging from 14.6% to 20% between before and peak of COVID19 pandemic. There were more internet searches for

insomnia during the early stages of the pandemic, which may indicate that the pandemic exacerbated symptoms of insomnia (Zitting, 2021). In comparison to pre-pandemic estimates, emerging research shows higher prevalence rates of insomnia and mental health conditions like anxiety and depression (Voitsidis et al., 2020; Pappa et al., 2020; Mandelkorn et al., 2021; Lahiri et al., 2021; Li et al., 2020; Pieh, 2021).

- d) Independent COVID19 effect on OCD: The COVID19 infection had a 37% significant independent effect at .01 level on OCD among the samples ($F=440.413$; $\eta^2=.37$; $p > .001$) In comparison to pre-pandemic estimates, emerging research shows higher prevalence rates of insomnia and mental health conditions like anxiety and depression (Voitsidis et al., 2020; Pappa et al., 2020; Mandelkorn et al., 2021; Lahiri et al., 2021; Li et al., 2020; Pieh, 2021). Research evinced the exacerbation of OCD symptoms due to the COVID19 pandemic (Benatti et al., 2020; Prestia et al., 2020) in approximately one-third of their sample, and the first lockdown increased OCD symptoms. Evidence on OCD during the start of the COVID19 pandemic showed increased OCD in Italy (Benatti et al., 2020; Davide et al., 2020). Chakraborty and Karmakar (2020) studied patients who contracted COVID19 and are currently diagnosed with OCD and their findings showed that although 5 patients of 84 showed exacerbated symptoms the rest were not particularly affected by the COVID19 regarding their hand-washing compulsion.

(ii) *Independent effect of ‘Gender’ on PTSD, Depression, Insomnia and OCD among samples:*

- a) Independent ‘Gender’ effect on PTSD: The ‘Gender’ had a 31% significant independent effect at .01 level on PTSD among the samples ($F=13.094$; $\eta^2=.31$; $p > .001$). Hierarchical regression analysis and a non-parametric test suggest that women reported significantly higher on the aspects of Post-Traumatic stress such as re-experiencing, negative alterations and hyper-arousal (Liu et al., 2020). Survey conducted on 6882 individuals showed that compared with men, women presented with higher levels of trauma-related distress and are more vulnerable during the pandemic (Kolakowsky-Hayner et al., 2021).

- b) Independent ‘Gender’ effect on Depression: The ‘Gender’ had a 34% significant independent effect at .01 level on PTSD among the samples ($F=20.75$; $\eta^2=.34$; $p >.001$). Some studies showed the prevalence of depression to be 13.25%, with females experiencing severe stress and depression which dissipate over time (Hou et al., 2020) although the prevalence may fluctuate among differing population. Among the Israeli adults, women reported higher levels of Depression and being a woman of younger age, who relies more on emotion focused coping with low level of resilience contributed a large portion of variation in acquiring psychiatric symptoms (Laufer & Bitton, 2021).
- c) Independent ‘Gender’ effect on Insomnia: The ‘Gender’ had a 30% significant independent effect at .01 level on Insomnia among the samples ($F=38.135$; $\eta^2=.30$; $p >.001$). Pappa et al. (2020) assessed COVID19 patients after 1-2 months of discharge and established that Insomnia is the second highest prevalent psychiatric symptoms (33%) and females reported more mental health symptoms such as Insomnia etc. compared to males. On the other hand, Salfi et al. (2020) found men to show deterioration and sleep disturbances on the long run while females are more susceptible only during the initial period.
- d) Independent ‘Gender’ effect on OCD: The ‘Gender’ had a 39% significant independent effect at .01 level on OCD among the samples ($F=51.511$; $\eta^2=.39$; $p >.001$) Jalalifar et al (2023) conducted a meta-analysis of the researches and the results revealed 41.2% overall prevalence of OCD during the COVID19 pandemic and 47.1% and 39.1% OCD prevalence for female and male genders respectively. Another study also suggested that 20% average prevalence of OCS during the pandemic, with very high heterogeneity among the included studies (I^2 99.6%). The highest prevalence of OCS was found in pregnant women (36%, $n = 5$), followed by individuals diagnosed with COVID19 (22%, $n = 4$) and general population (22%, $n = 19$), undergraduates (21%, $n = 5$), and healthcare workers (5%, $n = 5$) (Pozza et al., 2024).

The results of the Independent effect of ‘COVID19’ and ‘Gender’ suggested accepting hypothesis 4.

Objective -5: To study the Interaction effect of ‘COVID19 and Gender’ on PTSD, Depression, Insomnia and OCD among the samples.

To study the Interaction effect of ‘COVID19 and Gender’ on PTSD, Depression, Insomnia and OCD, Two-way ANOVA was used and the results are discussed below.

- (i) ***Interaction effect of ‘COVID19 and Gender’ on PTSD:*** The ‘COVID19 and Gender’ had a 36 % significant interaction effect at .01 level on PTSD among the samples ($F=126.527$; $\eta^2=.36$; $p > .003$) and the same trend was found by earlier research that men and women show different rates of PTSD and Depression, whereas no Insomnia is found in both males and females. Besides gender, education, living conditions, direct exposure to COVID19, the post mental and the physical health condition is related to PTSD, Depression, and Insomnia (Liu et al., 2020; Arcand et al., 2023).
- (ii) ***Interaction effect of ‘COVID19 and Gender’ on Depression:*** The ‘COVID19 and Gender’ had a 29 % significant interaction effect at .01 level on Depression among the samples ($F=147.023$; $\eta^2=.29$; $p > .010$). The combination of being COVID19 patient with a specific gender had a significant effect on developing depression and other stress symptoms, there was an increase in depressive symptoms for all sexes and gender during the pandemic (Seens et al., 2021). On the other hand gender does not have significant impact on depression while it has for anxiety (Arcand et al., 2023).
- (iii) ***Interaction effect of COVID19 and Gender’ on Insomnia:*** The ‘COVID19 and Gender’ had a 38 % significant interaction effect at .01 level on Insomnia among the samples ($F=245.704$; $\eta^2=.38$; $p > .010$). The interaction effect between COVID19 and Gender has significant impact on individual’s development of symptoms of Insomnia

(Liu et al., 2021). Although several factors intervened with this interaction, gender still plays a significant role in progressing sleep disturbance. Multiple regression analyses showed that variables, including sex, age, income level, and worry score, contributed to the significant regression equation for insomnia but not for daytime sleepiness. Specifically, the female, younger, lower income, and highly worried populations contributed significantly more than the male, elderly, higher income, and less worried populations, respectively, to the prediction of insomnia (Bajaj et al., 2020).

(iv) Interaction effect of COVID19 and Gender' on OCD: The 'COVID19 and Gender' had a 32 % significant interaction effect significant at .01 level on OCD among the samples ($F=565.582$; $\eta^2=.32$; $p >.010$) and the same trend was found by earlier research that gender does interact with COVID19 in developing Obsessive-Compulsive Disorder behavior wherein females are more prone to develop symptoms than male (Javed et al., 2021). Although significant, the involvement of other factors must be put to consideration as they would interact with these variables.

The results of the interaction effect of 'COVID19 and Gender' and the supporting literatures suggested accepting hypothesis 5.

Objective -6: To examine the prediction of PTSD on Depression, Insomnia and OCD among the participants.

To evince the PTSD prediction, the regression analysis was calculated.

(i) **Prediction of PTSD on Depression:** PTSD predicted 34% ($R^2 = .341$; $F = 259.298$; $p >.002$) on Depression which explained that PTSD invites Depression among the samples. The finding was supported by earlier research findings in other cultures that among COVID19 survivors PTSD and Depression were highly prevalent and comorbid. Among the Irish there was a high level of comorbidity with generalized anxiety (49.5%) and depression (53.8%). Meeting the diagnostic requirement for COVID19 related PTSD was associated with younger age, male sex,

living in a city, living with children, moderate and high perceived risk of COVID19 infection, and screening positive for anxiety or depression (Karatzias et al., 2020).

(ii) **Prediction of PTSD on Insomnia:** PTSD predicted 32% ($R^2 = .323$; $F = 216.970$; $p > .001$) on Insomnia which made it clear that PTSD promoted insomnia among the sample. The recent finding suggests that 32% of variation within Insomnia is explained by having symptoms of PTSD incites a large portion of variation. Self-reported PTSD and Depression were associated with sleep disturbance and sleep deprivation (Wang et al., 2022). Some studies had model which inversely predicted PTSD from Insomnia which found a high predictability (Wright et al., 2011) shedding some light on the current findings although the models are inversed.

(iii) **Prediction of PTSD on OCD:** PTSD predicted 24% ($R^2 = .245$; $F = 160.396$; $p > .010$) on OCD which explained that PTSD was with OCD among the samples. Anxiety, depression, PTSD, and Obsessive-Compulsive symptoms are common among the COVID19 survivors and that underscores the need to diagnose and manage mental health morbidities among these survivors long after their recovery from COVID19 (Dar et al., 2021). Patients with comorbid PTSD showed no significant improvements in OCD and depression symptoms. OCD and depression symptoms improved significantly more in patients without comorbid PTSD than in patients with comorbid PTSD (Gershuny et al., 2002). Those with a current diagnosis of PTSD were 3.62 times more likely to have OCD, whereas those with a current diagnosis of OCD were not at greater risk of having PTSD leading some to speculate whether symptoms of PTSD serve as precipitating factors of OCD (Wadsworth et al., 2023).

The results of the prediction of PTSD on Insomnia, Depression and OCD were significant and the supporting literature suggested accepting hypothesis 6.

SUMMARY:

The dawn of the 21st century saw one of the greatest pandemics the world has experienced, due to its sheer amount of impact on the global economy along with the casualties and lives it claimed. The COVID19 outbreak has been classified by the World Health Organization as a public health emergency of global concern as of January 30, 2020. Millions of people have already experienced direct effects from the virus on their physical health, and it is also thought to be a major global threat to mental health (Talevi et al., 2020). Health inequalities and mental health problems may worsen due to the COVID19 pandemic's unpredictability and uncertainty, lockdowns, physical distancing, and other containment measures, as well as the subsequent economic collapse (Moreno et al., 2020). A number of guidelines have been released by the WHO Department of Mental Health to assist various population groups in maintaining their mental and psychosocial well-being (Ahuja et al., 2021).

Apart from all the medical research and findings, there is a need to better understand the effect it had on our society. Although there have been a lot of literatures that provide resourceful information about the COVID19, there is a higher need to understand the post effect of the COVID19 especially among people of different races. The post-pandemic crisis has certain problems posed to individuals from all over the world. Therefore this study endeavored in establishing a better insight into the post-pandemic effect on the target population. The study also highlights how it is important to address the situation from a different angle as it strongly affects the target population, especially among the female section.

This research was also conducted to study the impact of contracting COVID19 on several psychological issues; Post-Traumatic Stress, Depression, Insomnia and Obsessive-Compulsive behavior. Several objectives such as whether COVID19 affects Post-traumatic stress, Depression, Sleep disturbance and Obsessive-Compulsive behaviors, the relationship between these behaviors among COVID19 patients and the independent and interactive effects of COVID19 and Gender on the aforementioned behaviors.

The result and discussion of the analysis provide an insight into how COVID19 affected the mental health of its casualties. The analysis result of the first objective clearly showed that COVID19 patients were traumatized when they came in contact with the disease. With all the social and legal proceeding requirements combined with the life-threatening condition, it was traumatizing. In support of these results, the level of depression was also much higher compared to those who were not in contact with COVID19. It was highly stressful as day-to-day activities halted and everyone stayed indoors, traumatized with fear of being in contact with the disease. In addition to these, individuals that are under-privileged and belonging to lower income sector who earns their daily living experience higher levels of stress. Sleep disturbance was also common, as most individuals cannot resume their daily life, the need for early to bed and early to rise was gradually decreasing. The result also revealed that COVID19 patients compared to normal healthy individuals have developed Insomnia and other sleep disturbances. One of the protective measures was sanitizing hands regularly, which could increase compulsive and excessive hand washing or sanitizing even though one is not in contact with an infected person. COVID19 patients were much worse on Obsessive-Compulsive behaviours compared to Non COVID19 patients.

The second objective endeavored investigating the effect of gender among COVID19 patients on Post-Traumatic Stress, Depression, Insomnia and Obsessive and compulsive behaviors. The results revealed an outcome that was in line with the expected outcome wherein males are less affected compared to females. Men experienced lower Post-traumatic stress, Depression, Insomnia and Obsessive-Compulsive disorder behaviors. Gender has a pivotal role in over-turning the impact of COVID19 on PTSD, Depression, Insomnia and OCD. Some men downplay the pandemic itself, which might protect them mentally from the psychological effects of COVID19.

The correlational analysis was done in hope of finding how the variables of interest are associated among COVID19 patients. These findings are expected to provide better insight which could aid in post-infection mental health treatment plans not

only on COVID19 but also for other Severe Acute Respiratory diseases. Post-traumatic stress was positively correlated with Depression and Insomnia which is also a strong relationship. Since over the past decades, it has been proven that Post-traumatic stress, depression and insomnia have an indelible relationship among different sections of population. The pandemic was a traumatic experience for many, at least during the primary stage. When fear of a disease or any other traumatic experience occurs, it is often accompanied by difficulty in sleep. Sleep deprivation or hypersomnia is the hallmark of stressful life events and PTSD. Depression and Insomnia also had a strong positive relationship among COVID19 patients. This meant that as Post-Traumatic Stress increases so do the depressive levels and sleep disturbance. PTSD was also positively associated with Obsessive-Compulsive behaviors which is quite common and highly expected resulting in compulsive sanitary behaviors. People showed compulsive hand-washing and sanitization during and after the pandemic subsided. The traumatic experience manifests the inner compulsion to sanitize and drive the individual to give paramount in such behavior like compulsive hand washing etc. It is also normal to expect these relationships in circumstances outside the pandemic as well.

The predictability of Insomnia, Depression and OCD from PTSD was also estimated based on the correlation between these variables. The predictability was strongest for Depression followed by Insomnia and OCD. These findings clearly highlight the significance of treating PTSD which could subsequently demote depression and sleep disturbance especially Insomnia.

LIMITATIONS:

The sample was determined and estimated to suffice the statistical tests in examining the variables. With that being said, the sample drawn was yet insufficient to represent the target population due to withdrawal of consent, incomplete and deceitful responses.

The second limitation would be the inability to comprise other factors such as personality, intelligence, etc. which were very much attempted to include in the study. These omitted factors could result in a more complex finding, but offer clarity on the relationships and outcome of the study. But due to financial constraints and overwhelming information, the present study opted to exclude it.

The study did not include demographic variables such as socioeconomic status, educational qualification, etc. which can affect psychological functions.

The study could not incorporate qualitative methods within the study due to lack of expertise and qualitative methods cannot get rid of subjectivity confounds. Therefore, crucial information and components may be left out.

SUGGESTIONS:

It would be more meaningful to increase sample size or coverage of a bigger sample size which can tap more information making generalizations about the psychological function of the target population.

It would be good to include some psychological variables including personality, IQ, etc. as independent variables to get more information about COVID19 effect on mental problems.

The inclusion of demographic variables such as socioeconomic status, age, educational qualification, etc. was suggested to get more information about the effects of COVID19 on psychological functions.

The inclusion of Qualitative methods was suggested for getting the unforeseen information to understand the COVID19 effects on mental health.

SIGNIFICANCE OF THE STUDY:

The study was meticulously designed and conducted following the systematic research methodology which provided authentic findings and has never been conducted in the target population including:

- (i) The differential prevalence of Psychological pathology between Post COVID19 and Non COVID19 along with gender differences,
- (ii) The relationship between PTSD , Insomnia, Depression and OCD variables;
- (iii) The Contribution (effect) of COVID19 and gender on PTSD, Insomnia, Depression and OCD variables;
- (iv) The joint contribution (Interaction effect of) COVID19 and gender on PTSD, Insomnia, Depression and OCD variables; and
- (v) The prediction of PTSD on Insomnia, Depression and OCD variables.

The results highlighted the COVID19 adverse effects on mental health which is worse than other critical physical illnesses and also highlighted the need to pay attention to COVID19 survival by giving psychological and physical support, especially female COVID19 survival.

REFERENCES:

- Ahmadi, R., Rahimi-Jafari, S., Olfati, M., Javaheripour, N., Emamian, F., Ghadami, M. R., & Sepehry, A. A. (2022). Insomnia and post-traumatic stress disorder: A meta-analysis on interrelated association (n= 57,618) and prevalence (n= 573,665). *Neuroscience & Biobehavioral Reviews*, 141, 104850.
- Ahuja, P., Syal, G., & Kaur, A. (2021). Psychological stress: Repercussions of COVID-19 on gender. *Journal of Public Affairs*, 21(4), e2533.
- Aleksanyan, Y., & Weinman, J. P. (2022). Women, men and COVID19. *Social Science & Medicine*, 294, 114698.
- Alimoradi, Z., Broström, A., Tsang, H. W., Griffiths, M. D., Haghayegh, S., Ohayon, M. M., & Pakpour, A. H. (2021). Sleep problems during COVID19 pandemic and its' association to psychological distress: A systematic review and meta-analysis. *EClinicalMedicine*, 36.
- Arcand, M., Bilodeau-Houle, A., Juster, R. P., & Marin, M. F. (2023). Sex and gender role differences on stress, depression, and anxiety symptoms in response to the COVID19 pandemic over time. *Frontiers in Psychology*, 14, 1166154.
- Bajaj, S., Blair, K. S., Schwartz, A., Dobbertin, M., & Blair, R. J. R. (2020). Worry and insomnia as risk factors for depression during initial stages of COVID19 pandemic in India. *PloS one*, 15(12), e0243527.
- Bajoulvand, R., Hashemi, S., Askari, E., Mohammadi, R., Behzadifar, M., & Imani-Nasab, M. H. (2022). Post-pandemic stress of COVID19 among high-risk groups: A systematic review and meta-analysis. *Journal of affective disorders*, 319, 638-645.
- Baroiu, L., Dumea, E., Năstase, F., Niculeț, E., Fotea, S., Ciubara, A. B., ... & Ciubara, A. (2021). Assessment of Depression in Patients with COVID19.

- BRAIN. Broad Research in Artificial Intelligence and Neuroscience, 12(2), 254-264.
- Bastug, A., Bodur, H., Erdogan, S., Gokcinar, D., Kazancioglu, S., Kosoali, B. D., ... & Yilmaz, F. M. (2020). Clinical and laboratory features of COVID19: Predictors of severe prognosis. *International immunopharmacology*, 88, 106950.
- Beck, A. T., & Beck, R. W. (1972). Screening depressed patients in family practice: A rapid technic. *Postgraduate medicine*, 52(6), 81-85.
- Belleville, G., Ouellet, M. C., & Morin, C. M. (2019). Post-traumatic stress among evacuees from the 2016 Fort McMurray wildfires: exploration of psychological and sleep symptoms three months after the evacuation. *International journal of environmental research and public health*, 16(9), 1604.
- Benatti, B., Albert, U., Maina, G., Fiorillo, A., Celebre, L., Girone, N., ... & Dell'Oso, B. (2020). What happened to patients with obsessive compulsive disorder during the COVID19 pandemic? A multicentre report from tertiary clinics in northern Italy. *Frontiers in psychiatry*, 11, 720.
- Bo, H. X., Li, W., Yang, Y., Wang, Y., Zhang, Q., Cheung, T., ... & Xiang, Y. T. (2021). Posttraumatic stress symptoms and attitude toward crisis mental health services among clinically stable patients with COVID19 in China. *Psychological medicine*, 51(6), 1052-1053.
- Breslau, N., Davis, G. C., Andreski, P., Peterson, E. L., & Schultz, L. R. (1997). Sex differences in posttraumatic stress disorder. *Archives of general psychiatry*, 54(11), 1044-1048.
- Bueno-Notivol, J., Gracia-García, P., Olaya, B., Lasheras, I., López-Antón, R., & Santabárbara, J. (2021). Prevalence of depression during the COVID19 outbreak: A meta-analysis of community-based studies. *International journal of clinical and health psychology*, 21(1), 100196.

- Chakraborty, A., & Karmakar, S. (2020). Impact of COVID19 on obsessive compulsive disorder (OCD). *Iranian journal of psychiatry*, 15(3), 256.
- Ciotti, M., Ciccozzi, M., Terrinoni, A., Jiang, W. C., Wang, C. B., & Bernardini, S. (2020). The COVID19 pandemic. *Critical reviews in clinical laboratory sciences*, 57(6), 365-388.
- Cox, R. C., & Olatunji, B. O. (2021). Linking insomnia and OCD symptoms during the coronavirus pandemic: Examination of prospective associations. *Journal of anxiety disorders*, 77, 102341.
- Daher, A., Cornelissen, C., Hartmann, N. U., Balfanz, P., Müller, A., Bergs, I., ... & Dreher, M. (2021). Six months follow-up of patients with invasive mechanical ventilation due to COVID19 related ARDS. *International Journal of Environmental Research and Public Health*, 18(11), 5861.
- Dar, S. A., Dar, M. M., Sheikh, S., Haq, I., Azad, A. M. U. D., Mushtaq, M., ... & Wani, Z. A. (2021). Psychiatric comorbidities among COVID19 survivors in North India: A cross-sectional study. *Journal of education and health promotion*, 10, 309.
- Davide, P., Andrea, P., Martina, O., Andrea, E., Davide, D., & Mario, A. (2020). The impact of the COVID19 pandemic on patients with OCD: Effects of contamination symptoms and remission state before the quarantine in a preliminary naturalistic study. *Psychiatry research*, 291, 113213.
- Di Giuseppe, M., Zilcha-Mano, S., Prout, T. A., Perry, J. C., Orrù, G., & Conversano, C. (2020). Psychological impact of coronavirus disease 2019 among Italians during the first week of lockdown. *Frontiers in psychiatry*, 11, 576597.
- Fineberg, N. A., Van Ameringen, M., Drummond, L., Hollander, E., Stein, D. J., Geller, D., & Dell'Oso, B. (2020). How to manage obsessive-compulsive disorder (OCD) under COVID19: A clinician's guide from the International College of Obsessive Compulsive Spectrum Disorders (ICOCS) and the

Obsessive-Compulsive and Related Disorders Research Network (OERN) of the European College of Neuropsychopharmacology. *Comprehensive psychiatry*, 100, 152174.

Fontenelle, L. F., & Miguel, E. C. (2020). The impact of coronavirus (COVID-19) in the diagnosis and treatment of obsessive-compulsive disorder. *Depression and anxiety*, 37(6), 510.

Gallagher, D. (1986). 8/The beck depression inventory and older adults: Review of its development and utility. *Clinical Gerontologist*, 5(1-2), 149-163.

Gershuny, B. S., Baer, L., Jenike, M. A., Minichiello, W. E., & Wilhelm, S. (2002). Comorbid posttraumatic stress disorder: Impact on treatment outcome for obsessive-compulsive disorder. *American Journal of Psychiatry*, 159(5), 852-854.

Giosan, C., Malta, L. S., Wyka, K., Jayasinghe, N., Evans, S., Difede, J., & Avram, E. (2015). Sleep disturbance, disability, and posttraumatic stress disorder in utility workers. *Journal of Clinical Psychology*, 71(1), 72-84.

Golińska, P. B., Cieślak, M., Hubert, O., & Bidzan, M. (2021). Mental Health and the Symptoms of PTSD in People with Depression and Anxiety Disorders during the COVID19 Pandemic. *International journal of environmental research and public health*, 18(11), 5542.

Goodman, W. K., Price, L. H., Rasmussen, S. A., Mazure, C., Fleischmann, R. L., Hill, C. L., & Charney, D. S. (1989). The Yale-Brown obsessive compulsive scale: I. Development, use, and reliability. *Archives of general psychiatry*, 46(11), 1006-1011.

- Gopal, A., Sharma, A.J., Subramanyam, M.A. (2020). Dynamics of psychological responses to COVID19 in India: A longitudinal study. A longitudinal study. PLOS ONE 15(10).
- Guan, W. J., Ni, Z. Y., Hu, Y., Liang, W. H., Ou, C. Q., He, J. X., & Zhong, N. S. (2020). Clinical characteristics of coronavirus disease 2019 in China. *New England journal of medicine*, 382(18), 1708-1720
- Guzick, A. G., Candelari, A., Wiese, A. D., Schneider, S. C., Goodman, W. K., & Storch, E. A. (2021). Obsessive–compulsive disorder during the COVID19 pandemic: a systematic review. *Current psychiatry reports*, 23, 1-10.
- Hansen, M., Andersen, T. E., Armour, C., Elklit, A., Palic, S., & Mackrill, T. (2010). PTSD-8: a short PTSD inventory. *Clinical practice and epidemiology in mental health: CP & EMH*, 6, 101.
- Hawryluck, L., Gold, W. L., Robinson, S., Pogorski, S., Galea, S., & Styra, R. (2004). SARS control and psychological effects of quarantine, Toronto, Canada. *Emerging infectious diseases*, 10(7), 1206.
- Homayuni, A. (2023). Investigating the correlation between perceived stress and health anxiety with obsessive–compulsive disorder and quality of life during COVID19 pandemic. *BMC psychology*, 11(1), 54.
- Hossain, M. M., Tasnim, S., Sultana, A., Faizah, F., Mazumder, H., Zou, L., ... & Ma, P. (2020). Epidemiology of mental health problems in COVID19: a review. *F1000 Research*, 9, 636.
- Hou, Y. J., Okuda, K., Edwards, C. E., Martinez, D. R., Asakura, T., Dinnon, K. H., & Baric, R. S. (2020). SARS-CoV-2 reverse genetics reveals a variable infection gradient in the respiratory tract. *Cell*, 182(2), 429-446.
- Huang, Y., Fietze, I., & Penzel, T. (2022). Analysis of the correlations between insomnia and mental health during the COVID19 pandemic in Germany. *Somnologie*, 26(2), 89-97.

- Jalalifar, E., Arad, A., Rastkar, M., & Beheshti, R. (2023). The COVID19 pandemic and obsessive-compulsive disorder: a systematic review of comparisons between males and females. *Acta Neuropsychiatrica*, 35(5), 270-291.
- Javed, H., Arjmand, A., Arshid, M., & Zahid, S. (2021). Gender difference in developing loneliness and obsession compulsion symptoms during COVID19 pandemic. *International Journal of Advance Research, Ideas and Innovations in Technology*, 7(3).
- Karatzias, T., Shevlin, M., Murphy, J., McBride, O., Ben-Ezra, M., Bentall, R. P., & Hyland, P. (2020). Posttraumatic stress symptoms and associated comorbidity during the COVID-19 pandemic in Ireland: A population-based study. *Journal of traumatic stress*, 33(4), 365-370.
- Kazmi, S. S. H., Hasan, D. K., Talib, S., & Saxena, S. (2020). COVID19 and lockdown: A study on the impact on mental health. Available at SSRN 3577515.
- Kessler, R. C., Foster, C. L., Saunders, W. B., & Stang, P. E. (1995). Social consequences of psychiatric disorders, I: Educational attainment. *American journal of psychiatry*, 152(7), 1026-1032.
- Khosravani, V., Aardema, F., Ardestani, S. M. S., & Bastan, F. S. (2021). The impact of the coronavirus pandemic on specific symptom dimensions and severity in OCD: A comparison before and during COVID19 in the context of stress responses. *Journal of Obsessive-Compulsive and Related Disorders*, 29, 100626.
- Klimkiewicz, A., Jasionowska, J., Schmalenberg, A., Klimkiewicz, J., Jasińska, A., & Silczuk, A. (2021). COVID19 pandemic-related depression and insomnia among psychiatric patients and the general population. *Journal of Clinical Medicine*, 10(15), 3425.
- Kolakowsky-Hayner, S. A., Goldin, Y., Kingsley, K., Alzueta, E., Arango-Lasprilla, J. C., Perrin, P. B., & Constantinidou, F. (2021). Psychosocial impacts of

the COVID19 quarantine: a study of gender differences in 59 countries. *Medicina*, 57(8), 789.

Kontis, V., Bennett, J. E., Rashid, T., Parks, R. M., Pearson-Stuttard, J., Guillot, M., & Ezzati, M. (2020). Magnitude, demographics and dynamics of the effect of the first wave of the COVID19 pandemic on all-cause mortality in 21 industrialized countries. *Nature medicine*, 26(12), 1919-1928.

Kyzar, E. J., Purpura, L. J., Shah, J., Cantos, A., Nordvig, A. S., & Yin, M. T. (2021). Anxiety, depression, insomnia, and trauma-related symptoms following COVID19 infection at long-term follow-up. *Brain, Behavior, & Immunity-Health*, 16, 100315.

Lahiri, A., Jha, S. S., Acharya, R., Dey, A., & Chakraborty, A. (2021). Correlates of insomnia among the adults during COVID19 pandemic: evidence from an online survey in India. *Sleep medicine*, 77, 66-73.

Laufer, A., & Shechory Bitton, M. (2021). Gender differences in the reaction to COVID19. *Women & health*, 61(8), 800-810.

Lavie, P. (2001). Sleep disturbances in the wake of traumatic events. *New England Journal of Medicine*, 345(25), 1825-1832.

Li, Y., Qin, Q., Sun, Q., Sanford, L. D., Vgontzas, A. N., & Tang, X. (2020). Insomnia and psychological reactions during the COVID19 outbreak in China. *Journal of Clinical Sleep Medicine*, 16(8), 1417-1418.

Liao, J., Liu, L., Fu, X., Feng, Y., Liu, W., Yue, W., & Yan, J. (2021). The immediate and long-term impacts of the COVID19 pandemic on patients with obsessive-compulsive disorder: A one-year follow-up study. *Psychiatry research*, 306, 114268.

Liao, Y., Feng, Y., Wang, B., Wang, H., Huang, J., Wu, Y., ... & Sun, H. (2020). Clinical characteristics and prognostic factors of COVID19 patients

- progression to severe: a retrospective, observational study. *Aging* (Albany NY), 12(19), 18853.
- Lin, L. Y., Wang, J., Ou-Yang, X. Y., Miao, Q., Chen, R., Liang, F. X., & Wang, T. (2021). The immediate impact of the 2019 novel coronavirus (COVID19) outbreak on subjective sleep status. *Sleep medicine*, 77, 348-354.
- Liu, C., Liu, D., Huang, N., Fu, M., Ahmed, J. F., Zhang, Y., & Guo, J. (2021). The combined impact of gender and age on post-traumatic stress symptoms, depression, and insomnia during COVID19 outbreak in China. *Frontiers in Public Health*, 8, 620023.
- Liu, N., Zhang, F., Wei, C., Jia, Y., Shang, Z., Sun, L., & Liu, W. (2020). Prevalence and predictors of PTSS during COVID19 outbreak in China hardest-hit areas: Gender differences matter. *Psychiatry research*, 287, 112921.
- Liyanage-Don, N. A., Winawer, M. R., Hamberger, M. J., Agarwal, S., Trainor, A. R., Quispe, K. A., & Kronish, I. M. (2022). Association of depression and COVID-induced PTSD with cognitive symptoms after COVID19 illness. *General Hospital Psychiatry*, 76, 45-48.
- Lone, S. A., & Ahmad, A. (2020). COVID19 pandemic – an African perspective. *Emerging Microbes & Infections*, 9(1), 1300–1308.
- Longo, L., Shalev, A., Liberzon, I., Marmar, C. (2017). Post-Traumatic Stress Disorder. *New England Journal of Medicine*, 376(25), 2459–2469.
- Mandelkorn, U., Genzer, S., Choshen-Hillel, S., Reiter, J., Meira e Cruz, M., Hochner, H., & Gileles-Hillel, A. (2021). Escalation of sleep disturbances amid the COVID19 pandemic: a cross-sectional international study. *Journal of Clinical Sleep Medicine*, 17(1), 45-53.
- Mao, J., Wang, C., Teng, C., Wang, M., Zhou, S., Zhao, K., & Wang, Y. (2022). Prevalence and associated factors of PTSD symptoms after the COVID19

- epidemic outbreak in an online survey in China: the age and gender differences matter. *Neuropsychiatric Disease and Treatment*, 18, 761.
- Mattioli, F., Stampatori, C., Righetti, F., Sala, E., Tomasi, C., & De Palma, G. (2021). Neurological and cognitive sequelae of COVID19: a four month follow-up. *Journal of neurology*, 268(12), 4422-4428.
- Mazza, M. G., Palladini, M., De Lorenzo, R., Bravi, B., Poletti, S., Furlan, R., & Benedetti, F. (2022). One-year mental health outcomes in a cohort of COVID19 survivors. *Journal of psychiatric research*, 145, 118-124.
- Mazza, M. G., Palladini, M., De Lorenzo, R., Magnaghi, C., Poletti, S., Furlan, R., ... & COVID19 BioB Outpatient Clinic Study group. (2021). Persistent psychopathology and neurocognitive impairment in COVID19 survivors: effect of inflammatory biomarkers at three-month follow-up. *Brain, behavior, and immunity*, 94, 138-147.
- Mazza, M.G., De Lorenzo, R., Conte, C., Poletti, S., Vai, B., Bollettini, I., Melloni, E., Furlan, R., Ciceri, F., Rovere-Querini, P., et al. (2020). Anxiety and depression in COVID19 survivors: Role of inflammatory and clinical predictors. *Brain Behav. Immun.*89, 594–600.
- Moreno, C., Wykes, T., Galderisi, S., Nordentoft, M., Crossley, N., Jones, N., & Arango, C. (2020). How mental health care should change as a consequence of the COVID19 pandemic. *The lancet psychiatry*, 7(9), 813-824.
- Morin, C. M., Belleville, G., Bélanger, L., & Ivers, H. (2011). The Insomnia Severity Index: psychometric indicators to detect insomnia cases and evaluate treatment response. *Sleep*, 34(5), 601-608.
- Narayan, K. G., Sinha, D. K., & Singh, D. K. (2025). *Handbook of Management of Zoonoses*. Springer.

- Norris, M. P., Arnau, R. C., Bramson, R., & Meagher, M. W. (2004). The efficacy of somatic symptoms in assessing depression in older primary care patients. *Clinical Gerontologist*, 27(1-2), 43-57.
- Nzimande, N. P., El Tantawi, M., Zuñiga, R. A. A., Opoku-Sarkodie, R., Brown, B., Ezechi, O. C., & Folayan, M. O. (2022). Sex differences in the experience of COVID19 post-traumatic stress symptoms by adults in South Africa. *BMC psychiatry*, 22(1), 238.
- Ochnik, D., Rogowska, A. M., Arzenšek, A., & Benatov, J. (2022). Longitudinal predictors of coronavirus-related PTSD among young adults from Poland, Germany, Slovenia, and Israel. *International journal of environmental research and public health*, 19(12), 7207.
- Orrù, G., Bertelloni, D., Diolaiuti, F., Mucci, F., Di Giuseppe, M., Biella, M., ... & Conversano, C. (2021, May). Long-COVID syndrome? A study on the persistence of neurological, psychological and physiological symptoms. In *Healthcare* (Vol. 9, No. 5, p. 575). MDPI.
- Panchal, N., Kamal, R., Orgera, K., Cox, C., Garfield, R., Hamel, L., & Chidambaram, P. (2020). The implications of COVID19 for mental health and substance use. *Kaiser family foundation*, 21, 1-16.
- Pappa, S., Barmparessou, Z., Athanasiou, N., Sakka, E., Eleftheriou, K., Patrinos, S., & Katsaounou, P. (2022). Depression, insomnia and post-traumatic stress disorder in COVID19 survivors: role of gender and impact on quality of life. *Journal of Personalized Medicine*, 12(3), 486.
- Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V. G., Papoutsis, E., & Katsaounou, P. (2020). Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID19 pandemic: A systematic review and meta-analysis. *Brain, behavior, and immunity*, 88, 901-907.
- Pfefferbaum, B., & North, C. S. (2020). Mental health and the COVID19 pandemic. *New England journal of medicine*, 383(6), 510-512.

- Pieh, C., Budimir, S., Delgadillo, J., Barkham, M., Fontaine, J. R., & Probst, T. (2021). Mental health during COVID19 lockdown in the United Kingdom. *Biopsychosocial Science and Medicine*, 83(4), 328-337.
- Pinchoff, J., Santhya, K. G., White, C., Rampal, S., Acharya, R., & Ngo, T. D. (2020). Gender specific differences in COVID19 knowledge, behavior and health effects among adolescents and young adults in Uttar Pradesh and Bihar, India. *PloS one*, 15(12), e0244053.
- Pozza, A., Ragucci, F., Angelo, N. L., Pugi, D., Cuomo, A., Garcia-Hernandez, M. D., & Starcevic, V. (2024). Worldwide prevalence of obsessive-compulsive symptoms during the COVID19 pandemic: A systematic review and meta-analysis. *Journal of Psychiatric Research*.
- Rapp, S. R., Parisi, S. A., Walsh, D. A., & Wallace, C. E. (1988). Detecting depression in elderly medical inpatients. *Journal of consulting and clinical psychology*, 56(4), 509.
- Renaud-Charest, O., Lui, L. M., Eskander, S., Ceban, F., Ho, R., Di Vincenzo, J. D., & McIntyre, R. S. (2021). Onset and frequency of depression in post-COVID19 syndrome: A systematic review. *Journal of psychiatric research*, 144, 129-137.
- Rodriguez-Besteiro, S., Tornero-Aguilera, J. F., Fernández-Lucas, J., & Clemente-Suárez, V. J. (2021). Gender differences in the COVID19 pandemic risk perception, psychology, and behaviors of Spanish university students. *International Journal of Environmental Research and Public Health*, 18(8), 3908.
- Salfi, F., Lauriola, M., Tempesta, D., Calanna, P., Socci, V., De Gennaro, L., & Ferrara, M. (2020). Effects of total and partial sleep deprivation on reflection impulsivity and risk-taking in deliberative decision-making. *Nature and science of sleep*, 309-324.

- Schou, T. M., Joca, S., Wegener, G., & Bay-Richter, C. (2021). Psychiatric and neuropsychiatric sequelae of COVID19—A systematic review. *Brain, behavior, and immunity*, 97, 328-348.
- Seens, H., Modarresi, S., Fraser, J., MacDermid, J. C., Walton, D. M., & Grewal, R. (2021). The role of sex and gender in the changing levels of anxiety and depression during the COVID19 pandemic: a cross-sectional study. *Women's Health*, 17, 17455065211062964.
- Sekowski, M., Gambin, M., Hansen, K., Holas, P., Hyniewska, S., Wyszomirska, J., & Łojek, E. (2021). Risk of developing post-traumatic stress disorder in severe COVID19 survivors, their families and frontline healthcare workers: what should mental health specialists prepare for?. *Frontiers in psychiatry*, 12, 562899.
- Shigemura, J., Ursano, R. J., Morganstein, J. C., Kurosawa, M., & Benedek, D. M. (2020). Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psychiatry and clinical neurosciences*, 74(4), 281.
- Struyf, T., Deeks, J. J., Dinnes, J., Takwoingi, Y., Davenport, C., Leeflang, M. M., ... & Cochrane COVID19 Diagnostic Test Accuracy Group. (2022). Signs and symptoms to determine if a patient presenting in primary care or hospital outpatient settings has COVID-19. *Cochrane database of systematic reviews*, (5).
- Sumner, J. (2016). PTSD signs and symptoms. SCAD Alliance.
- Talevi, D., Socci, V., Carai, M., Carnaghi, G., Faleri, S., Trebbi, E., ... & Pacitti, F. (2020). Mental health outcomes of the COVID19 pandemic. *Rivista di psichiatria*, 55(3), 137-144.
- Taquet, M., Geddes, J. R., Husain, M., Luciano, S., & Harrison, P. J. (2021). 6-month neurological and psychiatric outcomes in 236 379 survivors of

COVID19: a retrospective cohort study using electronic health records. *The Lancet Psychiatry*, 8(5), 416-427.

- Tarsitani, L., Vassalini, P., Koukopoulos, A., Borrazzo, C., Alessi, F., Di Nicolantonio, C., & d'Ettorre, G. (2021). Post-traumatic stress disorder among COVID19 survivors at 3-month follow-up after hospital discharge. *Journal of general internal medicine*, 36, 1702-1707.
- Tsukamoto, R., Kataoka, Y., Mino, K., Ishibashi, N., Shibata, M., Matsuo, H., & Fujiwara, H. (2021). Gender differences in anxiety among COVID19 inpatients under isolation: a questionnaire survey during the first and second waves of the COVID19 pandemic in Japan. *Frontiers in public health*, 9, 708965.
- Varshney, M., Parel, J. T., Raizada, N., & Sarin, S. K. (2020). Initial psychological impact of COVID19 and its correlates in Indian Community: An online (FEEL-COVID) survey. *PloS one*, 15(5), e0233874.
- Verma, S., & Mishra, A. (2020). Depression, anxiety, and stress and socio-demographic correlates among general Indian public during COVID19. *International Journal of Social Psychiatry*, 66(8), 756-762.
- Voitsidis, P., Gliatas, I., Bairachtari, V., Papadopoulou, K., Papageorgiou, G., Parlapani, E., & Diakogiannis, I. (2020). Insomnia during the COVID19 pandemic in a Greek population. *Psychiatry research*, 289, 113076.
- Wadsworth, L. P., Van Kirk, N., August, M., Kelly, J. M., Jackson, F., Nelson, J., & Luehrs, R. (2023). Understanding the overlap between OCD and trauma: Development of the OCD trauma timeline interview (OTTI) for clinical settings. *Current Psychology*, 42(9), 6937-6947.
- Wan, S., Xiang, Y. I., Fang, W., Zheng, Y., Li, B., Hu, Y., ... & Yang, R. (2020). Clinical features and treatment of COVID-19 patients in northeast Chongqing. *Journal of medical virology*, 92(7), 797-806.

- Wang, D., Zhao, J., Zhai, S., Ye, H., Bu, L., & Fan, F. (2022). Does sleep disturbance predicts posttraumatic stress disorder and depression among college students during COVID19 lockdown? A longitudinal survey. *Frontiers in Public Health*, 10, 986934.
- Wang, P. S., Aguilar-Gaxiola, S., Alonso, J., Angermeyer, M. C., Borges, G., Bromet, E. J., & Wells, J. E. (2007). Use of mental health services for anxiety, mood, and substance disorders in 17 countries in the WHO world mental health surveys. *The Lancet*, 370(9590), 841-850.
- World Health Organization. (2020). Mental health and psychosocial considerations during the COVID19 outbreak, 18 March 2020. In *Mental health and psychosocial considerations during the COVID19 outbreak*, 18 March 2020.
- Wright, K. M., Britt, T. W., Bliese, P. D., Adler, A. B., Picchioni, D., & Moore, D. (2011). Insomnia as predictor versus outcome of PTSD and depression among Iraq combat veterans. *Journal of clinical psychology*, 67(12), 1240-1258.
- Wu, K. K., Lee, D., Sze, A. M., Ng, V. N., Cho, V. W., Cheng, J. P., & Tsang, O. T. (2022). Posttraumatic stress, anxiety, and depression in COVID19 survivors. *East Asian Archives of Psychiatry*, 32(1), 5-10.
- Wu, Y., Fan, L., Xia, F., Zhou, Y., Wang, H., Feng, L., ... & Chen, L. (2024). Global, regional, and national time trends in incidence for depressive disorders, from 1990 to 2019: an age-period-cohort analysis for the GBD 2019. *Annals of General Psychiatry*, 23(1), 28.
- Xiao, S., Luo, D., & Xiao, Y. (2020). Survivors of COVID19 are at high risk of posttraumatic stress disorder. *Global health research and policy*, 5(1), 29.
- Ya'qoub, L., Elgendy, I. Y., & Pepine, C. J. (2021). Sex and gender differences in COVID19: More to be learned!. *American heart journal plus: cardiology research and practice*, 3, 100011.

Zandifar, A., Badrfam, R., Yazdani, S., Arzaghi, S. M., Rahimi, F., Ghasemi, S., & Qorbani, M. (2020). Prevalence and severity of depression, anxiety, stress and perceived stress in hospitalized patients with COVID19. *Journal of Diabetes & Metabolic Disorders*, 19, 1431-1438.

Zitting, K. M., Lammers-Van Der Holst, H. M., Yuan, R. K., Wang, W., Quan, S. F., & Duffy, J. F. (2021). Google Trends reveals increases in internet searches for insomnia during the 2019 coronavirus disease (COVID19) global pandemic. *Journal of Clinical Sleep Medicine*, 17(2), 177-184.