Prevalence and Consequences of Sleep Disorders among Traffic Agents: A Case Study

PREVALENCIA Y CONSECUENCIAS DE LOS TRASTORNOS DEL SUEÑO ENTRE LOS AGENTES DE TRÁNSITO: UN ESTUDIO DE CASO

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ABSTRACT

This study came up with the main objective to inspect the sleep quality and sleep disorders among traffic agents in Rio de Janeiro, Brazil. A cross-sectional and descriptive study was carried out in which 118 traffic agents were surveyed. To this end, the Pittsburgh Quality of Sleep Index (PSQI) questionnaire was administered. The results demonstrate that the mean PSQI global score was 8.5 ± 2.4 . Thirty four subjects had high sleep quality and 84 had low sleep quality. Global PQSI scores had a mean of 3.5 ± 1.37 . Those categorized as low sleep quality ranged from 6-12 with a mean of 7.52 ± 1.64 . Related to the usual medications, drugs most commonly used are those intended for the treatment of anxiety (9.32%), sleep inducers (10.17%), hypertension (24.58%), anti-depressants (16%), and analgesics (30.51%). The relationship of insomnia severity to age was significant from a statistical point of view ($p = 0.001$). Poor sleep quality has a negative impact on general health and well-being and can produce signs and symptoms associated with concussions. The relatively moderate sleep deficits experienced by subjects in this study did not affect, at first, the performance on professional activities.

Keywords: SLEEP, SLEEP DISORDERS, PUBLIC HEALTH, WORKER HEALTH

RESUMEN

Este estudio surgió con el objetivo principal de inspeccionar la calidad del sueño y trastornos del sueño entre los agentes de tránsito en Río de Janeiro, Brasil. Un estudio transversal y descriptivo se llevó a cabo en el que se encuestó a 118 agentes de tránsito. Para este fin, fue administrado el cuestionario Índice de Calidad del sueño de Pittsburgh (ICSP). Los resultados demuestran que la puntuación media ICSP global fue de $8,5 \pm 2,4$. Treinta y cuatro sujetos tenían alta calidad del sueño y 84 tuvieron baja calidad del sueño. Puntajes globales ICSP tenían una media de $3,5 \pm 1,37$. Aquellos categorizados con baja calidad de sueño variaron de 6-12 con una media de $7,52 \pm 1,64$. En cuanto a los medicamentos habituales, los medicamentos utilizados más comúnmente son los destinados para el tratamiento de la ansiedad (9,32%), inductores del sueño (10,17%), la hipertensión (24,58%), antidepresivos (16%) y analgésicos (30,51%). La relación de la gravedad del insomnio con la edad fue significativa desde el punto de vista estadístico ($p = 0,001$). La mala calidad del sueño tiene un impacto negativo en la salud general y el bienestar, y puede producir signos y síntomas asociados con las conmociones cerebrales. Los déficits de sueño relativamente moderadas que experimentan los sujetos en este estudio no afectaron, en un primer momento, el desempeño de las actividades profesionales.

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Palabras clave: SUEÑO, TRASTORNOS DEL SUEÑO, SALUD PÚBLICA, SALUD DEL TRABAJADOR

INTRODUCTION

Sleep is a fundamental biological function in memory consolidation, in binocular vision, thermoregulation, energy conservation and restoration, and restoration of brain energy metabolism. Recent studies show that about one third of the general population

suffers from some form of sleep disorder.¹⁻³ The most common sleep disorders at the level of primary health care include lethargy, drowsiness, fatigue, headaches, reduced attention and concentration, memory deficits, anxiety, depressive symptoms, irritability, poor performance at work or school and frequent accidents.⁴ The impact of these consequences on quality of life,⁵ the work environment, economy and health care expenditure are considerable.⁶⁻⁸ Sleep is traditionally divided into two main stages, the rapid-eye movement (REM) sleep and nonREM (NREM) sleep. According to the Sack et al.⁹ standards the NREM sleep is subdivided to stages N1, N2 and N3 representing the depth of the sleep. Normal sleep consists of sleep periods, each of which in adulthood last for 90 to 120 minutes, except for the first cycle after sleep onset, which lasts for 70 to 100 minutes. The sleep cycle begins with a short period of NREM stage 1 followed by stages N2, N3 and back to N2, before finally moving to REM sleep. Stage 1 NREM sleep serves as a transitional phase between wakefulness and sleep. Stage 2 NREM sleep is somewhat deeper than the stage 1 sleep. The last NREM

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phase is the N3 which is described as the slow wave sleep. This stage occurs mostly during the first third of the night, and decreases along the later sleep cycles, and is considered to be important in the recovery from the previous day.¹⁰ After NREM sleep phases, the sleep shifts into REM sleep. Most of the REM sleep occurs in the latter parts of the sleep. REM and NREM sleep have several differences in the physiological and neurological functioning e.g. muscle tone, brain activity, heart rate, sympathetic nerve activity and respiration.¹¹

Circadian rhythms refer to the daily rhythms in physiology and behavior. These rhythms are thought to regulate sleep-wake cycle, modulate physical activity and nutritional intake and control different bodily functions e.g. temperature, heart rate or hormone secretion. Circadian rhythms are generated by neural structures in the hypothalamus.¹² Circadian timing, working in tandem with the neurotransmitter adenosine and melatonin hormone, determines the ideal timing of and a correctly structure of the sleep episode.¹³ Sleeping is an important part of human function and proper sleep is needed to work in an efficient and safe manner, not to mention the health aspect of sleep. Impaired or disrupted sleep quality can result in harmful effects causing a reduction in mental, cognitive and physical abilities and is an important cause of labor abstention, consequently reflecting on inefficient work.¹⁴ Global disasters such as the tanker Exxon Valdez accident, Chernobyl nuclear accident, and the disaster of the space shuttle Challenger, were related to sleep deprivation.¹⁵

When looking at the transformations in work organization, it is clear the even acting as a stressor on the individual.¹⁶ One of such changes is the shift work that can be seen as a way to fairly common organization currently. Companies give increasing emphasis to continuous 24-hour shifts for purely economic reasons.¹⁷ The justifications for the organization shifts in modernity are the needs of a technological nature, that cause, in certain areas of production, to stop the production process (with respect to the working hours) adversely affects the quality of products; economic constraints, requiring expensive machinery have to be used continuously to allow the return of timely investment.¹⁸

Occupational stress appears due to the tensions at work, professional life and can be generated resulting from the individual's own factors, or pertaining to the conditions and the working environment, of which the most common are: noise, hygiene, work per shift, exposure to risks and hazards, among others. However, rarely a type of stressor is absolute and often the stressed individual occupationally reacts with excessive use of alcohol or other drugs for the purpose of alleviating anxiety.¹⁹ For individuals who suffer from these disorders, the effect of their symptoms on their quality of life often prompts them to seek medical attention for diagnosis and treatment.

The aim of this study is to assess the sleep quality and sleep disorders among traffic agents in Rio de Janeiro, Brazil; in order to diagnose them through questionnaire according to the Pittsburgh Quality of Sleep Index.

MATERIALS AND METHODS

Design

A cross-sectional and descriptive study was carried out in traffic agents were surveyed.

The methodology encompassed the sleep disorders analysis using the Pittsburgh Quality of Sleep Index (PSQI) (Brazilian Portuguese version).²⁰ The PSQI was self-administrated during 2013-2014 to traffic agents.

A total of 118 traffic agents employed at 3° Special Group of Traffic (Municipality of Rio de Janeiro), which acts on the districts (Jacarepaguá, Barra da Tijuca and Campo Grande) were included in this study (Figure 1).

A Person-Environment-Occupation Model of Occupational Performance

The obtaining data on traffic agents' occupational activities was planned, implemented and evaluated according to the model described by Law et al.²¹ (Figure 2). Groups in three phases for evaluation process in occupational safety and health: development, implementation and effect evaluation. Each phase consists

Figure 1.

Study area: Localization of districts – Jacarepaguá, Barra da Tijuca and Campo Grande, Municipality of Rio de Janeiro, Brazil.

of five central tasks: gathering background information; developing partnership; choosing methods and design; completing development, implementation and evaluation; and reporting and disseminating the process and results. The process described encourages going a step backwards whenever the five tasks in each phase have been completed in order to evaluate and improve the development, implementation and occupational evaluation.

Figure 2.

Depiction of the Person-Environment-Occupation Model of Occupational Performance (Law et al.²¹).

The instrument Pittsburgh Sleep Quality Index (PSQI)

The PSQI is composed of 19 self-rated questions (items) and 5 questions rated by a bed partner or roommate pertaining to sleep disturbances. Only the self-rated items are used in scoring the overall scale. The self-administered scale contains 15 multiple-choice items that inquire about frequency of sleep disturbances and subjective sleep quality during the previous month. Four additional write-in items inquire about typical bedtime, wake-up time, sleep latency, and sleep duration. The 5 bed partner questions are multiple-choice ratings of sleep disturbance and are used for clinical information only. The 19 self-rated PSQI items are combined into seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction. Each component has a score that ranges from 0 (no difficulty) to 3 (severe difficulty). All component scores are summed to produce a global score ranging from 0-21. According to the authors of the PSQI instrument, a PSQI global score greater than 5 is suggestive of significant sleep disturbance.²² The PSQI has been shown to be reliable (Interclass correlation (r) = 0.87) between test and re-test sessions.²³

Statistical analysis

All data were analyzed using SPSS 19.0 statistical software; with an a priori alpha level set to 0.05. It was used the Cronbach's alpha coefficient in order to verify the PSQI internal consistency. Internal consistency refers to the degree of uniformity and consistency between the survey participants' responses to each items of the test, i.e., it assesses the degree to which the overall variation in results is associated with the sum of the variance item by item. It was also calculated the 95% confidence interval for the PSQI classification.

RESULTS

Characterization of study population

The target study population consisted of 162 workers. 29 workers (17.9%) were excluded because they were away, changed function or in vacation during the period of data collection. From 133 people who met the study criteria, 5 were in external courses, travelling to service or it failed to find them, remaining 128 (79%) workers contacted. Among the 128 workers, three did not respond or declined to participate the study, determining a refusal rate of 2.34%. There was also a loss of 7 workers who answered the questionnaire incompletely, resulting in a 10 total losses. Remaining 118 workers correspond to 72.84% of 162 workers that met the inclusion criteria.

The study participants consisted of 118 traffic agents divided in 95 males and 23 females, aged 26-63 years old, average 38.29 years. As to marital status most were married (73.73%); single (17.8%); divorced and separated (8.47%). Related to the education level, there was a predominance of secondary level (95.76%), followed by high school graduate professionals (4.24%). Time function working ranged in 1-23 years, average 5.13 years, with (68.64%) concentrated between 2-11 years.

Item analysis of PSQI components

The mean PSQI global score was 8.5 ± 2.4 . Thirty four subjects had high sleep quality (score of less than 5) and 84 had low sleep quality (score of 5 or greater). Global PQSI scores categorized as high sleep quality ranged from 0-5 and had a mean of 3.5 ± 1.37 . Those categorized as low sleep quality ranged from 6-12 with a mean of 7.52 ± 1.64 . The ranges of global PSQI scores are shown in Table 1.

Table 1.
Pittsburgh Sleep Quality Index Global Scores

PSQI Global Scores	Number (N=118)	Percent (%)
0-5	34	28.82
6-10	59	50
11-15	14	11.86
16-21	11	9.32

Data on sleep habits were obtained using the answers to the first four questions of the PSQI questionnaire (1. When have you usually gone to bed? 2. How long (in minutes) has it taken you to fall asleep each night? 3. When have you usually gotten up in the morning? 4. How many hours of actual sleep do you get at night?). What refer to the usual bedtime, the sleep latency (time in minutes that the patient takes to fall asleep from the moment lies) at the usual time of waking the subject and subjective sleep efficiency (the number of hours that the subject thinks slept).

Regarding the usual time of the subject lie, it was observed in the research that bedtime fluctuated between 21 hours and 4 hours (median = 7.0), with a mean of 22 hours and 20 minutes. It was found that the most frequent bedtime was 23 hours (24.58%) and 24 hours (18.64%).

Concerning the time that the study subjects took to fall asleep, it was found that the most frequently reported was 30 minutes (27.12%), 15 minutes (16.95%) 5 minutes (14.41%) 10 minutes (12.71%), and even significantly, 60 minutes (7.63%). The average was 26.12 minutes, with a maximum value that was 150 minutes and the minimum 2 minutes. It was found that 47.45% of subjects ($n = 56$) had a sleep latency longer than 30 minutes.

It was observed that a large part of the study subjects had the subjective feeling of having slept between 6 to 7 hours (38.13% and 19.49%, respectively). The average value was 5.14, which means 5 hours 43 minutes. The minimum value was 2.5 hours and the maximum 8 hours and 15 minutes (median = 8.0).

In what regards the time that the subject is raised, it was found that the correlation with age is statistically significant ($p = 0.000$), the greater the age of the subject, the sooner they arose. Subjective sleep duration also showed a significant correlation with age from a statistical point of view ($p = 0.000$), it was found that the number of hours of sleep decreased, as the increased age of the subject.

With regard to the usual medications, drugs most commonly used are those intended for the treatment of anxiety (9.32%), sleep inducers (10.17%), hypertension (24.58%), anti-depressants (16%), and analgesics (30.51%).

For the description of insomnia complaints, it was considered that a PSQI score > 5 reflected the existence of insomnia complaints, while a PSQI score < 5 meant the non existence of insomnia complaints. Complaints insomnia had a significant prevalence in the sample (33.05%) ($n=39$) (PSQI score > 5). Regarding the sample daytime sleepiness were 20.34% ($n=24$) subjects who showed excessive daytime sleepiness.

When in question was the change in insomnia severity according to age group, not significant insomnia clinical point of view is the most prevalent in the age group of 34-43 years (25%, $n= 5$). In the same perspective, the slight insomnia was prevalent in the age group of 54-63 years (11.76%, $n=2$), and in turn insomnia moderate severity the most significant severe in the age group of 44-53 years (31.25%, $n=10$). The age group with the lowest incidence of minor severity of insomnia from the clinical point of view was that of 26-33 years (12.24%, $n=6$). The slight insomnia was less frequent in the age group of 44-53 years (20%, $n=2$), and insomnia in its most severe form was also less present in the age group of 26-33years (66.66%, $n=4$). The relationship of insomnia severity to age was significant from a statistical point of view ($p = 0.001$).

DISCUSSION

Cronbach's alpha is a measure of internal consistency, and reliabilities of the PSQI scales are adequate or good with range 0.70-0.89.24 The consistency of the questionnaires applied was satisfactory (Cronbach's alpha ≥ 0.72). Mean level of satisfaction amongst workers was comparatively high. The results compared to Cronbach's alpha coefficient for the overall scale of the sample ($n=118$) revealed a high internal consistency almost all dimensions obtained Cronbach's alpha coefficients higher than 0.60.

A large percentage of traffic agents in this survey report disturbances in subjective sleep quality. The high prevalence of disturbed sleep in this study is not explained by the effect of rotating work

shifts. This suggests that there are factors intrinsic to routine work that contribute to poor sleep quality. Sleep disturbances are more strongly associated with routine work environment stressors than exposure to traffic agents duty related traumatic stress. Despite the perception that the dangerous life-threatening aspects of traffic agents work may take its toll on psychological and physical health, it seems to be the routine stressors of traffic service that most affect global sleep quality in these subjects.

There are several limitations of this study that are a consequence of its cross-sectional design and the lack of polysomnographic measures. Nevertheless, the results suggest a high prevalence of insomnia complaints in traffic agents, both absolutely and in relationship to peer-matched control subjects, that potentially has implications for their physical and psychological functioning.

The results from this study suggest we have to take into account the fact that a poor quality of sleep can follow the insomnia complaints and in these cases the perception of individuals is not being distorted necessary to apply other techniques that do not involve directly the perception, in order to better sleep quality. The findings also suggest a role for sleep hygiene interventions to enhance occupational performance and both psychological and physical well-being of traffic agents.²⁵ On the other hand, as mentioned above, certain individuals can indeed present a distorted perception of their own sleep and in these cases one of the main goals to be taken into account in the intervention is based on the change of basic psychological aspects, particularly the changing perception of sleep of those subjects.

The results from this study suggest that psychological interventions that have an expanded focus on the negative effects of routine traffic agents work environment stressors theoretically have the potential to improve sleep quality and sleep-dependent physical and psychological functioning.

CONCLUSION

Sleep disorders are common and are largely undiagnosed and untreated in Brazilian traffic agents. It was found that 71.18% of traffic agents reported symptoms consistent with at least 1 sleep disorder.

The prevalence of sleep duration and sleep problems was similar with the findings of previous studies that have used sleep questionnaires and have been conducted in police officers. A short sleep duration, behavioral insomnia and daytime sleepiness were associated with each other.

Poor sleep quality has a negative impact on general health and well-being and can produce signs and symptoms associated with concussions. The relatively moderate sleep deficits experienced by subjects in this study did not affect, at first, the performance on professional activities.

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