

PTSD and Sleep Disorders (With Special Emphasis on Sleep Paralysis) Among People in Relation to their Age, Gender, Family Type and Occupational Status

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Abstract - Sleep is an essential component of life for health and well-being. But millions of people don't get enough sleep, resulting in problems such as daytime sleepiness, poor decision-making, interference with learning, focus, concentration and accidents. The amount of sleep is also a determinant of various sleep disorders. Sleep disorders are the specific conditions that adversely affect the quality, amount and the timing of sleep one is able to get. Common sleep disorders include insomnia, restless legs syndrome, narcolepsy, sleep apnea and a very rare yet terrifying sleep condition named sleep paralysis. Sleep disorders can affect one's mental as well as physical health. The aim of this study is to review the existing literature and understandings about sleep disorders and the phenomenon of sleep paralysis, and studying the relationship which sleep disorders, specifically sleep paralysis has with post-traumatic stress disorder. It is also very important to have a deep research and analysis on sleep paralysis because it is a seriously traumatizing phenomenon, not yet researched upon fully, which can also cause some hazardous effects on the human body and mind.

Keywords: *Sleep, Sleep disorders, Post Traumatic Stress Disorder, Sleep Paralysis*

I. INTRODUCTION

A. Sleep and Sleep Disorders

Sleep is a behavioural state in mind, characterized by temporary rest, immobility and reduced perception of the environmental stimuli, in which consciousness and cognition are suspended. Sleep mainly occurs when the brain waves are slow, and the activity of many parts of the brain starts to coordinate into a synchronized background rhythm. The heart rate also slows, the muscles are relaxed, and the wakeful brain calms to the point, that a satisfying sense of relaxation occurs as we slowly mentally drift away from our surrounding environment into peaceful unconsciousness. Sleep, no matter how many hours we can manage to get each night, is not in one consistent long

episode. Instead there are two types of sleep: Rapid Eye Movement (REM) and Non-Rapid Eye Movement (NREM), and within these two types of sleep, there are majorly five stages: REM has one stage and NREM has four stages.

The past few decades have witnessed the impressive expansion and deepening of research regarding what might usually go wrong with sleep. In fact, the speed of the discovery has been so rapid and efficient as it lead to formation of an entirely new branch of medicine.

Only a few years ago, it was majorly possible to classify most of the disorders as instances of the classical or traditional medical specialties (neurology, psychiatry, etc.), but with the emerging field of sleep disorders and medicine, it has become more obvious that these classical and traditional categories will no longer suffice. Instead, the new field of sleep disorders and sleep medicine expands through multiple disciplines, including psychiatry, neurology, internal medicine and otolaryngology. As last counted, there were 77 separate sleep disorders. Of these, only a few are mainly encountered frequently by sleep medicine practitioners: Sleep Apnea, Insomnia, Narcolepsy, Restless Legs Syndrome, and Sleep Paralysis.

B. PTSD and Sleep Disorders

Post-traumatic stress disorder (PTSD) is a disorder brought about by an exposure to an extremely traumatic event, such as an violence, accident, or natural disaster. PTSD is quite a common reaction to military service in a war zone, people who have lost their loved ones, etc. Mostly, sleep disorders, also including frequent and terrifying nightmares and the condition of sleep paralysis, can be symptoms of PTSD. Other symptoms of sleep disruption may include sadness, flashbacks, anxiety, or uncontrollable anger.

C. Sleep paralysis

Sleep paralysis is a short period of time, where a person consciously experiences temporary paralysis either when going

to sleep (also known as hypnogogic) or waking up from sleep (also known as hypnopompic). During the incident of sleep paralysis, individuals are almost fully aware of their surroundings and happenings around them, and are able to open and close their eyes mostly, but they almost all the time feel unable to move their bodies. They may also face the feeling of troubled breathing and extremely high anxiety. Varying from person to person, these attacks or incidents may be characterized by the quite unpleasant feelings like excessively high fear, alleged demonic attacks, sensing of presence of someone else, anxiety, irritation, etc. and they very rarely feel any pleasant feelings like relaxation or calmness.

Sleep paralysis, at earlier times, was often misinterpreted as narcolepsy which is a totally different phenomenon that may occur anytime suddenly in the day besides of any kind of mental or physiological involvements and movements, such as talking to someone, driving or working, eating food, etc. These are the uncontrollable sleep attacks, mostly lasting for 10 to 20 minutes, soon after which, the person might feel very refreshed and energized. However, the presence of sleep paralysis is usually also found with narcolepsy (approximately 40% to 60% possibility) but, mostly not necessarily in all the patients of narcolepsy. On the contrary, sleep paralysis may also be present as a totally independent state in many cases.

It is usually a dissociative wakeful state of sleep, during which the inability of movement of body parts (temporary paralysis) occurs while individual is conscious. These findings are also supported by explanation of sleep paralysis with terms of REM sleep atonia, coexisting with conscious awareness.

Sleep paralysis is often associated with some unusual sleeping habits and stiff positions such as sleeping alone and sleeping in supine position (face up and flat-horizontal body posture) respectively. Sleep paralysis is less likely to occur in the unusual and uncomfortable sleeping positions, like sitting or lying on one's either side, or prone position (face down). Evidences from existing studies report the approximate duration of such attacks, lasting from few seconds to 10 minutes, which gets over mostly due to the strong efforts put by the sleeper to move their body. Research indicates a high prevalence (20% to 60%) of sleep paralysis with diverse hallucinations, giving rise to the supernatural or paranormal beliefs among most of the people's minds. This state of sleep paralysis, without any other symptoms of narcolepsy, is also known as Isolated Sleep Paralysis (ISP).

On its contrary, Recurrent Sleep Paralysis (RISP) is a state of the sleep, which may last for a much longer period of time, such as an hour or more, which can be terrifying, but rare. Historically, the original definition of sleep paralysis was somewhat formed by Samuel Johnson, in his work, 'A Dictionary of the English Language', as a nightmare. In the initial religious writings and literature, sleep paralysis can be understood as a demonic activity of some demon or evil spirit, sitting on the chests of the sleeping people, nowadays described

as 'Night Hag'. Although there is no certain factual proof of such occurrences, people tend to believe in them more than they believe in the rather scientific explanations of such events and incidents.

II. REVIEW OF LITERATURE

A. Mayer G et. al. (2010)

REM sleep behaviour disorder (RBD) is a parasomnia which is manifested by vivid, and often frightening dreams that are associated with simple or complex type of motor behaviour during REM phase of sleep. Patients often appear to be "acting out their dreams," in which, the exhibited behaviours mostly mirror the content of the dreams. The dream content often involves a theme of chasing or attacking.

Recent results of genome wide analyses suggest that narcolepsy is caused by an autoimmune process. In idiopathic RBD almost 80% of all affected persons develop a neurodegenerative disease. As narcolepsy is frequently associated with RBD (N+RBD) we were interested to study if neurodegeneration may occur in the course of the disease.

In this prospective study we could show that all but one young female patient with N+RBD develop signs of neurodegeneration in the course of the disease. If this neurodegeneration is only occurring in N+RBD or in all narcoleptic patients will be of interest in the understanding of the underlying pathology. The signs of neurodegeneration are very mild, cognitive or olfactory deterioration do not seem to be markers that signal the disease progress.

B. Marike Lancel et. al. (2021)

Sleep disturbances frequently co-occur with posttraumatic stress disorder (PTSD). Insomnia and nightmares are viewed as core symptoms of PTSD. Yet, relations between disturbed sleep and PTSD are far more complex: PTSD is linked to a broad range of sleep disorders and disturbed sleep markedly affects PTSD-outcome. This study provides a concise overview of the literature on prevalent comorbid sleep disorders, their reciprocal relation with PTSD and possible underlying neurophysiological mechanisms. Furthermore, diagnostic procedures, standard interventions—particularly first choice non-pharmacological therapies—and practical problems that often arise in the assessment and treatment of sleep disturbances in PTSD are described. Finally, some perspectives on future multidisciplinary clinical and experimental research to develop new, more effective sleep therapies to improve both sleep and PTSD were also presented in the study.

Insomnia symptoms, reported by ~70% of patients, are often related to increased autonomic arousal and fear of sleep: fear of loss of control and/or of having nightmares. PTSD is also associated with obstructive sleep apnea (OSA), concerning 40–90% of PTSD patients. The repeated OSA events lead to

frequent oxygen desaturations and arousals. Insomnia, nightmares and OSA may trigger and exacerbate each other, forming a vicious cycle.

In addition, multiple studies found a high proportion (around 33%) of periodic limb movement disorder (PLMD) in PTSD patients. The limb movements during sleep are associated with arousals/awakenings. Also relatively prevalent in PTSD are periods of sleep paralysis, typically occurring during (REM) sleep-wake transitions, which are often accompanied by distressing experiences, referred to as hypnagogic or hypnopompic hallucinations. Although the exact frequency is unclear, PTSD is also linked to remarkable disruptive nocturnal behaviours, including abnormal vocalizations and complex body movements. These parasomnias are generally thought to occur during non-REMS (confusional arousals, night terrors, sleepwalking), but may also take place during REMS, implying REMS behaviour disorder (RBD)-like periods of REMS without the usual muscle atonia (RWA) with dream enactment. Mysliwiec et al. proposed a distinct trauma-associated sleep disorder (TASD), conceptualized as a parasomnia encompassing nightmares, disruptive nocturnal behaviours as well as RWA. In support of this idea, a recent study in a large sample of veterans found self-reported dream enactment in nearly 40%.

Research strongly indicates that disturbed sleep is not merely a symptom or consequence of PTSD, but constitutes a predisposing, precipitating and perpetuating factor for PTSD. Sleep disturbances prior to and/or shortly after trauma increase the risk for PTSD. For instance, in patients admitted to an emergency department after a motor vehicle collision both pre-trauma insomnia and nightmares predicted subsequent PTSD development. Furthermore, sleep disturbances affect the clinical course of PTSD: poor sleep quality is associated with reduced responsiveness to trauma-focused therapy, while interventions targeting insomnia, nightmares or OSA improve sleep quality and ameliorate daytime PTSD symptoms. Moreover, sleep disturbances often persist after trauma-focused therapy. For example, Walters et al. recently showed that prolonged exposure therapy improved daytime PTSD symptoms, but did not ameliorate insomnia and nightmares in veterans with PTSD. Residual insomnia has been shown to be an important risk factor for the development of and relapse in diverse mental disorders.

C. Setty AR et. al. (2012)

Sleep parasomnias such as night terrors, like sleep paralysis, are common problems studied by sleep physicians. Few existing studies and researches have shown that sleep disordered breathing (SDB) can be a triggering factor of parasomnia in children and treatment of obstructive sleep apnea can lead to resolution of parasomnia. However, there is limited information on sleep complaints and other co-existing sleep disorders in this population.

A retrospective study of medical records was performed in children (1-20 yrs.) with parasomnia who were evaluated at the sleep disorders centre at Cincinnati Children's Hospital from January 2000 to September 2012. All children had a formal evaluation in sleep centre and subsequently underwent overnight sleep study. Any patients without complete records were excluded. 145 children with parasomnia met the criteria for entry into analysis. Analysis of sleep complaints and daytime symptoms revealed that 48.3% of patients reported snoring, 35.2% reported breathing pauses, 22.1% reported frequent leg movements during sleep, 41.4% reported insomnia, 41.4% reported mood disturbances, 7.6% reported daytime headaches, and 22.1% reported daytime sleepiness. Examination of standardized questionnaire demonstrated that 40.7% of patients had scores of Michigan PSQ suggestive of OSA (>0.33), 15.9% had significant EDS (Epworth sleepiness scale >10). From sleep study, 31.0% of patients was diagnosed with obstructive sleep apnea and 17.9% was diagnosed with periodic limb movement disorder (PLMD, PLM index $>5/hr$). In children with long term follow up, treatment of OSA and PLMD led to improvement of parasomnia.

Symptoms of SDB, insomnia and PLMD are common in Pediatric parasomnia. Polysomnography identifies frequent and co-existing sleep disorders, such as PLMD and obstructive sleep apnea. Parasomnia in children is mainly associated with significant major daytime consequences which includes daytime headaches, mood disturbances and EDS. Further study is essentially needed to evaluate whether the daytime consequences are the ultimate result of either parasomnia or co-existing sleep disorders.

D. Orff HJ et. al. (2016)

Many Veterans of Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) experience post-concussive symptoms associated with a history of mild to moderate traumatic brain injury (mTBI).

Sleep complaints are highly prevalent in post-mTBI Veterans, however the degree and impact of impairment, relative to Veterans who have not experienced mTBI, is largely unknown. Veterans enrolled for studies of mTBI at the VA San Diego Healthcare System received a comprehensive screening of sleep (Pittsburgh Sleep Quality Inventory-PSQI; Insomnia Severity Index-ISI; Epworth Sleepiness Scale-ESS; Multidimensional Fatigue Inventory-MFI), psychiatric symptoms, post-concussive symptoms, alcohol/substance use, and quality of life. Results were compared using independent samples t-tests and bivariate correlations to explore differences between Veterans with and without mTBI.

21 Veterans with a history of mTBI and 17 Veterans with no history of mTBI were studied. Compared to the non-mTBI group, the mTBI group exhibited significantly greater sleep disturbance, more insomnia symptoms, more daytime sleepiness, and higher levels of fatigue.

The mTBI group also exhibited significantly elevated depressive, anxious, PTSD related, and post concussive / neurobehavioral symptoms, however, the groups did not differ on alcohol/substance abuse or quality of life measures. PSQI Global scores were significantly correlated with lower quality of life and higher PTSD symptom severity in both groups. Additionally, PSQI Global scores were correlated with higher levels of post-concussive symptoms, anxiety symptom severity, and fatigue severity in mTBI Veterans.

Veterans with mTBI exhibit increased levels of sleep disturbance relative to Veterans who have not experienced mTBI. Poor sleep also appears to be associated with greater neuropsychiatric impairment in these individuals. Future research should attempt to examine the causal relationships between mTBI, sleep disturbance, and neuropsychiatric functioning in Veterans with mTBI.

E. Pruiksma KE et. al. (2006)

Sleep disturbances are among the ones that are the most frequently reported symptoms of PTSD. Evidence suggests insomnia and nightmares are rather resistant to trauma-focused cognitive behavioural therapy (CBT), despite general improvements in PTSD. This study aims to a) describe the pattern of sleep disturbances in active duty Soldiers who completed group treatment for PTSD and b) to determine if group Cognitive Processing Therapy (CPT) for PTSD is more effective than group Present Centred Therapy (PCT) for PTSD at reducing sleep disturbances.

Ninety-one active duty military personnel diagnosed with PTSD participated in a randomized clinical trial of group CPT (n=43) vs group PCT (n = 48). Participants completed the PTSD Symptom Scale Interview (PSSI) at baseline and 2 weeks post-treatment. A rating of 1 (range 0-3) was used to indicate symptom endorsement.

At baseline, insomnia was the most frequently reported PTSD symptom on the PSSI (95%) followed by anger (94%). Nightmares were reported by 73%. Of participants who no longer met criteria for PTSD at post-treatment (n = 16), hypervigilance (88%) and difficulty sleeping (81%) were the most commonly reported residual symptoms followed by concentration problems (63%). Nightmares and hypervigilance were the most intractable symptoms with a 6% reduction in prevalence rates at post-treatment followed by insomnia which had a 13% reduction. Neither insomnia nor nightmares changed significantly after treatment. McNemar's tests indicate there were no differences between CPT and PCT in relieving insomnia or nightmares. Results at 6-month post-treatment will also be presented as these data are currently being collected. This study is consistent with previous reports suggesting nightmares and insomnia are resistant to current treatment approaches for PTSD. This suggests these symptoms may require specific interventions. Future research should also

examine protocols that combine interventions targeting both PTSD and sleep disturbances.

F. Article by Thomas C. Neylan (2008)

The National Comorbidity Survey estimates that approximately 50% of the population in the United States is exposed to traumatic events and that the lifetime prevalence of post-traumatic stress disorder (PTSD) is approximately 7.8%. Multiple studies have demonstrated that patients with PTSD complain of recurrent nightmares and sleep continuity disturbances, which are listed separately in the re-experiencing and hyperarousal clusters in DSM-IV.

Disturbed sleep is associated with a wide range of adverse conditions. Subjectively, these include fatigue, cognitive impairment, mood disturbance, and reduced quality of life. Objectively, disturbed sleep has been associated with poorer job performance and increased frequency of accidents, aggression, and use of alcohol. Furthermore, there is a large body of evidence that demonstrates that chronic sleep loss is associated with poor psychomotor performance, especially when tasks require sustained vigilance. Compounding such effects is the inability of many sleep-deprived persons to self-monitor their sleepiness or performance deficits.

Sleep disturbances are associated with an increased risk for physical health complaints, diminished ability to cope with stress, and a reduced capacity to carry out daily activities. CBT for insomnia has shown some promise for addressing insomnia complaints. It remains to be seen whether CBT-I without a focus on trauma experiences can reduce nightmares. Sedative-hypnotic drugs are virtually untested for PTSD despite the prominence of sleep complaints.

G. Article by Brandon Peters (2021)

This article stated that the initial symptoms associated with post-traumatic stress disorder (PTSD) may be triggered by an upsetting event, but the effects may linger for months or even years. The effects of PTSD on sleep may be profound and range from insomnia to nightmares. There are clearly effects of PTSD on sleep. Some surveys suggest that 70% of people with PTSD have sleep complaints, most often insomnia and nightmares.

The disruptions that occur in sleep often relate to the underlying symptoms of PTSD. The hyperarousal that occurs may result in extreme hypervigilance and paranoia. For example, if you are afraid of being attacked in your sleep, you may sleep lightly and be aware of every creak in the house during the night. This anxiety may lead to persistent insomnia. It may also be associated with isolated sleep paralysis.

PTSD can also cause flashbacks and nightmares. These episodes consist of re-experiencing the traumatic event. They can be quite vivid and often are recalled upon awakening. They

may lead to movements or even actions during sleep and the transition to wakefulness. This may result in violent or even injury-provoking behaviours. There may be sleep-talking. In addition, hallucinations during the transition to or from sleep may occur.

H. Literature Stating Neurochemistry of Sleep Paralysis

The latest researches on sleep disorders, sleep disturbances and sleep paralysis covers a wide range of explanations supporting the scientific views and causes. In their recent study on sleep paralysis, Jalal and Ramachandran have been identified a significant role of mirror neurons. The chemistry of sleep paralysis stating that it mainly occurs due to stress which disturbs the normal sleep cycle, simultaneously disturbing the normal chemical flow in brain which prevents us to be awake during sleep, was explained by Rose in her recent article on sleep paralysis.

During the sleep paralysis phase, this flow of chemicals in brain become unusual and disrupted from the cycle in a partial awakening state. According to her, this can be the reason of various hallucinations of such states when the partial brain wants to dream or stay in dream and the rest wants to wake up instantly due to the restlessness and stressful state.

Cheyne et al. explains the phenomenon of sleep paralysis with the help of a three-factor structured model which includes:

- Incubus: It is a hyper vigilant state of mid brain.
- Intruder: It specifies a state of hyperpolarization of motor neurons on perceptions of respiration.
- Unusual bodily experiences: These are generated by conflicts of endogenous and exogenous activation related to body position or movement.

This view has been confirmed by various researchers in the further attempts to understand sleep paralysis. Moreover, many explanations of these visual hallucinations are also seen in the literature stating the cause to the stimulation and changes in the visual areas of the occipital cortex during the PGO waves spike (an indicator of hyper alertness), in which, the rapid eye movements (REM Stage) may reflect attempts to try and scan the images, or conversely, the images may be formed by the oculomotor impulses which are in response to the direct stimulation coming from the Gigantocellular pontine reticular field.

I. Literature Stating Psychogenesis of Sleep Paralysis

Psychodynamics of sleep paralysis are not explained enough in the previous studies, some researches, however, have explained it quite differently. The variables associated with sleep paralysis have been identified and mentioned by Denis et al. as stress, substance use, genetic factors, sleep disorders, physical illness, anomalous beliefs, personality, etc.

Schenck's study interprets it as an existing but not yet noticeable homosexuality in symptom-formation and probably this may be the reason many people report of experiencing sexual assaults or harassments during these attacks. Rushton, in his findings reported quite normal EEG patterns during the sleep paralysis incidents and phases, supported this view of Schenck. Out of all the possible explanations, nightmares, stress, and psychiatric disorders etc. emerge as its possible precipitators and causes but factually, neurophysiological explanations are more prominently found and accepted over the psychological ones.

Despite the several attempts done to explain the deep root cause of sleep paralysis, modern research, in some ways, fails to explain its actual causes, precipitators, exaggerators and therefore, here, the paranormal explanations take place to fill this void. The patterns, genesis, and determinants of sleep paralysis have been covered at a greater and wider length since its commencement to the contemporary period, as not infrequently, the concept is unfamiliar to majority of the population, even researchers.

Some qualitative preliminary studies and observations have been made with the first few medically reported cases of sleep paralysis with respect to selected psychological aspects and determinants. More specifically stating, this study was primarily carried out to fulfil the following objectives:

- To examine the link and association of spiritual beliefs in a group of people experiencing sleep paralysis.
- To identify the link and accuracy of paranormal beliefs in these cases.
- To evaluate the role of stressful life events in causing the underexplored disorder of sleep paralysis.
- To explore and understand the relationship between feelings of inadequacy and sleep paralysis.

It was broadly understood to be hypothesized that the sufferers of sleep paralysis are more prone to stress, anxiety and to develop greater intensity of spiritual and paranormal beliefs.

J. Esther Olunu et. al. (2018)

Sleep paralysis is a state linked with the inability to move (becomes paralysed temporarily) that occurs when an individual is almost asleep or just waking up. It could often occur in healthy people as isolated sleep paralysis. It has also been associated with other underlying and unidentified psychiatric and sleep disorders. Statistics also show that 8% of the overall population suffers from sleep paralysis. Although this estimate has been described inaccurately, there is still no standard definition or aetiology to diagnose sleep paralysis and its causes. There are several speculations and assumptions describing sleep paralysis in the current and past literature. These descriptions can be seen as either medical-based or cultural-based. The difference among ethnic or cultural groups

and medical professionals and researchers in identifying sleep paralysis has led to the various approaches to understanding and managing the condition.

This review aimed to medically describe sleep paralysis and how it has been interpreted and managed among various cultural and ethnic groups. The causes of sleep paralysis are unknown, but various studies and researchers have identified the potential risk factors such as trauma, substance use, stress, physical illness, genetic influences, and irregular sleeping habit.

Moreover, studies have shown that sleep paralysis is particularly prevalent and sometimes dominant in adults and adolescents who have past histories of sexual abuse in childhood, people with panic disorder and post-traumatic stress disorder. A study conducted in Japan revealed that around 40% of the population experiences sleep paralysis. The highest prevalence has also been seen reportedly in Cambodians, who are also believed to have an intense history of severe traumas, panic disorders and post-traumatic stress disorder.

The Medical Perspective of Sleep Paralysis: The dream occurs or takes place in the REM phase of sleep, where there is no muscle activity or motion. We tend to have our most emotional and intense dreams during REM phase of sleep, and to stop us from adversely reacting and acting out on these dreams, the brain halts the muscle movement and keeps us temporarily paralyzed. This temporary paralysis (postural atonia) is, as a result of the suppression of the skeletal muscle tone by the ventromedial medulla and the pons, effected by the neurotransmitters glycine and γ -Aminobutyric acid which majorly inhibits the motor neurons in the spinal cord. A situation where we begin to wake up mentally and then we become aware while still under REM stage paralysis is termed sleep paralysis. The victim is left breathless and feeling trapped, not at all able to move or speak upon awakening or falling asleep, however, the individual can breathe heavy and is almost fully aware of his surroundings.

The Cultural approach to sleep paralysis: There is a lot of religious and cultural influences in cases of sleep paralysis which have been seen worldwide. Based on several kinds and levels of literature, Isolated sleep paralysis has not been linked to any form of long-term effect or side-effect on the sufferer. Individuals from different cultural backgrounds and regions have developed a way to manage it or suppress it, although it is not confirmed if these remedies work.

Sleep paralysis has received much more attention from the unscientific world than the scientific world. The stigma and stereotypical superstitions associated with individuals suffering from sleep paralysis has also prevented sufferers from reporting the issue at medical institutions. As such, most sufferers have been noticed reverting to other confidential means such as religious leaders, herbalists, and traditional priests for a solution. Thus, it is important to sensitize the public and make

them aware on what sleep paralysis is and how it should be approached and managed medically. However, the current knowledge on sleep paralysis is somewhat limited and narrow as there is still a lack of reports on the risk factors, triggers, and the long-term damaging effects of sleep paralysis.

K. Azal Ikhlaiq et. al. (2021)

Sleep paralysis (SP) is described as a phenomenon which might be perceived as brief episodes of powerlessness, and inability to talk and move. Sleep paralysis has typically been depicted as far as its relationship with narcolepsy. Surely, it is thought of as one of the segments of the narcolepsy (i.e., cataplexy, sleep attack, sleep paralysis, and hypnagogic hallucinations).

In this study, the correlation between Sleep Paralysis and anxiety symptoms among undergraduate medical students of Pakistan was inspected. It was a questionnaire based cross-sectional study. All pre-tested, pre-designed questionnaires were administered to a number of 100 participants and any association between sleep paralysis and PTSD symptoms, Perceived Stress, or Pathological worry was found. There was a positive correlation between Experience of Sleep Paralysis and PTSD Symptoms ($d=0.319$ and $p=0.001$), Pathological Worry and Sleep Paralysis ($p=0.005$ and $d=0.270$), and Perceived Stress and Sleep Paralysis ($p<0.001$ and $r=-0.394$). Pakistani population particularly medical undergraduates showed a high prevalence (52.8%) of frequent experiences of sleep paralysis. Also, the high rate of occurrence among the females than males and higher rates in adolescents are particularly of concern. Statistically significant correlation between sleep paralysis and PTSD symptoms, PSS value, and PSWQ score was found.

The results showed that more than half of the approximately 52.8% reported to be sleep paralysis experiencers among the normal individuals. It affirms the idea that of SP in normal individuals which is an alarming situation because of its effects on sleep cycles and general mental health of the individual and among them almost 20% reported to have experienced SP more than 4 times during the past year. This high frequency of sleep paralysis affirms the idea of recurring isolated sleep paralysis as shown by the previous research and this is an alarming situation as the more specific "recurrent isolated sleep paralysis" is widely mistaken as sleep-wake disorder by non-sleep specialists. The events experienced during isolated sleep paralysis are also quite similar in terms of hypnagogic and hypnopompic hallucinations and inability to move which have been reported by 76% of the individuals which is depicted in terms of visual hallucinations by Hinton and colleagues showing that approximately 90% of highly traumatized Cambodian Refugees have visual hallucinations during an episode of SP.

This study was the first to describe a correlation among SP and trauma and anxiety symptoms in Pakistan. Pakistani population particularly medical undergraduates have a high

prevalence of frequent experiences of sleep paralysis. Also, the high rate of occurrence among the females than males and higher rates in adolescents are particularly of concern. Statistically significant correlation between sleep paralysis and PTSD symptoms, PSS value, and PSWQ score is found. So, efforts should be made to remove the factors responsible for anxiety and distress among masses.

L. Dan Denis et. al. (2018)

According to this study, sleep paralysis is a relatively common but under-researched phenomenon. While the causes are unknown, a number of studies have investigated potential risk factors. In this article, a systematic review on the available literature regarding variables associated with both the frequency and intensity of sleep paralysis episodes was conducted. A total of 42 studies met the inclusion criteria.

For each study, sample size, study site, sex and age of participants, sleep paralysis measure, and results of analyses looking at the relationship(s) between sleep paralysis and associated variable(s) were extracted. A large number of variables were associated with sleep paralysis and a number of themes emerged. These were: substance use, stress and trauma, genetic influences, physical illness, personality, intelligence, anomalous beliefs, sleep problems and disorders (both in terms of subjective sleep quality and objective sleep disruption), symptoms of psychiatric illness in non-clinical samples (particularly anxiety symptoms), and psychiatric disorders. Sleep paralysis appears to be particularly prevalent in post-traumatic stress disorder.

This review suggested a couple of areas where potential interventions could be targeted. As factors such as anxiety and stress appear to be linked with sleep paralysis, techniques aiming to reduce levels of these factors may also help in alleviating sleep paralysis episodes. Cognitive behavioural therapy (CBT) has been shown to be useful in reducing levels of anxiety and coping with stress, and has also been shown to be effective in various sleep disorders, particularly insomnia. A CBT for isolated sleep paralysis manual now exists as a promising therapy, however systematic evidence for its effectiveness is still lacking.

M. Paulina Wróbel-Knybel et. al. (2022)

In this study, sleep paralysis (SP) is defined as a transitional dissociative state that usually occurs while waking up from sleep or falling asleep. SP episodes manifest as an inability to move (muscle atonia) as in normal sleep, but the person stays awake. It often proceeds with hypnopompic and hypnagogic hallucinations: visual, tactile, kinesthetic, auditory, and less often olfactory. There are three types of hallucinations typical of SP: (1) the “intruder”, associated with a sense of a threatening/hostile presence, fear, auditory and visual hallucinations (often a shadow or dark form); (2) the “incubus”, associated with a feeling of tightness or pain on the chest,

breathing difficulties, and sometimes visual hallucinations (figure sitting on the chest); and (3) vestibular-motor hallucinations, described as unusual bodily sensations such as feelings of levitation, spinning, autoscapy, and out-of-body experiences (OBEs). SP episodes are often accompanied by various psychosomatic sensations, among which are the occurrence of the feeling of pressure on the chest, difficulty breathing, a feeling of suffocation, heart palpitations, sweating, and nausea. This is usually associated with increased fear or fear of dying.

Sleep paralysis (SP) is a hypnagogic or hypnopompic state associated with the inability to move while conscious. Recurrent isolated sleep paralysis (RISP) is a type of REM parasomnia. Individuals experiencing anxiety disorders, PTSD, exposure to chronic stress, or shift work are at risk of developing this sleep disorder. This study aimed to assess: (1) the prevalence, frequency, and symptomatology of SP, and (2) the impact of the severity of anxiety symptoms, perceived stress, and lifestyle mode variables on the frequency and severity of SP in four professional groups at high risk of SP ($n = 844$): nurses and midwives ($n = 172$), policemen ($n = 174$), teachers ($n = 107$), and a group of mixed professions—“other professions” ($n = 391$).

The study used a battery of online questionnaires: the Sociodemographic and Health Status Questionnaire, the SP-EPQ, the PCL -5, the STAI-T, the PSWQ and the PSS-10. The prevalence of SP was the lowest among policemen (15.5%) and the highest in the group of “other professions” (39.4%). The association of SP with symptoms of PTSD and anxiety was confirmed in the group of nurses and “other professions”. Among other factors modulating the incidence and severity of SP were: age, BMI, smoking, alcohol consumption, sleep duration, and perceived stress. This study indicates that there exist links between SP and psychological and lifestyle factors, suggesting a complex aetiology for this sleep disorder. Due to the high prevalence of SP in the studied groups of occupations, further research is necessary to develop preventive and therapeutic methods for SP.

The results of our study indicate that the prevalence of sleep paralysis in the occupational groups exposed to stress is higher than in the general population. The presence of this sleep disorder was associated with various variables depending on the professional group studied, which may be used in the future in planning preventive and therapeutic interventions, e.g., the reduction of alcohol consumption and smoking for policemen in particular, while for nurses, focusing on reducing anxiety levels and stress at the outset. Of course, further research is required to detail the impact of the variables we studied, in terms of personality (trait anxiety), stress-related (PTSD), and lifestyle-related variables. It would also be important to define the nature of these relationships because it is not clear whether certain personality traits associated with a greater risk of sleep paralysis choose jobs associated with greater stress or whether difficult working conditions (shift work, high levels of stress)

increase the risk of SP. We suppose that the aetiology of this disorder is complex and that both factors may be important, interact with each other, and differ between occupations. The third factor, which has not been identified so far, cannot be ruled out either.

N. Jean-Christophe Terrillon et. al. (2001)

The phenomenon of sleep paralysis has been attracting an increasing amount of attention in the scientific (medical) field only in the past few years, even though the occurrence of some phenomenon, which may be described as sleep paralysis, has been noticed, observed and documented as early as Hellenistic times. At a basic level, the term “Isolated Sleep Paralysis” or ISP is used to differentiate between the usual generalized muscle atonia and an abnormal generalized muscle atonia, which is a characteristic of REM sleep (Rapid Eye Movement - dream state), as well as to differentiate such a condition from sleep paralysis as a symptom of narcolepsy (which includes a combination of several diverse symptoms).

Isolated sleep paralysis (ISP) is very poorly understood, which has attracted highly increased attention in the recent years in both, medical community (Parkes & Dahlitz, 1993; Shimizu & Hishikawa, 1995) as well as psychological research (Fukuda et al., 1987, 1991; 1993; Takeuchi et al., Wing et al., 1994). Although the occurrence of isolated sleep paralysis is quite common, recurrent isolated sleep paralysis (RISP) is a rather rarer type of sleep paralysis which is characterized by frequent episodes or a complex sequence of episodes, where its total duration may exceed terrifyingly one hour, and particularly by the range and the sense of perceived reality of this subjective phenomenon which is experienced by the sufferer during episodes. Although such phenomenon are usually medically viewed as hypnagogic or hypnopompic hallucinations, there is yet at present no particular integrated model which adequately and accurately explains the assembling of psychological, cognitive, neurological, and physiological components of RISP.

In this paper it was attempted to synthesize information on RISP which was gathered from various diverse sources and to conjecture the most possible connections between RISP and other poorly understood phenomena at various different levels: at a neurophysiological level, neuropsychological level, with most anxiety disorders (Suarez, 1991; Paradis et al., 1997), with Sudden Unexplained Nocturnal Death Syndrome (SUNDS) (Nimmanit et al., 1991; Randall, 1992; Adler, 1995), and the temporary periodic paralyses (Stedwell et al., 1992); at a neurocognitive level, with vivid lucid dreaming (LaBerge, 1985); at a level that examines in detail the possibility of the manifestation and occurrence of paranormal phenomena and their intensity during RISP episodes, with Near-Death-Experiences (NDE) (Moody, 1976; Ring, 1979) and with Out-of-Body Experiences (OBE) (Tart, 1968; Osiris, 1981). Finally, the authors of this study performed a statistical analysis on RISP on a sample of 250 direct and indirect respondents to a

message which was posted initially by one of the authors on the registered sleep website of the University of California in Los Angeles (UCLA). The preliminary results indicate that around 90% of the respondents experience a very intense fear during their RISP episodes, and about 50% have experienced something paranormal or supernatural.

Neurocognitive Aspects of Recurring Isolated Sleep Paralysis – Hypnagogic or Hypnopompic Hallucinations and Lucid Dreams: The often experienced sleep paralysis may last from a few seconds to several terrifying minutes, which are occasionally longer, and are a pure motor inhibition, individuals have a subjective feeling of wakefulness, an almost complete perception

of the actual environment (in most of the cases they can simply open their eyes and look at their surroundings), but they are totally unable to move despite concerted and desperate efforts to do so. In the case of RISP, in addition to the primary feature of temporary paralysis, a large collection of secondary features called the hypnagogic and hypnopompic “experiences” (hallucinations) occur. The terms “hypnopompic” and “hypnagogic” refer to the experiences that take place during the process of waking up and while drifting to sleep, respectively. More rarely, other features which are tertiary features, that go far beyond the hypnagogic and hypnopompic experiences, occur during the “full-blown” episodes of RISP. The “experiences” which are a part of both, the secondary and tertiary features, are usually described as “hallucinations” in the scientific literature on sleep paralysis.

A hallucination is a vivid experience of perception, in almost the absence of an appropriate stimulus (mostly from the actual world), but which has the impact of a traditional perception and it is not at all under the control of the experienter.

It is specifically generated by internal stimuli which are inside the brain. While lucid dreaming, diminished self-reflection, loss of critical insight, and impaired logic that is typical of normal dreaming, does not actually seem to occur, critical thinking incidents can still take place there. To conclude, it can be honestly said that most aspects of sleep paralysis, of recurring isolated sleep paralysis in particular, are still largely not understood and studied in detail, may be partly because of the lack of research in that area and also partly because of its ‘lacking of factual basis’ nature. It is true that sleep paralysis has been receiving increasing attention in the scientific field in recent years, particularly by psychologists and researchers in various universities or research centres, such as the departments of psychology at Fukushima university in Japan, at the university of Waterloo in Canada, or at the university of Edinburgh in the UK (Fukuda et al., 1987, 1991, 1993; Takeuchi et al., 1992, 1994).

O. Paulina Wróbel-Knybel et. al. (2022)

Sleep paralysis is a hypnopompic or hypnagogic state which is associated with the temporary inability to move while being

conscious and total awareness of the surroundings. Recurrent isolated sleep paralysis is a type of REM stage parasomnia. Individuals experiencing post-traumatic stress disorder, anxiety disorders, exposure to chronic stress, or shift work are at risk of developing this terrifying sleep disorder. This study was aimed to assess: the frequency, prevalence, and symptomatology of sleep paralysis, and the impact of the severity and intensity of perceived stress, anxiety symptoms, and lifestyle variables on the severity and frequency of sleep paralysis in four professional groups which are at high risk of sleep paralysis ($n = 844$): policemen ($n = 174$), nurses and midwives ($n = 172$), teachers ($n = 107$), and a group of mixed professions, named as "other professions" ($n = 391$). The study used a battery of online inventories: the Sociodemographic and Health Status Questionnaire, the PCL -5, the SP-EPQ, the STAI-T, the PSS-10 and the SP-EPQ. The prevalence of Sleep paralysis was the lowest among policemen (15.5%) and the highest was in the group of other professions (39.4%).

The association of sleep paralysis with symptoms of post-traumatic stress disorder and a certain type of anxiety was confirmed in the group of nurses and other professions. Among other factors modulating the incidence, severity and frequency of sleep paralysis were: age, BMI, , alcohol consumption, smoking, perceived stress, and sleep duration. This study indicates that there is a link between sleep paralysis and psychological and lifestyle factors, which is suggesting a complex aetiology for this particular sleep disorder. Due to the high number of cases of sleep paralysis in the studied groups of occupations, further research is becoming necessary to develop preventive and therapeutic methods for sleep paralysis.

The results of this study indicate that the occurrence of sleep paralysis in the studied occupational groups exposed to high stress is much more than in the regular population. The presence of this sleep disorder was linked with various variables depending on the professional groups that were studied, which may be further used in planning preventive and effective therapeutic interventions, for example, the reduction of the amount of alcohol consumption and smoking for the policemen in particular, while for the nurses, focusing on reducing stress and anxiety levels. Further research is definitely required to study in detail, the impact of the variables studied here in brief, in terms of personality-related variable (particularly trait anxiety), stress-related variable (post-traumatic stress disorder), and lifestyle-related variables. It would also be significant to define the true nature of these relationships because it is not quite clear whether certain personality traits linked with a greater risk of sleep paralysis choose jobs that are associated with greater levels of stress or whether difficult working conditions (high levels of stress due to shift work) increases the risk of sleep paralysis. The aetiology of this disorder is quite complex and both factors may be equally important, interact with each other, and somewhat differ between occupations.

P. Cyle Johnson (2023)

According to this study, sleep paralysis is a parasomnia that occurs when the muscle atonia of rapid eye movement sleep extends into wakefulness and can be accompanied by intense fear and hallucinations. The primary neurophysiological processes that lead to sleep paralysis are well known and include alterations in the gamma-aminobutyric acid, glycine, orexin, and serotonin systems. Despite a universal neurophysiological basis, there is large variability in subjective experiences across cultures.

Neurophysiologically, during normal REM sleep, neurons containing gamma-aminobutyric acid and glycine that originate in the ventral medial medulla directly inhibit motor neurons in the spinal cord to produce a state of atonia. This feature of REM sleep prevents an individual from acting out dreams and reduces the potential for injury during this stage of sleep. Conversely, wakefulness is regulated by the neuropeptide orexin, which stimulates noradrenergic, histaminergic, cholinergic, and serotonergic neurons that in turn promote cortical arousal. Sleep paralysis occurs when these two processes pathologically overlap and the atonia of REM sleep persists into wakefulness.

Sleep paralysis is certainly not the only neuropsychiatric disorder in which culture has been identified to explicitly shape symptoms. For instance, fear of personal embarrassment and negative evaluation by others is considered the hallmark of social anxiety disorder. However, cross-cultural studies have shown that social anxiety disorder in some cultures can instead be characterized by a fear that the individual will offend others.

Q. Brian A. Sharpless et. al. (2015)

Although previous chapters have argued for sleep paralysis as a relatively unexplored manifestation of psychopathology in its own right, this study summarizes and evaluates the growing body of literature associating sleep paralysis with other, more conventional forms of psychopathology. Following the presentation of research associating sleep paralysis with higher levels of psychiatric comorbidity in general, the relatively extensive literature linking sleep paralysis with traumatic stress is reviewed. Relevant roles of dissociation, hypnotisability, hyperarousal, hypervigilance, peritraumatic tonic immobility, and sleep disruption are discussed in this. Sleep paralysis's potential associations with specific anxiety disorders (e.g., panic disorder) and the more general constructs of anxiety sensitivity and death distress are detailed. Limited data on unipolar and bipolar mood disorders and psychotic disorders are also briefly discussed.

R. Ambra Stefani et. al. (2020)

This study focuses on nightmare disorder and recurrent isolated sleep paralysis are rapid eye movement (REM) parasomnias that cause significant distress to those who suffer from them. Nightmare disorder can cause insomnia due to fear of falling

asleep through dread of nightmare occurrence. Hyperarousal and impaired fear extinction are involved in nightmare generation, as well as brain areas involved in emotion regulation. Nightmare disorder is particularly frequent in psychiatric disorders and posttraumatic stress disorder. Nonmedication treatment, in particular imagery rehearsal therapy, is especially effective. Isolated sleep paralysis is experienced at least once by up to 40% of the general population, whereas recurrence is less frequent. Isolated sleep paralysis can be accompanied by very intense and vivid hallucinations. Sleep paralysis represents a dissociated state, with persistence of REM atonia into wakefulness. Variations in circadian rhythm genes might be involved in their pathogenesis. Predisposing factors include sleep deprivation, irregular sleep–wake schedules, and jetlag. The most effective therapy consists of avoiding those factors.

Sleep paralysis not occurring in association with narcolepsy is defined as isolated sleep paralysis. RISP is defined by the ICSD-3 as a recurrent inability to move the trunk and all the limbs at sleep onset (hypnagogic form) or upon awakening from sleep (hypnopompic form). Each RISP episode can last from a few seconds to a few minutes and causes clinically significant distress including bedtime anxiety or fear of sleep. The episodes resolve spontaneously or upon sensory stimulation, e.g., when someone touches the person or an alarm clock sounds, or sometimes also by subject-initiated movements of the eyes. RISP should not be better explained by another sleep disorder (especially narcolepsy), mental disorder, medical condition, medication, or substance use.

The first-ever occurrence of sleep paralysis can be very frightening due to the mixture of subjective wakefulness and complete inability to move (if individuals only experience very slow movement or feel as if their body is heavier than usual, this is not sleep paralysis) combined with subjective awakenings. In addition, because not only the striated limb muscles are affected but also the auxiliary respiratory muscles (intercostal muscles), and the diaphragm is the only respiratory muscle not affected during the episodes, patients during sleep paralysis often experience some oppression/pressure on the chest or a heavy weight on the rib cage. RISP can be accompanied by very intense and vivid hallucinatory experience, which may be visual, tactile, or auditory, or the sense of a presence in the room. RISP is a benign phenomenon.

Predisposing factors include sleep deprivation and jetlag. Therefore, all patients with sleep paralysis should be screened for sleep quality and insomnia symptoms. Conditions in which nightmare disorder is particularly frequent include psychiatric disorders and posttraumatic stress disorder. Non-medication treatment, in particular imagery rehearsal therapy, is particularly effective for this condition. Isolated sleep paralysis is a common condition that is experienced at least once by up to 40% of the general population, whereas recurrence is less frequent. Very intense and vivid hallucinations can accompany the sleep paralysis episodes. It represents a dissociated state,

with persistence of REM atonia into wakefulness. Familial cases have been reported, and the pathogenesis of sleep paralysis may involve variations in circadian rhythm genes. Predisposing factors include sleep deprivation, irregular sleep–wake schedules, and jetlag. Avoiding these factors is the most effective therapy.

S. R. Rani et. al. (2009)

Sleep paralysis is a temporary disorder where the suffering person is unable to talk or move the body parts and also experience a temporary breathlessness. Patient may complaint like an evil is sitting on them and making them immovable. It occurred due to the sleep disturbances during sleep while drop off to a sleep or during awakening from a sleep. Sleep paralysis may last for few seconds to minutes mostly. The main common causes for sleep paralysis are stress, sudden disturbances in sleep etc. The very common symptoms are anxiety, hallucination or paralysis which is temporary. In this study, the causes and treatment for sleep paralysis are discussed.

SP mostly occurs in young adulthood, but there is a lifetime prevalence. Almost 8% of general population, 28% of students and 32% of psychiatric patients experience at least one episode of SP during their lives. The sooner the SP begins, the more frequent the episodes are. Experiencing SP is usually unpleasant. Fear has been reported in 90% of the student sample. In psychiatric outpatients, the clinically significant level of fear was found in 69% of cases. According to Cheyne, fear arises mostly from the reaction to an inability to move or the hallucinatory content. Approximately 70% of SP episodes are accompanied by hallucinations, although some studies found their simultaneous occurrence only in 33%. Mostly, we distinguish 3 types of hallucinations – intruders, incubus and vestibular–motor hallucinations. Incubus and intruder hallucinations are correlated with each other and with intense fear. Vestibular–motor hallucinations can be associated with blissful and erotic feelings.

T. Article by PTSD UK (2023)

The connection between sleep paralysis and PTSD was explained in this article. Common expressions used to describe medical terms can sometimes add to widespread misunderstanding and stigma. That's certainly the case with 'Old Hag' syndrome, often depicted in art as a demon sitting on someone's chest while they sleep. It's believed that around 30% of the population experience an episode of sleep paralysis at least once.

As research into this issue advances, it's becoming clear that people with PTSD are far more likely to experience sleep paralysis than people without PTSD. Though sleep paralysis is not a serious medical problem – and can quickly pass – it is disorientating, unpleasant and at times terrifying. Particularly if you're still experiencing residual dreams and nightmares as you become awake. In this situation, not only do you have an

inability to move as you wake, but you can also be hallucinating too. For some people with PTSD, sleep paralysis is not only a symptom but also a trigger for additional anxiety and general mental ill-health. That's because temporary immobility from sleep paralysis can blur the boundaries between reality and nightmares.

When we are falling asleep, our brain is processing information and can generate hypnogogic hallucinations, or visions. As we wake up, these are called hypnopompic hallucinations. The sensory impact of sleep paralysis could even be sounds or smells, or physical sensations such as feeling like something is pressing you down, or that you are being watched or touched.

III. RATIONALE OF THE STUDY

Currently, only a little is known about sleep disorders, especially the experience of sleep paralysis, despite the fact that the majority of episodes and incidents are associated with extremely high fear and some of the cases can lead to clinically significant levels of distress and anxiety. Sleep paralysis can be explained as the unusual experience of waking up in the night, temporarily paralysed, without the ability to move.

The aim of this study is to review the existing literature and understandings about sleep disorders and the phenomenon of sleep paralysis, and studying the relationship which sleep disorders, specifically sleep paralysis has with post-traumatic stress disorder. It is also very important to have a deep research and analysis on sleep paralysis because it is a seriously traumatizing phenomenon, not yet discovered fully, which can also cause some hazardous effects on the human body and mind. Traumas, anxiety disorders and stressful events such as assault, domestic violence, death of a loved one, sexual abuse and disasters are associated with sleep paralysis events, mainly playing a role in causing sleep paralysis or in other words, triggering it, along with other sleep disorders, hampering mental health of a person.

Future research needs to focus on designs which can classify the direction of effects and conduct a broader and diverse assessment of sleep paralysis that is able to capture associated symptoms or factors such as fear, hallucinations, and distress better than the existing studies. Our knowledge about sleep disorders, specifically sleep paralysis is still in its infancy stage, which needs to grow fast. That is why, studying about sleep paralysis is a phenomenon to be dug deep to understand its relationship with hallucinations and some relevant sleep disorders.

Despite the number of studies on this aspect being limited, the work carried out by researchers till date has provided great insights and valuable connections and relationships into how sleep paralysis is linked to other aspects of sleep and sleep disorders. Results from various survey studies have revealed a large number of different and divergent aspects of sleep, which can be linked to sleep paralysis. Many of these studies have

efficiently used large sample sizes, which is a great strength and advantage to the work. However, there still exist large gaps in the studies that future studies need to assess, hereby, this study is just a block in the bridge of fillings these gaps scientifically, making sleep paralysis as a significant phenomenon to study and assess medically, along with other related sleep disorders.

IV. METHEDOLOGY

A. Problem Statement

To study PTSD and sleep disorders (with special emphasis on sleep paralysis) among people in relation to their age, gender, family type and occupational status in some of the selected areas of Mumbai.

B. Objectives

1. To find out the relationship between PTSD and sleep disorders among people in Mumbai.
2. To find out the difference in the levels of PTSD in young adults v/s middle aged adults.
3. To find out the difference in the levels of PTSD in male and female people in Mumbai.
4. To find out the difference in the levels of PTSD in people living in nuclear Family v/s Joint Family .
5. To find out the difference in the levels of PTSD in people working in Marketing v/s Finance v/s HR professions.
6. To find out the difference in the type of sleep disorders in young adults v/s middle aged adults.
7. To find out the difference in the type of sleep disorders in male and female people in Mumbai.
8. To find out the difference in the type of sleep disorders in people living in nuclear family v/s joint family.
9. To find out the difference in the type of sleep disorders in people working in Marketing v/s Finance v/s HR professions.
10. To find out the interaction effect of age and profession on the level of PTSD among people in Mumbai.
11. To find out the interaction effect of age and profession on the types of sleep disorders among people in Mumbai.
12. To find out the interaction effect of age and gender on the level of PTSD among people in Mumbai.
13. To find out the interaction effect of age and gender on the types of sleep disorders among people in Mumbai.

C. Hypotheses

H₁: There is no relationship between PTSD and sleep disorders among people in Mumbai.

H₂: There is no difference in the levels of PTSD in young adults v/s middle aged adults.

H₃: There is no difference in the levels of PTSD in male and female people in Mumbai.

H4: There is no difference in the levels of PTSD in people living in nuclear Family v/s Joint Family .

H5: There is no difference in the levels of trauma in people working in Marketing v/s Finance v/s HR professions.

H6: There is no difference in the type of sleep disorders in young adults v/s middle aged adults.

H7: There is no difference in the type of sleep disorders in male and female people in Mumbai.

H8: There is no difference in the type of sleep disorders in people living in Nuclear Family vs Joint Family .

H9: There is no difference in the type of sleep disorders in people working in Marketing v/s Finance v/s HR professions.

H10: There is no interaction effect of age and profession on the level of PTSD among people in Mumbai.

H11: There is no interaction effect of age and profession on the types of sleep disorders among people in Mumbai.

H12: There is no interaction effect of age and gender on the level of PTSD among people in Mumbai.

H13: There is no interaction effect of age and gender on the types of sleep disorders among people in Mumbai.

D. Research Methodology

1. *Research Design:* Quantitative, descriptive, cross-sectional study to be conducted using survey method.

2. *Variables:*

- PTSD
- Sleep Disorders
- Gender
- Age
- Occupation type
- Family type

3. *Operational Definition:*

- **PTSD:** In the present study, Post-traumatic stress disorder (PTSD) refers to a condition that is triggered by a terrifying event, by either witnessing it or experiencing it, causing symptoms such as severe anxiety, flashbacks, and nightmares, as well as uncontrollable negative thoughts about the event, as measured by Post-traumatic Stress Disorder Checklist: PCL – 5, developed by Weathers et. al. (2013).

- **Sleep Disorders:** In the present study, Sleep disorders are mental health conditions that disturb and disrupt one's normal sleep patterns, which can also impact on overall safety, health, and quality of life, as measured by Sleep Disorder Questionnaire (SDQ), developed by Douglas et al. (1986).

- **Gender:** In the present study, Gender refers to the social roles adopted by the participants based on their biological characteristics.

- **Age:** In the present study, age refers to the chronological years of a person starting from the birth till the present date.

- **Occupation type:** In the present study, Occupation type refers to the type of field or industry one is a part of or the work one is interested in. Here, we are studying three fields – Marketing, Finance and HR.

- **Family type:** In the present study, Family type refers to the structure of the family. Here, we are studying two structures – Nuclear family and Joint family.

E. Sample

1. *Sampling Technique:* Homogeneous Purposive Sampling technique will be used in this study. The sample will comprise of Young adults (20-40 years) and middle age adults (41-60 years), working in some of the selected private sector organizations in Mumbai.

2. *Sampling Size & Nature:* Total 70 participants will be taken, out of which 35 participants will be male and 35 participants will be female.

3. *Sampling Criteria:*

- Inclusion criteria for the study:
 - Subjects falling in the age group of 20-60 years.
 - Subjects only from Mumbai.
 - Subjects either male or female.
 - Subjects only from private sector and from the three selected professions only (Marketing, Finance and HR).
 - Subjects those who have proficiency in English, at least up to 10th Std.

- Exclusion Criteria for the study:

- Subjects outside the age group of 20-60 years.
- Subjects outside Mumbai.
- Subjects other than male or female.
- Subjects not belonging to private sector and are not under the three selected professions (Marketing, Finance and HR).

- Subjects are those who do not have proficiency in English, at least up to 10th Std.

F. Tests/Tools

The tools to be used for data collection are stated below:

1. *Post-traumatic Stress Disorder Checklist: PCL – 5*

- **Authors' name:** Weathers et. al. (2013)
- **Sub factors:**
 - Intrusion (five items).
 - Avoidance (two items).
 - Negative alterations in cognitions and mood (seven items).
 - Alterations in arousal and reactivity (six items).
- **Total number of items:** 20
- **Scoring:** Respondents are required to rate how affected they have been by each of the 20 items individually in the past month on a five - point Likert scale, ranging from 0 to 4. Items are then summed to provide a total severity score which ranges from 0 to 80. 0 means 'Not at all', 1 means 'A little bit', 2 means 'Moderately', 3 means 'Quite a bit', and 4 means 'Extremely'.

The PCL-5 can determine a rough diagnosis in two ways:

- By summing up all the 20 items (ranging from 0 to 80) and using a cut-point score of 31-33.
- By treating each item rated 2 as "Moderately" or if higher, a symptom diagnosed, then following the diagnostic rule of DSM-5, which requires at least: One Criterion B item (questions 1 to 5), One Criterion C item (questions 6 to 7), Two Criterion D items (questions 8 to 14), Two Criterion E items (questions 15 to 20).

If any patient meets the provisional diagnosis using either of the two methods, he/she needs further detailed assessment (for e.g., CAPS-5) to confirm the diagnosis of PTSD.

- **Norms:** A total score of 33 or higher will suggest that the participant is inclining towards showing PTSD symptoms. Scores lower than 33 may indicate that the participant does not meet criteria for PTSD.
- **Reliability and Validity:** The PCL has been recently revised to reflect the DSM-5 changes to the PTSD criteria. PCL-5 scores exhibited strong test-retest reliability, and discriminant and convergent validity. PCL-5 validation studies show that all the four criterion scales demonstrate quite high internal consistency (Cohen et al., 2015). There

has also been seen a high correlation between the two methods of scoring: symptom severity scoring method and diagnostic classification scoring methods. Overall, the results of the studies indicate that the PCL-5 is a psychometrically sound, valid and reliable measure of diagnosing PTSD symptoms.

2. *Sleep Disorder Questionnaire (SDQ)*

- **Authors' name:** Douglas et al. (1986)
- **Sub factors:**
 - SA (sleep apnea)
 - NAR (narcolepsy)
 - PLMD (periodic limb movement disorder)
 - PSY (psychiatric sleep disorder)
- **Total number of items:** 175
- **Scoring:** All of the items on the SDQ are to be rated from 1 to 5 by the respondent. Using the list of subscale items given in the manual of SDQ, the subscale total score will simply be the sum of all the items on that particular subscale.

For instance, the SA subscale contains 12 items, therefore the maximum score achievable on that subscale would be 5 x 12 which is 60.
- **Norms:** Grading 4 or 5 on questions for PSY states inclination towards psychiatric disorders. Grading 4 or 5 on PLMD would suggest that the participant is showing symptoms of periodic limb movement disorder. Grading 4 or 5 on questions for SA states inclination for sleep apnea. Grading 4 or 5 on questions for NAR shows tendencies of narcoleptic symptoms.
- **Reliability and Validity:** A popular study of the reliability and validity of the SDQ was conducted on 130 patients. The test-retest reliability (calculated by Spearman's ρ) of the four sub-scales in the 130 sleep-disorder patients over a period of four months is as follows: For SA, it is 0.842; for NAR, it is 0.753; for PSY, it is 0.848 and for PLMD is 0.817. All are significant at $p < 0.0001$. As a test of internal validity, a multivariate analysis of variance (also known as MANOVA), also followed by a univariate ANOVA, was performed on the four scales to confirm that the groups demonstrated significant differences from each another. The post hoc MANOVA to assess the internal validity is high. In ANOVA, the only significant difference came between the control group and PLMD group.

G. Data Collection

The management of some of the selected private sector organisations were contacted. The purpose of the study was explained, permission was taken for conducting the

study and then the employees were contacted for the further process.

Rapport was established with the employees and the purpose of the study was explained to them properly. The employees was assured about the privacy of the data and they were told that they were free to leave the study at any point of time, whenever they want. Only after getting the informed consent of all the employees, the forms were distributed to them.

V. DATA ANALYSIS

Both Descriptive and Inferential statistics were used to analyse and present the data.

- **For testing Hypothesis 1:** Pearson's Product Moment Correlation Coefficient was used.
- **For testing Hypotheses 2,3,4,6,7,8:** Independent t-test was used.
- **For Hypotheses 5,9,10,11,12,13:** Two way ANOVA was used.

A. Findings

On detailed study of the survey done by self-report inventories PCL-5 and SDQ, it was found that PTSD is more common in general population than it is assumed. Nowadays, Sleep disorders are emerging to be more prominent due to the new found lifestyle of the young generation. Sleep disorders linked with PTSD make the worse combination of disorders. It was also observed that almost 30% of the victims of PTSD suffer from sleep paralysis but are not acknowledged due to various cultural superstitions of people, perceiving sleep paralysis as something paranormal instead of accepting it as a scientific and biological concern and getting treatment for it. It was also noticed that PTSD and sleep disorders prevail more in the female population as compared to the male population.

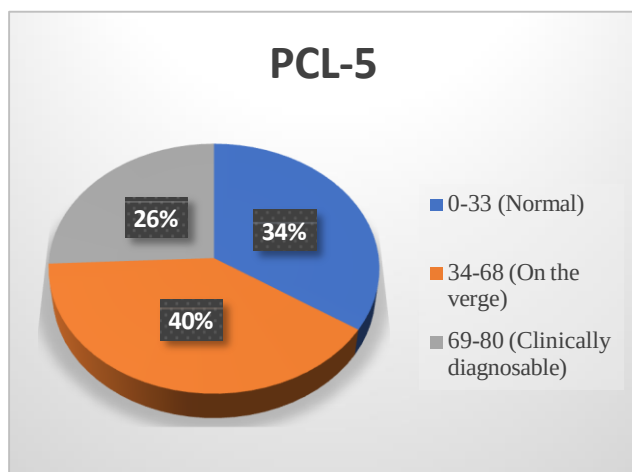


Figure 1. Results of PCL-5 administered of 70 subjects

B. Analysis of the Hypotheses

1. **H₁:** There is no relationship between PTSD and sleep disorders among people in Mumbai.

The Pearson's Correlation Coefficient was **0.66**. It suggests that there is a moderate positive correlation between PTSD and sleep disorders among the people in Mumbai. Therefore, we **reject** the Hypothesis 1.

2. **H₂:** There is no difference in the levels of PTSD in young adults v/s middle aged adults.

	YOUNG ADULTS	MIDDLE-AGED ADULTS
MEAN	58.9714	29.05714286
STANDARD DEVIATION	25.3742	21.39535801
		t = 25.87800764

The independent variable t-test was administered and the value was found to be 25.8. It was found to be significant at 0.01 level of significance, therefore we **reject** the hypothesis 2.

3. **H₃:** There is no difference in the levels of PTSD in male and female people in Mumbai.

	MALE	FEMALE
MEAN	36.1143	51.91428571
STANDARD DEVIATION	26.8446	26.7035704
		t = -12.7737588

The independent variable t-test was administered and the value was found to be 12.77. It was found to be significant, therefore we **reject** the hypothesis 3.

4. **H₄:** There is no difference in the levels of PTSD in people living in nuclear Family v/s Joint Family .

	NUCLEAR	JOINT
MEAN	44.0857	43.94285714
STANDARD DEVIATION	28.7876	27.08260008
		t = 0.113069571

The independent variable t-test was administered and the value was found to be 0.11. It was not found to be significant at 0.01 level of significance, therefore we **accept** the hypothesis 4.

5. **H₅:** There is no difference in the levels of trauma in people working in Marketing v/s Finance v/s HR professions.

Anova: Single Factor

SUMMARY				
Groups	Count	Sum	Average	Variance
Column 1	23	1144	49.7391	642.474

Column 2	23	977	42.4783	787.988
Column 3	24	960	40	889.13

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1194.811801	2	597.406	0.77092	0.46665	3.13376
Within Groups	51920.17391	67	774.928			
Total	53114.98571	69				

No Difference noted therefore hypothesis 5 **accepted**.

6. **H₆**: There is no difference in the type of sleep disorders in young adults v/s middle aged adults.

	YOUNG ADULTS	MIDDLE-AGED ADULTS
MEAN	2.65162	1.71647619
STANDARD DEVIATION	0.66667	0.545380247
		t = 5.025189462

The independent variable t-test was administered and the value was found to be 5.02. It was found to be significant, therefore we **reject** the hypothesis 6.

7. **H₇**: There is no difference in the type of sleep disorders in male and female people in Mumbai.

	MALE	FEMALE
MEAN	1.72397	2.644126984
STANDARD DEVIATION	0.67439	0.548984047
		t = -4.92171334

The independent variable t-test was administered and the value was found to be 4.92. It was found to be significant, therefore we **reject** the hypothesis 7.

8. **H₈**: There is no difference in the type of sleep disorders in people living in Nuclear Family vs Joint Family.

	NUCLEAR FAMILY	JOINT FAMILY
MEAN	2.14124	2.226857143
STANDARD DEVIATION	0.82932	0.707416386
		t = -0.40860548

The independent variable t-test was administered and the value was found to be 0.40. It was not found to be significant, therefore we **accept** the hypothesis 8.

9. **H₉**: There is no difference in the type of sleep disorders in people working in Marketing v/s Finance v/s HR professions.

Anova: Single Factor

SUMMARY				
Groups	Count	Sum	Average	Variance
Column 1	23	51.8256	2.25329	0.70123
Column 2	23	48.96	2.1287	0.60901
Column 3	24	52.0978	2.17074	0.50075

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.184975898	2	0.09249	0.1536	0.85791	3.13376
Within Groups	40.34265135	67	0.60213			
Total	40.52762725	69				

No difference noted, therefore Hypothesis 9 **accepted**.

10. **H₁₀**: There is no interaction effect of age and profession on the level of PTSD among people in Mumbai.

	PROFESSION		
	MARKET	FINANCE	HR
YA	63.08333	54.81818	58.66667
MA	35.18182	31.16667	21.33333

Anova: Two-Factor Without Replication

SUMMARY				
	Count	Sum	Average	Variance
Row 1	3	176.5682	58.85606	17.10508
Row 2	3	87.68182	29.22727	50.76607
Column 1	2	98.26515	49.13258	389.2473
Column 2	2	85.98485	42.99242	279.6971
Column 3	2	80	40	696.8889

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Rows	1316.798	1	1316.798	53.70778	0.018115	18.51282
Columns	86.70667	2	43.35333	1.768238	0.361241	19
Error	49.03564	2	24.51782			
Total	1452.54	5				

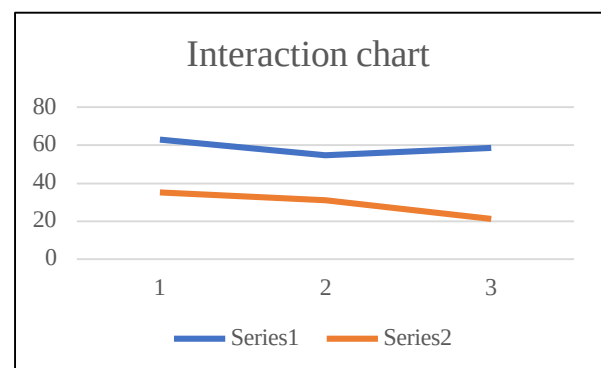


Figure 2. Interaction chart

No interaction between the lines can be seen in the chart,
therefore hypothesis 10 is **accepted**.

11. H_{11} : There is no interaction effect of age and profession on the types of sleep disorders among people in Mumbai.

	PROFESSION		
	MARKET	FINANCE	HR
YA	2.76148	2.66495	2.52954
MA	1.69889	1.63713	1.81194

Anova: Two-Factor Without Replication

SUMMARY						
	Count	Sum	Average	Variance		
Row 1	2	5.42643	2.71322	0.00466		
Row 2	2	3.33602	1.66801	0.00191		
Column 1	2	4.46037	2.23019	0.56455		
Column 2	2	4.30208	2.15104	0.52821		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Rows	1.09246	1	1.09246	3613.99	0.01059	161.448
Columns	0.00626	1	0.00626	20.7222	0.13766	161.448
Error	0.0003	1	0.0003			
Total	1.09902	3				

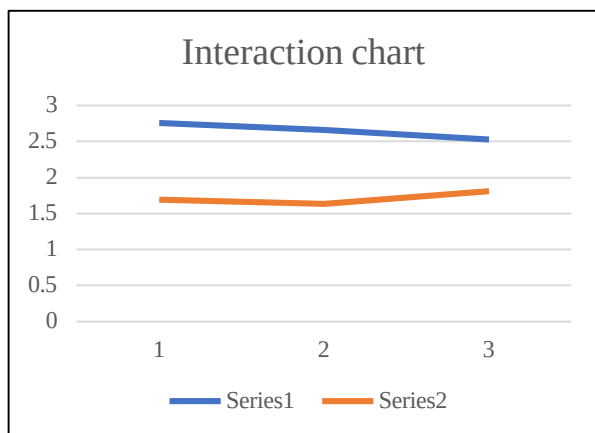


Figure 3. Interaction chart

No interaction between the lines can be seen in the chart,
therefore hypothesis 11 is **accepted**.

12. H_{12} : There is no interaction effect of age and gender on the level of PTSD among people in Mumbai.

	MALE	FEMALE
YA	48.44444	70.11765
MA	23.05882	34.72222

Anova: Two-Factor Without Replication

SUMMARY	Count	Sum	Average	Variance		
Row 1	2	118.5621	59.28105	234.8639		
Row 2	2	57.78105	28.89052	68.01743		
Column 1	2	71.50327	35.75163	322.2149		
Column 2	2	104.8399	52.41993	626.418		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Rows	923.5839	1	923.5839	36.87102	0.10391	161.4476
Columns	277.8322	1	277.8322	11.09153	0.185702	161.4476
Error	25.04904	1	25.04904			
Total	1226.465	3				

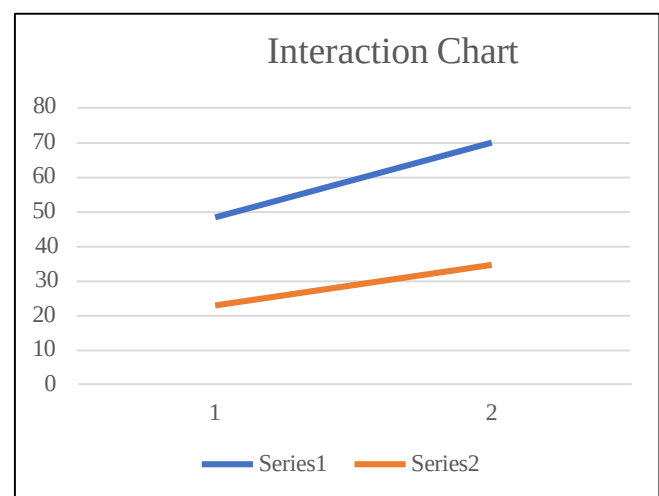


Figure 4. Interaction chart

No interaction between the lines can be seen in the chart,
therefore hypothesis 12 is **accepted**.

13. H_{13} : There is no interaction effect of age and gender on the types of sleep disorders among people in Mumbai.

	MALE	FEMALE
YA	2.234321	3.093464
MA	1.183595	2.219753

Anova: Two-Factor Without Replication

SUMMARY	Count	Sum	Average	Variance
Row 1	2	5.327785	2.663893	0.369063
Row 2	2	3.403348	1.701674	0.536812
Column 1	2	3.417916	1.708958	0.552013
Column 2	2	5.313217	2.656609	0.381685

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Rows	0.925865	1	0.925865	118.1915	0.058394	161.4476
Columns	0.898042	1	0.898042	114.6397	0.059286	161.4476
Error	0.007834	1	0.007834			
Total	1.83174	3				

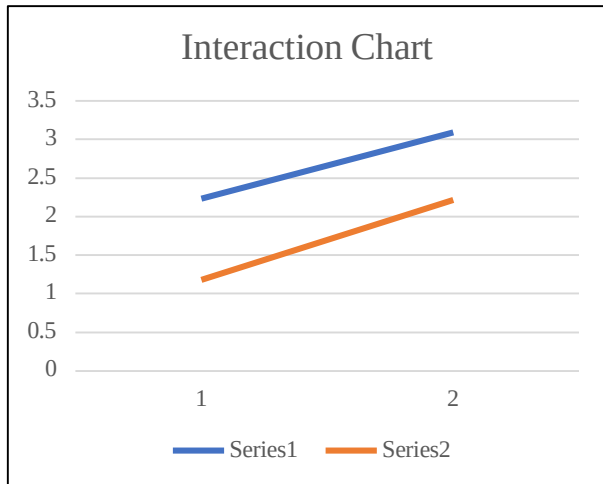


Figure 5. Interaction chart

No interaction between the lines can be seen in the chart, therefore hypothesis 13 is **accepted**.

C. Study of Sleep Paralysis Subscale

Out of the sample of 70 subjects, 18 people, who were clinically diagnosed under PCL-5 as subjects to clinically qualify for PTSD were studied in the further inventory SDQ, which analyses four subscales, namely, Sleep Apnea (SA) [≥ 50], Narcolepsy (NAR) [≥ 65], Periodic limb movement disorder (PLMD) [≥ 35], and Psychiatric Sleep Disorder (PSY) [≥ 35]. Under PSY, another subscale was present for Sleep Paralysis (SP) [≥ 38], which was studied in detail and the responses of the subjects were analyzed for the same.

On quantitative analysis, from the 18 subjects who had clinical eligibility for PTSD, 11 subjects were found to be suffering from so or the other type of Sleep Paralysis. On Qualitative analysis through in-depth interview, the detailed experiences of the sleep paralysis incidents faced by these 11 subjects was noted.

Results disclosed that the entire sample indicated a noticeably high level of spirituality and feelings of inadequacy, but 11 out of the 18 cases showed signs of sleep disorders and past trauma leading to the intensified condition of sleep paralysis. Furthermore, three cases reported that they have been experiencing great stress in their present life events. Also, all the cases reported sleeping alone, sleeping in the supine position, an experience of fear, a sense of pressure on their chest, a presence of someone in the room and increased level of anxiety of the unknown.

VI. CONCLUSION AND IMPLICATIONS

In terms of subjective sleep variables, worse sleep quality has been found in multiple studies to be associated with increased odds of sleep paralysis occurrence. In addition, insomnia symptoms (but not a diagnosed insomnia disorder) have also been found to predict sleep paralysis. Associations between sleep paralysis and other unusual and/or threatening sleep experiences such as nightmares, exploding head syndrome, and lucid dreaming have been reported. In terms of objective measurements, the limited literature to date shows sleep paralysis to be a “mixed” state of consciousness, combining elements of rapid eye movement sleep with elements of wakefulness.

First, all of the current literature used cross-sectional designs, making it impossible to infer direction of effects. As such, it is still unknown whether poor sleep quality causes sleep paralysis or if sleep paralysis leads to poor sleep quality. As hypothesized previously, it is likely a bidirectional relationship. Factors such as genetics and particular stressors lead to a reduction in sleep quality, increasing the likelihood of sleep paralysis. In turn, if there is enough fear/associated distress, experiencing sleep paralysis may lead to a further decrease in sleep quality through maladaptive behaviours such as trying to stay awake to avoid an episode. Only in studies taking a longitudinal approach, perhaps using diary or experience sampling approaches, will the exact nature of the relationship be unravelled.

A second limitation of the literature to date is that the majority of research has been interested in simply the presence of lifetime episodes (i.e., at least one episode in life) or the simple frequency of episodes. Associated features such as hallucinations, fear, and episode distress have been investigated far less frequently despite the fact that these aspects are likely of most relevance to individuals. Future research linking sleep paralysis to sleep quality should endeavour to stop using single-item measures of sleep paralysis occurrence, as has been the norm to date, in favour of more detailed questionnaires and clinical interviews. A few examples of such measures are the Waterloo Unusual Sleep Experiences Questionnaire, the Unusual Sleep Experiences Questionnaire, and the Fearful Isolated Sleep Paralysis Interview (FISPI). Currently, the FISPI is the only measure to tap into both the frequency of episodes and the associated features of hallucinations, fear, distress, and interference with waking life.

Nevertheless, good progress has been made in terms of investigating associations between sleep paralysis and other aspects of sleep. This research has shown sleep paralysis to be linked to more general sleep quality and insomnia symptoms. Furthermore, it appears that sleep paralysis does not necessarily occur in isolation, but frequently co-occurs with other sleep experiences such as nightmares and exploding head syndrome. Now, research needs to address the directionality of observed effects, in order to separate out the causes from the consequences.

VII. LIMITATIONS AND FUTURE SUGGESTIONS

The only major limitation related to this study is the lack of awareness among people about various sleep disorders like sleep paralysis and the lack of adequate sample who has knowingly experienced sleep paralysis. Sleep is the most difficult neurological dimension to study and research upon as doing a research involves the subject to be in his/her senses, which is not possible here, making it a limitation of this study.

Other limitations of this study involves its exclusion of people outside Mumbai, making its scope narrower, exclusion of other fields than marketing, finance and HR, and exclusion of the left out age group from the sample which provides a wide area for research still left to be touched upon. Also, there wasn't an actual licenced self-report inventory available on the internet specifically for Sleep Paralysis, therefore SP had to be analysed qualitatively through in-depth interview, which again questions the reliability of the study.

The only suggestion for future researches on this topic could be making the subject aware first about their condition and then studying them to strike out almost all the culturally superstitious perceptions of disorders just like the one of Sleep Paralysis.

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Sleep Disorder Questionnaire (SDQ)

Version date: 11 April 2018

URL: <https://www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp>

Note: This is a fillable form. You may complete it electronically.

In the past month, how much were you bothered by:	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Repeated, disturbing, and unwanted memories of the stressful experience?	0	1	2	3	4
2. Repeated, disturbing dreams of the stressful experience?	0	1	2	3	4
3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?	0	1	2	3	4
4. Feeling very upset when something reminded you of the stressful experience?	0	1	2	3	4
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?	0	1	2	3	4
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	0	1	2	3	4
7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?	0	1	2	3	4
8. Trouble remembering important parts of the stressful experience?	0	1	2	3	4
9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?	0	1	2	3	4
10. Blaming yourself or someone else for the stressful experience or what happened after it?	0	1	2	3	4
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?	0	1	2	3	4
12. Loss of interest in activities that you used to enjoy?	0	1	2	3	4
13. Feeling distant or cut off from other people?	0	1	2	3	4
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?	0	1	2	3	4
15. Irritable behavior, angry outbursts, or acting aggressively?	0	1	2	3	4
16. Taking too many risks or doing things that could cause you harm?	0	1	2	3	4
17. Being "superalert" or watchful or on guard?	0	1	2	3	4
18. Feeling jumpy or easily startled?	0	1	2	3	4
19. Having difficulty concentrating?	0	1	2	3	4
20. Trouble falling or staying asleep?	0	1	2	3	4

PCL-5 (11 April 2018)

National Center for PTSD

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Centres d'Étude, de Recherche et d'Évaluation
de la Vigilance et du Sommeil


1/12

Sleep Disorders Questionnaire (SDQ)

Name

Date of Birth

Today's Date

Doctor's Name

Weight

Height

Instructions

In answering the questions, consider each question as applying to the **past six months** of your life, unless you have been told differently by the person who gave you this booklet.

Most of the questions are simple statements. You answer by circling a number from 1 to 5. If you are using the **computerized answer sheet**, blacken the space which corresponds to your answer, "1 to 5", instead of circling the answer.

Notice that an "answer key" appears at the top of each page to remind you what is meant by the numbers.

If you are certain that a question does not apply to you, leave it blank.
But try to answer every question if at all possible. This is important.

Source: Douglass A. B., Barnstein R., Nino-Murcia G., Keenan S., Miles L., Zoccolillo Y. F. J., Gullerminault C. and Demert W. C. (1994) The Sleep Disorders Questionnaire I: Creation and Multivariate Structure of SDQ. *Archives of Pediatrics and Adolescent Medicine*, 148, 1025-1030.

serenity
MEDICAL SERVICES

Please mark ✓✓ as appropriate:		NEVER (charged)	RARELY (blurred)	SOMETIMES (hot sun)	USUALLY (light)	ALWAYS (agreed)
1.	I get too little sleep at night	☐	☐	☐	☐	☐
2.	I often have a poor night's sleep	☐	☐	☐	☐	☐
3.	I have trouble getting to sleep at night	☐	☐	☐	☐	☐
4.	I wake up often during the night	☐	☐	☐	☐	☐
5.	My bedtime varies a lot	☐	☐	☐	☐	☐
6.	At bedtime, thoughts race through my mind	☐	☐	☐	☐	☐
7.	At bedtime, I feel sad and depressed	☐	☐	☐	☐	☐
8.	At bedtime, I worry about things	☐	☐	☐	☐	☐
9.	At bedtime, I feel muscular tension	☐	☐	☐	☐	☐
10.	At bedtime, I'm afraid of not being able to go to sleep	☐	☐	☐	☐	☐
11.	When falling asleep, I feel paralyzed (unable to move)	☐	☐	☐	☐	☐
12.	When falling asleep, I have "restless legs" (a feeling of crawling, aching, or inability to keep legs still)	☐	☐	☐	☐	☐
13.	After waking at night, I fear I will not be able to get back to sleep	☐	☐	☐	☐	☐
14.	My night sleep is restless and disturbed	☐	☐	☐	☐	☐
15.	At night, my sleep disturbs my bed partner's sleep	☐	☐	☐	☐	☐
16.	My night sleep is disturbed by light	☐	☐	☐	☐	☐
17.	My night sleep is disturbed by noise	☐	☐	☐	☐	☐
18.	My sleep is disturbed by severe heartburn and choking ("regurgitation", bringing up bitter stomach fluid)	☐	☐	☐	☐	☐
19.	I often wake up because I am hungry	☐	☐	☐	☐	☐
20.	I snore in my sleep	☐	☐	☐	☐	☐
21.	I am told I snore loudly and bother others	☐	☐	☐	☐	☐
22.	I am told I stop breathing ("hold my breath") in sleep	☐	☐	☐	☐	☐
23.	I awake suddenly gasping for breath, unable to breathe	☐	☐	☐	☐	☐
24.	At night my heart pounds, beats rapidly, or beats irregularly ("palpitations")	☐	☐	☐	☐	☐
25.	I sweat a great deal at night	☐	☐	☐	☐	☐

Source: Douglass A B, Bontden R, Nino-Murcia G, Keenan S, Miles L, Zatzore K P, Jr, Guilleminault C, and Dement W C. (1994) The Sleep Disorders Questionnaire: Creation and Multivariate Structure of SDQ



Serenity
MEDICAL SERVICES

| Sleep Disorders Questionnaire (SDQ)

3/12

Please mark "✓" as appropriate:

	NEVER (strongly disagree)	RARELY (disagree)	SOMETIMES (not sure)	USUALLY (agree)	ALWAYS (strongly agree)
26. I walk in my sleep	☐	☐	☐	☐	☐
27. I grind my teeth while I sleep	☐	☐	☐	☐	☐
28. I wake from sleep screaming, confused, and at times violent ("night terrors")	☐	☐	☐	☐	☐
29. My sleep is disturbed because of pain in the neck, back, muscles, joints, legs or arms	☐	☐	☐	☐	☐
30. My sleep is disturbed by chest pain (not angina)	☐	☐	☐	☐	☐
31. My sleep is disturbed by "restless legs" (a feeling of crawling, aching, inability to keep legs still)	☐	☐	☐	☐	☐
32. My sleep is disturbed by thoughts racing through my mind	☐	☐	☐	☐	☐
33. My sleep is disturbed by sadness or depression	☐	☐	☐	☐	☐
34. My sleep is disturbed by worrying about things	☐	☐	☐	☐	☐
35. My sleep is disturbed by muscular tension	☐	☐	☐	☐	☐
36. My sleep is disturbed by fears that I might not be able to get back to sleep if I should wake up	☐	☐	☐	☐	☐
37. I often have a night full of intense vivid dreams	☐	☐	☐	☐	☐
38. I have a lot of nightmares (frightening dreams)	☐	☐	☐	☐	☐
39. I feel unable to move (paralyzed) after a nap	☐	☐	☐	☐	☐
40. I have dream-like images (hallucinations) when I awaken in the morning even though I know I am not asleep	☐	☐	☐	☐	☐
41. I am sometimes very sleepy in the daytime, and this seems to go in cycles at regular intervals	☐	☐	☐	☐	☐
42. I have slept for several days at a time, or at least I have been overwhelmingly sleepy for that long	☐	☐	☐	☐	☐
43. I have been unable to sleep at all for several days	☐	☐	☐	☐	☐
44. I feel that my sleep is abnormal	☐	☐	☐	☐	☐
45. I feel that I have insomnia	☐	☐	☐	☐	☐
46. As a child, I had difficulty waking up in the morning	☐	☐	☐	☐	☐
47. As a child, I had sleepiness during the day	☐	☐	☐	☐	☐
48. I have a problem because of headaches while sleeping	☐	☐	☐	☐	☐

Source: Douglas A. B., Birmaher B., Rao-Melacini G., Kagan S., Miles L., Zisone Y. P. J., Gullerbaum C. and Demert W. C. (1996)
The Sleep Disorders Questionnaire I: Creation and Multivariate Structure of SDQ
102045-52

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MULTI-CENTRE STUDY
MCT-00208 rev A December 2019

| Sleep Disorders Questionnaire (SDQ)

5/12

Please mark "✓" as appropriate:

	NEVER (strongly disagree)	RARELY (disagree)	SOMETIMES (not sure)	USUALLY (agree)	ALWAYS (strongly agree)
68. I am excessively sleepy during the daytime	☐	☐	☐	☐	☐
69. I have at some time had trouble with my bladder	☐	☐	☐	☐	☐
70. I have had problems with tonsils or adenoids	☐	☐	☐	☐	☐
71. I have high blood pressure (or once had it)	☐	☐	☐	☐	☐
72. My tonsils and/or adenoids have been removed	☐	☐	☐	☐	☐
73. I get pains in my abdomen (stomach)	☐	☐	☐	☐	☐
74. I have had a head injury	☐	☐	☐	☐	☐
75. I have been knocked unconscious (knocked out)	☐	☐	☐	☐	☐
76. I suffer from dizzy spells	☐	☐	☐	☐	☐
77. I have seizures ("fits", convulsions, epilepsy)	☐	☐	☐	☐	☐
78. I have problems with clumsiness, incoordination	☐	☐	☐	☐	☐
79. I feel that I have a sexual problem	☐	☐	☐	☐	☐
80. My desire or interest in sex is less than it used to be	☐	☐	☐	☐	☐
81. I have pain or discomfort during sexual intercourse	☐	☐	☐	☐	☐
82. I sleep better after having sex	☐	☐	☐	☐	☐
83. I am unhappy about my social life	☐	☐	☐	☐	☐
84. I am unhappy about loving relationships in my life	☐	☐	☐	☐	☐
85. I am unhappy about my sex life	☐	☐	☐	☐	☐
86. I am dissatisfied with my job	☐	☐	☐	☐	☐
87. I have a problem with my sleep	☐	☐	☐	☐	☐
88. I wake up in the morning with a headache	☐	☐	☐	☐	☐
89. I have considered or attempted suicide	☐	☐	☐	☐	☐
90. I feel I am useful and needed	☐	☐	☐	☐	☐
91. I am sleeping more than I used to	☐	☐	☐	☐	☐
92. Someone in my immediate family has trouble with insomnia (brother/sister, father/mother, son/daughter, grandparent)	☐	☐	☐	☐	☐
93. Someone in my immediate family is very sleepy during the day	☐	☐	☐	☐	☐

Source: Douglas A. B., Birmaher B., Rao-Melacini G., Kagan S., Miles L., Zisone Y. P. J., Gullerbaum C. and Demert W. C. (1996)
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Please mark "✓" as appropriate:

	NEVER (strongly disagree)	RARELY (disagree)	SOMETIMES (not sure)	USUALLY (agree)	ALWAYS (strongly agree)
49. As a child, I was fatigued during the day	☐	☐	☐	☐	☐
50. As a child, I rocked myself to get to sleep	☐	☐	☐	☐	☐
51. I used to bang my head as a child	☐	☐	☐	☐	☐
52. I used to sleepwalk in childhood	☐	☐	☐	☐	☐
53. As a child, I had convulsions (seizures) during sleep	☐	☐	☐	☐	☐
54. As a child, I would grind my teeth while asleep	☐	☐	☐	☐	☐
55. Now, I am very sleepy during the day and I struggle to stay awake	☐	☐	☐	☐	☐
56. In the past 6 months, I have fallen asleep accidentally in some of these situations: eating a meal, talking on the phone, talking to someone, riding in a bus or car, watching TV, at a theater, reading a book, at a lecture	☐	☐	☐	☐	☐
57. I got bad grades in school because I was too sleepy	☐	☐	☐	☐	☐
58. I now have trouble doing my job because of sleepiness or fatigue	☐	☐	☐	☐	☐
59. I often have to let someone else drive the car because I am too sleepy to do it	☐	☐	☐	☐	☐
60. I see vivid dream-like images (hallucinations) either just before or just after a daytime nap, yet I am sure I am awake when they happen	☐	☐	☐	☐	☐
61. I have vivid dreams during my daytime naps	☐	☐	☐	☐	☐
62. I am often unable to move (paralyzed) when I am waking up in the morning	☐	☐	☐	☐	☐
63. Sometimes I realize I have driven my car to the wrong place, and I can't remember how I did it	☐	☐	☐	☐	☐
64. I find myself doing things which make no sense, such as writing nonsense instead of notes, or mixing together chocolate and gravy	☐	☐	☐	☐	☐
65. People tell me that I act strangely at times, and yet I was not aware of it when it happened	☐	☐	☐	☐	☐
66. I get "weak knees" when I laugh	☐	☐	☐	☐	☐
67. I get sudden muscular weakness (or even a brief period of paralysis, being unable to move) when laughing, angry, or in situations of strong emotion	☐	☐	☐	☐	☐

Source: Douglas A. B., Birmaher B., Rao-Melacini G., Kagan S., Miles L., Zisone Y. P. J., Gullerbaum C. and Demert W. C. (1996)
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Please mark "✓" as appropriate:

	NEVER (strongly disagree)	RARELY (disagree)	SOMETIMES (not sure)	USUALLY (agree)	ALWAYS (strongly agree)
94. Someone in my immediate family has psychiatric or emotional illness (e.g. depression, alcoholism)	☐	☐	☐	☐	☐
95. Some of my other relatives have trouble with insomnia (uncles, aunts, cousins)	☐	☐	☐	☐	☐
96. Some of my other relatives are very sleepy during the day	☐	☐	☐	☐	☐
97. Some of my other relatives have psychiatric illness	☐	☐	☐	☐	☐
98. Some family member has died suddenly in their sleep	☐	☐	☐	☐	☐
99. Some family member has "restless legs" while sleeping (a feeling of crawling, aching, inability to keep the legs still)	☐	☐	☐	☐	☐
100. A child in my family died from "crib death" (sudden infant death syndrome, SIDS)	☐	☐	☐	☐	☐
101. Someone in my family has been hospitalized for a psychiatric illness or "nervous breakdown"	☐	☐	☐	☐	☐
102. People in my family seem to be worriers	☐	☐	☐	☐	☐
103. Someone in my family has diabetes	☐	☐	☐	☐	☐
104. Someone in my family has had a stroke ("epilepsy")	☐	☐	☐	☐	☐
105. I often use alcohol in order to get to sleep	☐	☐	☐	☐	☐
106. I use alcohol to steady my nerves	☐	☐	☐	☐	☐
107. While drinking alcohol, I have carried out actions without being aware of them, and not remembered them the next day	☐	☐	☐	☐	☐
108. I smoke tobacco within two hours of bedtime	☐	☐	☐	☐	☐
109. I have used "street drugs" (marijuana, "uppers", "downers", narcotics, hallucinogens, cocaine)	☐	☐	☐	☐	☐
110. I have used tobacco to help me go to sleep	☐	☐	☐	☐	☐
111. I have used marijuana to help me go to sleep	☐	☐	☐	☐	☐
112. I currently take a non-prescription drug from the pharmacy in order to help me sleep	☐	☐	☐	☐	☐
113. I currently take a non-prescription drug to stop me being so sleepy and fatigued in the daytime	☐	☐	☐	☐	☐
114. I take a prescription drug which the doctor gave me mainly to help me sleep (sleeping pills, anti-depressants, tranquilizers)	☐	☐	☐	☐	☐

Source: Douglas A. B., Birmaher B., Rao-Melacini G., Kagan S., Miles L., Zisone Y. P. J., Gullerbaum C. and Demert W. C. (1996)
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Please mark "✓" as appropriate:

	NEVER (strongly disagree)	RARELY (disagree)	SOMETIMES (not sure)	USUALLY (agree)	ALWAYS (strongly agree)
115. I take a prescription drug which the doctor gave me mainly to keep me awake during the day (e.g.: ritalin)	☐	☐	☐	☐	☐
116. I take some drugs at night for my other illnesses, not related to sleep, yet I find they help me sleep	☐	☐	☐	☐	☐
117. I have taken drugs for my heart	☐	☐	☐	☐	☐
118. I use relaxation techniques or mental imagery (e.g.: counting sheep) to help me sleep	☐	☐	☐	☐	☐
119. I use non-drug therapies in order to get to sleep (e.g.: biofeedback, acupuncture, electrosleep)	☐	☐	☐	☐	☐
120. I exercise regularly	☐	☐	☐	☐	☐
121. I was born as part of a multiple birth (twins, or triplets, etc. Includes cases where the others died at birth or afterwards)	☐	☐	☐	☐	☐
122. My family was emotionally close in my childhood	☐	☐	☐	☐	☐
123. I got along well with my parents while growing up	☐	☐	☐	☐	☐
124. I am currently unemployed	☐	☐	☐	☐	☐
125. I am working at a job with rotating shifts	☐	☐	☐	☐	☐
126. I have had a job where I worked at unusual times	☐	☐	☐	☐	☐
127. I am presently living in a house	☐	☐	☐	☐	☐
128. I get along well with my husband / wife / friend, who is currently living with me	☐	☐	☐	☐	☐
129. Coffee, tea, or cola drinks seem to worsen my sleep	☐	☐	☐	☐	☐
130. Mental stress, worry, or anxiety worsens my sleep	☐	☐	☐	☐	☐
131. Physical exercise helps my sleep	☐	☐	☐	☐	☐
132. A daytime nap worsens my nighttime sleep	☐	☐	☐	☐	☐
133. Mental stress, worry, or anxiety makes me feel sleepy during the day	☐	☐	☐	☐	☐
134. After a nap, I feel less sleepy in the daytime	☐	☐	☐	☐	☐
135. Hot weather makes me sleepy during the day	☐	☐	☐	☐	☐
136. When doing shift work, I am sleepy during the day	☐	☐	☐	☐	☐
137. I have a small jaw, or other abnormality of the bones in my head or neck	☐	☐	☐	☐	☐

Source: Douglas A.B., Bonnet M.R., Nieto-Marcia G., Mateika J., Zisovec T.P.J., Guilleminault C. and Dement W.C. (1994)
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In the next section, please circle the item (numbered 1-5) which best matches your answer

153. How many hours of sleep do you get at night, not including time spent awake in bed?
- | | |
|---|-----------------------------------|
| ☐ 1 Less than 4 hours | ☐ 3 6 hours |
| ☐ 2 4 to 5 hours | ☐ 4 7 hours |
| | ☐ 5 8 or more |
154. How long is your longest wake period at night
- | | |
|---|---|
| ☐ 1 Less than 5 minutes | ☐ 3 20 to 59 minutes |
| ☐ 2 6 to 19 minutes | ☐ 4 1 to 2 hours |
| | ☐ 5 More than 2 hours |
155. How many times in a night do you get up to urinate?
- | | |
|--------------------------------|---|
| ☐ 1 None | ☐ 3 2 times |
| ☐ 2 1 time | ☐ 4 3 times |
| | ☐ 5 4 or more times |
156. How many work accidents have you had as a result of sleepiness or fatigue?
- | | |
|------------------------------|-----------------------------------|
| ☐ 1 None | ☐ 3 2 |
| ☐ 2 1 | ☐ 4 3 or 4 |
| | ☐ 5 5 or more |
157. How many car accidents or "near misses" have you had because of excessive sleepiness?
- | | |
|------------------------------|-----------------------------------|
| ☐ 1 None | ☐ 3 2 |
| ☐ 2 1 | ☐ 4 3 |
| | ☐ 5 4 or more |
158. How many daytime naps (asleep for 5 minutes or more) do you take on an average working day?
- | | |
|------------------------------|-----------------------------------|
| ☐ 1 None | ☐ 3 2 |
| ☐ 2 1 | ☐ 4 3 or 4 |
| | ☐ 5 5 or more |

Source: Douglas A.B., Bonnet M.R., Nieto-Marcia G., Mateika J., Zisovec T.P.J., Guilleminault C. and Dement W.C. (1994)
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Please mark "✓" as appropriate:

	NEVER (strongly disagree)	RARELY (disagree)	SOMETIMES (not sure)	USUALLY (agree)	ALWAYS (strongly agree)
138. I have a chronic chest disease (bronchitis, asthma, emphysema)	☐	☐	☐	☐	☐
139. I have a problem with my nose blocking up when I am trying to sleep (allergies, infections)	☐	☐	☐	☐	☐
140. I wake up with "attacks" which are different from those described anywhere else in this questionnaire	☐	☐	☐	☐	☐
141. My snoring or my breathing problem is much worse if I sleep on my back	☐	☐	☐	☐	☐
142. My snoring or my breathing problem is much worse if I fall asleep right after drinking alcohol	☐	☐	☐	☐	☐
143. My snoring or my breathing problem is much worse when I have an allergy or infection in the nose, throat, or chest	☐	☐	☐	☐	☐

The following questions are for women only:

144. I have gone through the menopause ("change of life")	☐	☐	☐	☐	☐
145. My sleep at night is affected by my menstrual cycle	☐	☐	☐	☐	☐
146. My daytime sleepiness worsens with pregnancy	☐	☐	☐	☐	☐
147. My daytime sleepiness is worse since my menopause	☐	☐	☐	☐	☐

The following questions are for men only:

148. I often have problems getting an erection	☐	☐	☐	☐	☐
149. I have trouble maintaining an erection	☐	☐	☐	☐	☐
150. I have trouble with ejaculation (either I can't do it at all, or it happens too soon)	☐	☐	☐	☐	☐
151. My erections are physically distorted	☐	☐	☐	☐	☐
152. I often awaken with an erection during the night, or in the morning	☐	☐	☐	☐	☐

Source: Douglas A.B., Bonnet M.R., Nieto-Marcia G., Mateika J., Zisovec T.P.J., Guilleminault C. and Dement W.C. (1994)
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In the next section, please circle the item (numbered 1-5) which best matches your answer

159. How many rest periods do you take on an average working day (but do not sleep during them)?
- | | |
|------------------------------|-----------------------------------|
| ☐ 1 None | ☐ 3 2 or 3 |
| ☐ 2 1 | ☐ 4 4 or 5 |
| | ☐ 5 6 or more |
160. How many times, in an average working day, do you try to nap but find that you can't fall asleep?
- | | |
|------------------------------|-----------------------------------|
| ☐ 1 None | ☐ 3 2 |
| ☐ 2 1 | ☐ 4 3 |
| | ☐ 5 4 or more |
161. How long do you remain restored (refreshed, alert) after a daytime nap?
- | | |
|--|---|
| ☐ 1 Less than 1 hour | ☐ 3 3 hours |
| ☐ 2 1 to 2 hours | ☐ 4 4 or 5 hours |
| | ☐ 5 6 hours or more |
162. How long do you remain restored after a rest?
- | | |
|--|---|
| ☐ 1 Less than 30 minutes | ☐ 3 1 to 2 hours |
| ☐ 2 30-59 minutes | ☐ 4 3 to 4 hours |
| | ☐ 5 5 hours or more |
163. What is your current weight (in lb.)?
- | | |
|---|---|
| ☐ 1 134 lb. or less | ☐ 3 160-183 lb. |
| ☐ 2 135-159 lb. | ☐ 4 184-209 lb. |
| | ☐ 5 210 lb. or more |
164. What was your weight six months ago?
- | | |
|---|---|
| ☐ 1 134 lb. or less | ☐ 3 160-183 lb. |
| ☐ 2 135-159 lb. | ☐ 4 184-209 lb. |
| | ☐ 5 210 lb. or more |

Source: Douglas A.B., Bonnet M.R., Nieto-Marcia G., Mateika J., Zisovec T.P.J., Guilleminault C. and Dement W.C. (1994)
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In the next section, please circle the item (numbered 1-5) which best matches your answer

165. What was your weight at age 20?

☐ 1 125 lb. or less

☐ 2 126-139 lb.

☐ 3 140-155 lb.

☐ 4 156-175 lb.

☐ 5 176 lb. or more

166. How many cups of regular coffee do you have in a day?

☐ 1 None

☐ 2 1 cup

☐ 3 2 cups

☐ 4 3 to 5 cups

☐ 5 6 cups or more

167. How many of the coffees are within 2 hours of bedtime?

☐ 1 None

☐ 2 1 cup

☐ 3 2 cups

☐ 4 3 to 5 cups

☐ 5 6 cups or more

168. How many glasses/cans of cola drinks do you have in a day (do not include decaffeinated types)?

☐ 1 None

☐ 2 1 can

☐ 3 2 cans

☐ 4 3 to 5 cans

☐ 5 6 cans or more

169. How many of these colas are within 2 hours of bedtime?

☐ 1 None

☐ 2 1 can

☐ 3 2 cans

☐ 4 3 to 5 cans

☐ 5 6 cans or more

170. How many years were you a smoker?

☐ 1 None

☐ 2 1 year

☐ 3 2 to 12 years

☐ 4 13 to 25 years

☐ 5 26 years or more

Source: Douglas A. B., Bornstein R., Nono Murcia G., Keenan S., Miles L., Zuccone V. P. J., Guillemineau C. and Demert W. C. (1994)
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In the next section, please circle the item (numbered 1-5) which best matches your answer

171. How long does it take you to adjust after traveling across time zones (especially 4 or more zones)?

☐ 1 No time at all

☐ 2 1 day

☐ 3 2 days

☐ 4 3 to 4 days

☐ 5 5 or more days

172. How tall are you?

☐ 1 63 in. or less

☐ 2 64 to 66.5 in.

☐ 3 67 to 69.5 in.

☐ 4 70 to 71 in.

☐ 5 71.5 inches or taller

173. How old are you now?

☐ 1 25 or under

☐ 2 26-35 year

☐ 3 36-44 year

☐ 4 45-50 year

☐ 5 51 year or older

174. How many years did you go to school? Include years of college and university too.

☐ 1 4 year. or less

☐ 2 5-11 year.

☐ 3 12 year.

☐ 4 13-14 year.

☐ 5 15 year. or more

175. Before this visit, how many "therapists" (doctor, psychiatrist, psychologist, nurse, counselor, osteopath, chiropractor) have you ever seen about a problem of sleeping too much or too little?

☐ 1 None

☐ 2 1 only

☐ 3 2

☐ 4 3 or 4

☐ 5 5 or more

If you are using the computerized answer sheet, please check that you put your name, sex, and birthdate on that sheet. Also, please remember to fill in the circles under these items. Thank you.

Source: Douglas A. B., Bornstein R., Nono Murcia G., Keenan S., Miles L., Zuccone V. P. J., Guillemineau C. and Demert W. C. (1994)
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