Original Article

Jet Lag and Cabin Crew: Questionnaire Survey

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ABSTRACT

Aircrew sleep is extremely significant in the current scenario of commercial operations. With the given speed and range of current aircraft operations, aircrew fatigue is becoming a limiting factor in aircraft operations. Modern commercial aircraft cross time zones at almost the same rate as the earth rotates, and it is these swift transmeridian transitions that lead to the syndrome commonly referred to as Jet Lag or Rapid Time Zone Change Syndrome. Cabin crew form an important part of the commercial airlines, they form an important part of the flight crew responsible for flight safety. Jet Lag degrades attention, short-term memory, decision-making; briefly the entire job content of cabin crew suffers. In effect, cabin crew can little afford to be 'jet lagged' and present a poor image of the airline. The aim of this paper is to document the incidence and effects of jet lag on the cabin crew of a commercial airline by conducting a questionnaire survey. It also suggests remedial measures in the medical, training and operation spheres.

A total of 462 cabin crew participated in the survey. The average age of the cabin crew is 42.9 years, perhaps a reflection of the recruitment policy of the airline. It is mirrored in the relatively high length of service (14.7 years) for the crew questioned. 17.3% cabin crew were of supervisory status. Hypertension, CAD and Diabetes mellitus were the most common chronic diseases encountered in the survey, often multiple disabilities were existing in individuals. 40.9% of the cabin crew were aware of Jet Lag, whereas 91.1% reported symptoms of Jet Lag. Approximately twice as many, found travelling on the Far Eastern route more taxing than flying West. The most difficult flights were the continuous short haul night flights, perhaps due to lack of quality sleep. Coping mechanisms included use of alcohol or drugs (anxiolytics) to induce sleep, often in combination. Individual coping strategies included exercise at the layover hotel or forced sleep, to combat Jet Lag.

An education and training module on Jet Lag management in flight operations is mandatory to understand physiological mechanisms underlying Jet Lag and fatigue countermeasures. Given the job at hand, they need to be educated on the various aspects of Jet Lag and the organization has to implement a flight schedule to help them overcome the peculiar job related disorder. Short acting hypnotics are helpful in adjusting to the new time zone and ensuring adequate sleep. There is a pressing need to develop and implement medical standards for cabin crew, along the lines of aircrew medical categories.

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"My mind clicks on and off... I try letting one eyelid close at a time while I prop the other open with my will. But the effort's too much. Sleep is winning. My whole body argues that nothing life can attain is quite so desirable as sleep. My mind is losing resolution and control."

Lindbergh's observations and circadian rhythm imbalances are familiar phenomena to aircrew. Desynchrony occurs when changing environmental cues (e.g., meals, daylight, work-sleep schedules) conflict with existing biological rhythms (1). Problems commonly associated with desynchrony usually manifest after transoceanic and transcontinental flights.

Air crew sleep is extremely significant in the current scenario of commercial operations. With the given speed and range of current aircraft operations, aircrew fatigue is becoming a limiting factor in aircraft operations. Modern commercial aircraft cross time zones at almost the same rate as the earth rotates, and it is these swift transmeridian transitions that lead to the syndrome commonly referred to as Jet Lag or Rapid Time Zone Change Syndrome. On arrival at their destination, individuals find themselves out of synchrony with the social and time cues of their new surroundings. It is

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usually associated with excessive daytime sleepiness; sleep onset insomnia and frequent arousals from sleep, particularly in the latter half of the night. Gastro - intestinal discomfort is common.

Cabin crew form an important part of the commercial airlines. they form an important part of the flight crew responsible for flight safety. As far as the passenger is concerned, perhaps more important than the aircrew; the commercial passenger comes in contact only with the cabin crew and forms an impression about the airline through this interaction. Jet Lag degrades attention, short-term memory, decision-making; briefly the entire job content of cabin crew suffers. In effect, cabin crew can little afford to be 'jet lagged' and present a poor image of the airline.

Aim

The aim of this paper is to document the incidence and effect of Jet Lag on the cabin crew of a commercial airline by conducting a questionnaire survey. It also suggests remedial measures in the medical, training and operation spheres.

Results

To gauge the incidence and effect of jet lag, a questionnaire survey was conducted among the cabin crew of a commercial airline. The questionnaire was administered when the cabin crew was undergoing a bi-annual refresher course at the operations training wing. A total of 462 questionnaires were administered to cabin crew.

(a) Average Age Of Cabin Crew	42.6 $\pm$ 5.8 years
(b) Duration Of Service	14.7 $\pm$ 3.7 years
(c) Approximate Flying Hours Per Month	49.9 $\pm$ 8.7 hours
(d) Supervisory Status	17.3% (80)
(e) Pre-existing Medical Disability	
(i) Hypertension	8.4% (38)
(ii) CAD	4.5% (21)
(iii) Diabetes mellitus	9.1% (42)
(f) Basic Knowledge of Jet Lag	40.9% (189)
(g) Symptoms of Jet Lag Present	91.1% (421)
(h) Easier Flying	
(i) East	38.8% (179)
(ii) West	61.2%(283)
(i) Most Difficult Flights (in decreasing order of difficulty)	
(i) Continuous short haul night flights	
(ii) Far East	
(iii) USA	
(j) Coping Mechanism	
(i) Alcohol	45.8%
(ii) Drugs	33.7%
(iii) Miscellaneous (Exercise, Forced Sleep)	78.4%

Discussion

The average age of the cabin crew is 42.9 years, perhaps a reflection of the recruitment policy of the airline. It is mirrored in the relatively high length of service (14.7 years) for the crew questioned. 17.3% cabin crew were of supervisory status. Hypertension, CAD and Diabetes mellitus were the most common chronic diseases encountered in the survey, often multiple disabilities existing in individuals. 40.9% of the cabin crew were aware of jet lag, whereas 91.1% reported symptoms of jet lag. Approximately twice as many, found travelling on the Far Eastern route more taxing than flying West. The most difficult flights were the continuous short haul night flights, perhaps due to lack of quality sleep. Coping mechanisms included use of alcohol or drugs (anxiolytics) to induce sleep, often in combination. Individual coping strategies included exercise at the layover hotel or forced sleep, to combat jet lag.

Almost everyone on a long flight suffers jet lag to some degree. A 1994 survey of New Zealand based international flight attendants showed a similar result, with 96% of respondents saying they suffered from jet lag despite being accustomed to long haul travel. Specifically 90% suffered from tiredness after arrival, 94% experienced loss of energy and motivation and 93% reported broken sleep after arrival (2). The length of the flight is not the critical issue; the most important single factor is how many time zones are crossed. Generally, people have more difficulty adjusting to travel from west to east than from east to west. This is attributed to average natural circadian rhythm cycles of 24-26 hours. Eastward travel actually compresses days into shorter periods, taking a person even further from their natural cycle. In contrast, westward travel actually expands days to approximate the internal cycle more closely (3).

Immediate signs and symptoms of desynchronosis with the circadian rhythm include (1,4) Sleep disruption, Short-term fatigue, Irritability, Loss of appetite and Judgment alteration. Effects of mild sleep deprivation appear to be cumulative. One night of reduced sleep may not lead to great impairment in alertness, but the level of fatigue increases each night and may serve to explain continuous short haul night flights as most taxing. Decreases are observed in productivity and performance due to fatigue and lack of sleep. This decline is even more prominent if the worker, in addition to fatigue, is experiencing circadian dysrhythmia. The most common complaint among all types of shift workers is a reduction

in quality and quantity of sleep. Daytime sleep of night workers tends to be lighter, more fragmented, and less restful than sleep at night, since family activity and other normal daytime activity often interrupt it. Daytime sleep is typically 2 hours shorter than nocturnal sleep (5,6).

Gastrointestinal Distress

The second common medical complaint seen is GI distress. As many as 75% of night workers (compared to 20% of day workers) complain of loss of appetite, constipation, dyspepsia, heartburn, abdominal pain, and flatulence. A higher incidence of duodenitis and peptic ulcer is found in shift workers. Shift workers are more likely to consume more caffeine, alcohol, and tobacco in attempts to regulate their sleep/wake cycles. Disturbances of the circadian cycle of intestinal enzyme secretion and gastric acidity and psychological stress associated with shift work also may contribute to the pathophysiology of these disorders (5,6,7).

Psychological Disturbance

Psychological disturbance also is more common in shift workers than in the general population. Shift workers have more symptoms of depression and more often require hospitalization or treatment with psychotropic drugs. Those with endogenous depression or bipolar disorder are prone to greater exacerbations. Circadian rhythm disruption has been suggested to play a role in the genesis of depression or in the maintenance of endogenous depression (7).

Ischemic Disease

Shift workers have an increased incidence of ischemic cardiovascular disease. Heart attacks are more common in night workers than in day workers. Triglyceride levels are increased in workers on a phase-advance shift schedule. The exact mechanisms of cardiovascular effects are unclear. However, blood pressure and pulse follows a circadian rhythm; thus, mechanisms could be related to such rhythms. Additionally, excessive smoking or substance abuse related to shift work might be culpable (1,8).

Diseases With Intrinsic Circadian Variation

Diseases with intrinsic circadian variation may be exacerbated by shift work. For example, persons with chronic asthma may experience more symptoms at night because circadian acrophase (i.e., peak occurrence of bronchial reactivity) occurs between 4 and 7 a.m. This phenomenon has obvious implications for night workers. Shift work exacerbates glucose levels in persons with insulin-dependent diabetes. In an Australian study, the response to the different drug classes for treatment of hypertension differed. The response to drugs that work relatively nonspecifically (diuretics, calcium blockers) was relatively consistent over 24 h. However, the response to beta-blockers and to angiotensin converting enzyme inhibitors was dependent upon the time of the day the drug was administered, supporting the concept of multiple drug therapy that may need to be tailored to the time of day. No studies indicate an association between increased mortality and shift work. However, statistics on morbidity may be more meaningful when selection bias is considered. Epilepsy requiring medication, coronary artery disease, bronchial asthma, insulin dependent diabetes, hypertension on multiple drugs, recurrent peptic ulcer disease, irritable bowel syndrome and chronic depression may worsen on intrinsic circadian variation (9). This may perhaps be one of the more important reasons to develop and implement medical standards for cabin crew, along the lines of aircrew medical categories, especially for international airlines.

Increased Accidents And Errors

There are few studies on the effects of jet lag on task performance. Shift workers in hospitals or railways are exposed to similar stress and therefore, those studies are cited in comparison. Shift work has been associated with increased rates of accident and injury at work. Increased accident rates also are reported in shift workers traveling to and from work. Night shift nurses have a higher incidence of automobile-related injuries and near accidents while driving to and from work (5). Emergency physicians on night shifts were slower at manual tasks and more likely to commit errors as their shifts progressed. These physicians rated themselves more fatigued, less thoughtful, and more sleep deprived than day shift physicians. In other groups studied (e.g., truck drivers, air-traffic controllers), a great number of adverse incidents were due to decreased vigilance, lower performance, more fatigue, and higher error rates (6,7). Circadian-related performance decrements can occur in

workers even if they are not sleepy. Micro-sleeps are small bursts of sleepiness that can occur throughout the circadian cycle, allowing a previously alert person suddenly to be subject to severe fatigue, unable to stay awake and have obvious implications for injuries and accidents (8).

Factors Modulating Adaptation

Various factors modulate adaptation to shift work. Workers who choose shift work for reasons such as pay differential are more likely to adapt more easily. Tolerance to shift work declines with advancing age. This may be partly due to the cumulative effects of shift work exposure. The body also loses physiologic reserve. Difficulties may arise in persons older than 40 years, even if the worker previously tolerated shift work. Individuals vary in their ability to adjust to shift work. Many individuals suffer few or transient problems. Some, however, are unable to adjust at all; a phenomenon termed shift work intolerance. These workers are unable to synchronize their internal circadian rhythms with a imposed external environment, resulting in GI complaints, interpersonal relationship difficulties, drug and alcohol problems, decreased job performance, and increased accident rates (8).

Combating Jet Lag

Non-Pharmacological Methods are empirically used to avoid jet lag or reduce its severity (1,3).

(a) Pre-flight Preparation: This is one of the most important aspects of combating jet lag. Ensure a good night's rest and avoid stress, excitement or worry and fatigue from a function, the night before. Get plenty of exercise in the days prior to departure and try to avoid sickness such as flu, cold and so on.

(b) Exercise and Good Sleep Hygiene: The data on exercise are conflicting. While exercise increases energy and improves mood, it probably does not play a major role in resetting the body's biological clock. Some research suggests that moderate physical training leads to an increase in sleep length and night time alertness. Some recommend moderate physical exercise a few hours before the main sleep period; others recommend aerobic exercise immediately after awakening.

Drug Therapy for Jet Lag The two main approaches for pharmacological treatment of jet lag are the promotion of sleep with hypnotics and the resynchronization of the internal body clock. The latter is achieved by timed administration of Melatonin.

Melatonin In humans, plasma levels are high at night and low in daytime. This variation has suggested the possibility of a regulatory function in day / night dependent physiological process such as sleep and has led scientists to explore the effets of administered melatonin on the modulation of circadian rhythms. Melatonin delays the circadian rhythms when administered in the morning and advances them when given in the late afternoon / evening. Melatonin also acts as a mild hypnotic. Its principal aeromedical application has been in the experimental treatment of jet-lag effects. For aircraft passengers, melatonin administration at destination bedtime appears to improve sleep quality and to decrease the time required to re-establish normal circadian rhythms. However, for international aircrew who travel through multiple time zones without time to adapt to new environments, taking melatonin before arriving home may further impair already disturbed circadian rhythms (9).

Zolpidem is an imidazopyridine, structurally unrelated to the benzodizapines, has a short half-life, rapid absorption and a strong hypnotic effect with weak anticonvulsant and muscle relaxant properties. It has minimal next-day effects (hangover) when given at recommended doses. This factor is important for cockpit crews, who have to be mentally alert the next day, to operate the flight. Classically, Zolpidem is indicated for short and fast acting resynchronization of the circadian rhythms e.g. cockpit & cabin crew in commercial airline with short layovers at intermediate stations. Melatonin - Zolpidem combination is poorly tolerated subjectively perhaps because of the hangover effect due to the additive hypnotic effect of the drugs (9, 10,11). There are no fixed drug regimes or measures to avoid jet lag. Combating jet lag is more of a personal preference, measures that the passenger or crew are most comfortable with.

Conclusion

The need for 24-hour operations creates non-standard and altered work schedules that can lead to

cumulative sleep loss and circadian disruption. These factors can lead to fatigue and effect productivity and performance on job. Flight crews travelling to a time zone, that is more than 3 hours different to which they are accustomed, frequently experience extreme fatigue, somnolence and disordered sleeping patterns. Cabin crews have an important job at hand, as crewmembers responsible for flight safety and the 'official' publicity managers of the airline.

Designing And Scheduling Shift Work. Around-the-clock aviation operations pose unique challenges. Physiological requirements related to sleep; the internal circadian clock, and human fatigue are critical factors that are known to affect safety, performance, and productivity (4). Understanding the flight crews' capabilities and limitations is important to address these issues as global demand for aviation continues to increase. Flight Time Duty Limitations for aircrew (12) is meant as a guideline, to formulate the working schedule for cabin crew. Local variations need to be taken into account, e.g. continuous three nights short-haul flights may be more taxing than long haul trans-oceanic flights, due to lack of quality sleep at night. Given the strict boundaries for employment and work output for cabin crew, local regulations are needed to ensure optimal work output. The age group, local conditions viz. flight departure times, service conditions for flying with minimum crew and the medical disability of the aircrew need to be taken into account before formulating schedules for aircrew.

Medical Categorization. Medical disabilities and the medication schedule need to be taken in to account before rostering cabin crew. The average higher age group of the cabin crew also makes it difficult to adjust to the new time zones, reducing the efficiency and work output for cabin crew. The need of the hour is to set up and regulate the flying duties for cabin crew in accordance with their medical disabilities. Categorization of the cabin crew, in accordance with their medical disability, may help improve the work output, qualitatively and quantitatively.

To that end, an education and training module on jet lag management in flight operations is mandatory to understand physiological mechanisms underlying jet lag and fatigue countermeasures. Given the job at hand, they need to be educated on the various aspects of jet lag and the organization has to implement a flight schedule to help them overcome the peculiar job related disorder. Short acting hypnotics are helpful in adjusting to the new time zone and ensuring adequate sleep. There is a pressing need to develop and implement medical standards for cabin crew, along the lines of aircrew medical categories.

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