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Jet Lag, Circadian Rhythm Disruption, And Psychological Problems Among Cabin Crew

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Abstract: Shift work can disrupt the body's natural rhythm, causing physical and psychological changes for cabin crew. Recovery can take 1-2 weeks to a month, with an increased risk of health issues like hormonal imbalance, fatigue, and insomnia (Centers for Disease Control and Prevention, NIOSH). According to the World Health Organization shift work (including the kind of circadian rhythm disruption that cabin crew encounter) has the probability of causing cancer. The need to assist crew members in coping with psychological challenges is rising. Aviation psychology is a growing field that focuses on helping individuals manage their emotions, thoughts, and behavior, as well as addressing the challenges faced by crew members. The study aims to investigate the psychological challenges of cabin crew under high-pressure work environments, particularly focusing on circadian rhythm disruptions.

Index Terms - Jetlag, Circadian rhythm, Psychological problems, Mental health.I.

INTRODUCTION

Jet Lag

According to The American Academy for Sleep Medicine (AASM), in the second edition of its International Classification of Sleep Disorders [1] Jet lag is a disorder related to the temporal mismatch between the timing of the sleep-wake cycle generated by the endogenous circadian clock (Olivier Le Bon, 2018).

Circadian rhythm disruption

In DSM IV-TR, CRD is defined as a sleep disorder that is due to a mismatch between the sleep-wake schedule required by a person's environment or occupational circumstances (e.g. shift work) and his or her circadian sleep-wake pattern, resulting in excessive sleep or insomnia. This disorder was formally called sleep-wake schedule disorder. DSM-5 calls it circadian rhythm sleep-wake disorder.

Jet lag, or desynchronosis, is a sleep disorder caused by traveling rapidly across multiple time zones. It disrupts the body's internal clock known as the circadian rhythm, which takes time to adjust to the new time zone. The severity of jet lag worsens with the number of time zones crossed. The impact of jet lag on an individual's physical and mental well-being can be severe, leading to a range of debilitating symptoms such as fatigue, headaches, gastrointestinal issues, decreased alertness, memory and attention span impairment, performance issues, irritability, stress, and an increased risk of triggering depressive, manic, or bipolar episodes. It is crucial to take proactive measures to mitigate the effects of jet lag and prioritize one's health when traveling across time zones.

II. NEED OF THE STUDY

This research aims to understand how traveling across different time zones affects the mental health of cabin crew personnel. Due to the demanding nature of their work, cabin crew members experience psychological challenges like stress, anxiety, depression, and more. Within the aviation industry, psychologists are responsible for upholding mental wellness and increasing awareness. The study examines the effects of disrupted circadian rhythms and jet lag on mental health. It also covers potential therapies and techniques to ease related symptoms. It is worth noting that recent studies have shown an increase in depression, anxiety, and stress rates. These findings emphasize the importance of prompt and suitable action to tackle this problem.

III. OBJECTIVES

- To study the impact of psychological problems among cabin crew.
- To find how circadian rhythm disruption causes mental health problems.
- To examine how jet lag can trigger psychological disorders.

IV. LITERATURE REVIEW

1. Joan Arehart-Treichel (2002) discussed a study on “Jet lag may trigger mental illness relapse”, This study aimed to identify individuals with psychiatric illness who may face additional risks from jet lag. The scientific study involved 152 participants who were classified into two groups. The first group consisted of 81 individuals who traveled across seven or more time zones, while the second group comprised 71 individuals who traveled across three or fewer time zones. The research carried out in Jerusalem gathered sociodemographic data such as gender, age, marital status, and degree of religious engagement. Moreover, it comprised the DSM-IV for psychiatric illnesses diagnosis and the motive behind the patients' trip to Jerusalem. Both groups exhibited comparable relapse outcomes. According to research, people with existing psychiatric conditions are at a higher risk of experiencing relapses when traveling through seven or more time zones. This emphasizes the need to consider the possible

effects of long-distance travel on mental well-being and to take appropriate steps to minimize the dangers for vulnerable individuals.

2. The Indian EXPRESS (2010) conducted a study on “Jet Lag Causes Memory Loss: Study”, A team of researchers from the University of California conducted a study to examine the effects of chronic jet lag on the brain and its impact on memory and learning abilities. Female Syrian hamsters were exposed to six-hour time shifts twice a week for four weeks, during the study conducted by the researchers. After a month of recovery from jet lag performance in learning and memory were measured. According to the study, hamsters experienced difficulty in learning basic tasks while experiencing jetlag but were able to improve once they returned to a regular day-night routine. A study has shown that jetlag can have persistent effects on the hippocampus and can also cause decreased neurogenesis in the hippocampus, an important part of the brain that handles memory processing. The research reveals that cognitive problems can last for up to a month after jetlag until the circadian rhythm attains stability. The acute disruption of the circadian rhythm can cause malaise as well as gastrointestinal problems and disturb the hunger cycle in the body.

3. Iliia N. Karatsoreos (2014) conducted a study on “Links between Circadian Rhythms and Psychiatric Diseases” to discover prevention and alternative suffering to circadian rhythm and psychiatric disorders. This review explored disrupted circadian rhythm clock to neuropsychological disorders like depression, mania, and schizophrenia. In modern society, people are exposed to light at inappropriate times of the day like work shift workers, airline pilots, and medical workers, which leads to severe physical and mental health disorders. Circadian rhythm disruption leads to Neurobehavioural changes, Studies in cabin crew show decreased reaction time, increase in error rates, and marked temporal lobe atrophy. Findings show that jet lag alters the behavioral outcome and neurogenesis in the hippocampus reduces cognitive flexibility, attention, and executive functions. A recent study shows major depressive symptoms correlated with the alignment of the circadian rhythm. In addition, circadian rhythm

abnormalities are seen in mania where manic episode sleep patterns are significantly altered. And the link between circadian rhythm abnormality and causes of schizophrenia is less clear but evidence shows a strong link between the circadian clock and schizophrenia.

4. Lauren D. Asarnow, Adriane M. Soehner, and Allison G. Harvey (2014) conducted a study on “Circadian Rhythm and Psychiatric Disorders”, The primary objective of the research was to investigate psychiatric disorders and recent advancements in interventions for promoting sleep and regulating circadian rhythms through a combination of psychosocial and psychopharmacological treatments. Sleep and circadian rhythm processes are interrelated but also independent. An experiment was conducted by doing forced desynchronization (FD) to change the internal circadian rhythm and homeostasis to find psychiatric conditions. It showed that Melatonin levels remain low during and rise before sleep regulating the light-dark cycle. The circadian rhythm regulates body temperature, and cortisol level is high 30 minutes after awakening. Rest-activity patterns can be monitored through a wristwatch known as Actigraphy, which can measure physical motion by a sensor. Several studies have mentioned that sleep/Circadian insomnia is common in patients with Schizophrenia, major depression, postpartum mood disorder, and bipolar disorder. Interventions and treatments for circadian and sleep systems include Cognitive behavior therapy for insomnia in which multicomponent treatment by stimulus control, sleep duration, sleep hygiene, cognitive restructuring, and relaxation techniques. Interpersonal Social Rhythm Therapy (IPSRT), is used for targeting external factors zeitgebers that have a powerful impact on sleep rhythm like meals, and social contact, this seems to reduce depression and bipolar symptoms with medications. Chronotherapy is another intervention used for advancing bedtime and waketime up to reaching the desired alignment. Light exposure therapy seems to be helpful for seasonal depression patterns.

5. William H. Walker II, James C. Walton, A. Courtney DeVries, and Randy J. Nelson, (2020) conducted a study on Circadian Rhythm Disruption and Mental Health. This review explored the relationship of circadian rhythm with behavioral health and psychiatry. Exposure to technology at night disrupts the body's natural rhythms, leading to health problems like cancer, cardiovascular disease, and psychological problems for night shift workers. Prioritizing worker safety and sleep is essential to prevent negative outcomes. Sleep duration is key for diagnosing mood disorders. Disrupted circadian rhythms can cause irritability, depression, and dysphoric moods. Hormone production is affected by light exposure at night, leading to changes in behavior and increased depression risk. Therapies like bright light therapy and antidepressants can help maintain the biological clock. Increased Major depressive disorders due to rising circadian rhythm disorder. Therapies like bright light therapy, wake therapy, social rhythm therapy, and antidepressant seems quite helpful in treating depression. In bipolar disorder, genetic factor plays an important role which includes the linkage of the molecular circadian clock gene, it has been reported jet lag can induce bipolar episodes while traveling multiple zones. In addition, studies reported jet lag to cause a relapse of schizoaffective psychosis in individuals with schizophrenia.
6. Yvonne Gorlich, and Daniel Stadelmann, (2020) conducted a study on “Mental Health of the flying cabin crew: depression, anxiety, and stress before and during the COVID-19 pandemic”. An online survey with DASS-21 was used for 12 airlines in sample 1 and 1119 employees of 22 airlines for sample 2 were taken for the study. The study stated that shifts at night hours lead to physical and psychological problems. Cabin crew also face post-traumatic stress disorder (PTSD) after being met with air accidents. 37% anxiety provoked before taking off the flight. The financial crisis (2007-2009) led to unemployment leading to a rise in anxiety disorders, depression, dysthymia, and suicide rates. There is a positive correlation between the symptoms of depression anxiety and stress before and after the pandemic with subjective stressors like time pressure work intensity, fatigue increased physical and psychological demands, and on-call duty.

7. SKY Brary, Aviation Safety Foundation (2023) Discussed “Key Training Topics About Managing Jet Lag” effective strategies for coping with fatigue related to Jet lag. This study was conducted to bring forward awareness among cabin crew that jet lag is more than just fatigue. Besides trainees should be aware of symptoms like sleepiness, digestive upsets, impaired judgment, impaired decision, memory lapses, irritability, and apathy. Trainees should know how the biological clock works in the human body and how it changes with time zones. They should calculate the number of days needed to adjust to local time and learn strategies and recommendations to avoid jet lag. Knowing the advantages and disadvantages of sleep during base time will help to avoid fatigue. Trainees must practice a layover assessment adjustment questionnaire (LAAQ), body clock questionnaire, fatigue manifestations, sleep, and circadian rhythm that includes OGHFA (The Operator Guide to Human Factors in Aviation) materials to help maintain adjustment to local time.
8. John P. Cunha, DO, FACOEP (2023) conducted a study on “Jet Lag” which identified that jet lag also called Desynchronosis and flight fatigue. The hypothalamus also has a major role in activating various functions of the body alarm. Travelers flying east often experience more problems because they lose time due to consecutive one-hour time zone increases, as time increases more difficulty in adjustment. Even though jetlag is temporary, as the disparity in age increases recovery also takes time. Travelers with pre-existing conditions like sleep deprivation, stress, and poor sleep habits worsen their health conditions. Frequent traveling can also aggravate the situation. Consuming too much alcohol can increase the risk of experiencing jet lag. Children and babies exhibit comparable symptoms to those experienced by adults. Some remedies to prevent jet lag include exercising, re-scheduling activities according to the new time zone, getting medical advice, using fewer sleeping pills, and avoiding caffeine. People who have a history of heart disease may have a higher risk of experiencing a stroke.

9. J.R. Brown, Melchor J. Antunano, M.D. conducted a study on “Circadian Rhythm Disruption and Flying” stating that maintaining the circadian rhythm is crucial for achieving homeostasis and promoting behavior and physical well-being. When a 24-hour circadian rhythm is disrupted it is called Circadian Rhythm Disruption. It is said that the brain’s Suprachiasmatic nuclei are responsible for the circadian rhythm regulation, at the same time it relays outside influence Zeitgebres (German word time givers) to keep a normal schedule pattern of the body including daylight, social contact, physical activity, sleep, ambient temperature, and regular meals. As a result, the negative impact can cause sleep disorders and CRD, for example, Delayed sleep phase syndrome, Advanced sleep phase disorder Non24-hour sleep-wake disorder which can lead to depression, insomnia, relationship problems, and psychiatric disorders. To achieve good sleep certain guidelines must be followed mental and physical relaxation techniques like (yoga, meditation, and reading). Making sure that environment is conducive to sleep, exercising regularly, and a nutritious balanced diet is important. Jet lag or Rapid time zone change syndrome has greatly impacted symptoms showing decreased attention, Impaired memory, and isolation. Fatigue caused by CRD can have a significant impact on our daily routine, similar to the effects of alcohol or drugs.

10. Skybrary Aviation Safty, (2023) conducted a study on “Circadian Rhythm Disruption” stating that circadian rhythm acts as an internal biological clock and regulates functions like the wake /sleep cycle and other activities that are linked to the biological cycle. In the field of aviation, circadian rhythm variation leads to behavioral, physiological, and psychological consequences. Also known as circadian rhythm disruption (CRD). Some of the most common symptoms include fatigue, insomnia, negative mood, and digestive system problems and they also exhibit increased reaction time, decreased attention, impaired memory, distraction, and irritability. Strategies for minimizing impact and resetting the biological clock guidance should be given to flight crew like sleeping techniques, avoiding deep sleep before the flight, using caffeine during flight, and exposure to daylight helps to increase the level of

serotonin in the brain to stimulate positive mood, exercise during the day will reduce fatigue, 24-hour sleep is important after a flight to reset your jet lag.

V. IMPLICATIONS

The study findings suggest that jet lag and circadian rhythm disruption can significantly impact the psychological well-being of individuals who work under extreme work pressure. The study highlights the importance of understanding how travel across different time zones can affect behavior and how it can potentially trigger existing psychological disorders. By prioritizing research in aviation psychology, it can develop better management strategies to mitigate these potential impacts in the future. The study also highlights the need for further research in this area to improve understanding of the subject and develop effective intervention strategies. Circadian rhythm disruption affects both cabin crew and travelers worldwide. Identifying the associated factors can improve the area of tourism in India. Developing an in-depth understanding will encourage individuals to participate in positive psychological well-being, and help in understanding the role of psychologists in this area. Facilitating positive emotional and cognitive aspects through relaxation techniques, psychoeducation for effective schedule management, and strategies to manage mood changes, irritability, temporary confusion, and insomnia will assist in overcoming the problem effortlessly.

VI. LIMITATIONS AND SUGGESTIONS

The present literature review has various limitations. The study was conducted only in the area of cabin crew members, circadian disruption also happens for people who work extreme shift work hours. Jet lag not only happens with cabin crew members but also with pilots, business travelers, and athletes can be also considered. The difference in chronological age and severity of jet lag can be studied. Circadian rhythm disruption and jet lag can cause other physical and psychological changes/disorders, that can be further studied in depth.

VII. CONCLUSIONS

According to recent research, the aviation industry requires the expertise of more psychologists to offer crucial therapies and interventions. Recent research has shown that traveling in an eastward direction can result in severe jet lag. Disrupting the natural sleep-wake cycle can lead to the onset of neuropsychiatric conditions such as depression, mania, schizophrenia, and also problems like anxiety, confusion, irritability, difficulty focusing, coordination issues, insomnia, and memory impairment. The study reveals that psychological problems can arise due to jet lag, emphasizing the necessity of mental health specialists in this sector.

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