



SLEEP QUALITY IN PUBLIC SAFETY POLICE OFFICERS

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ABSTRACT

Introduction: Among the consequences of shift work, there is a direct relationship with poor sleep quality, with the Public Security Police (PSP) agents being a possible target of this problem, as they experience this form of work.

Objectives: Evaluate sleep quality in PSP agents, relating it to shift work.

Materials and Methods: The sample consisted of 1877 Portuguese agents, 165 female and 1712 male. The collection took place in 2020, by answering an online form, which included a sociodemographic questionnaire, the Pittsburgh Sleep Quality Index and the Epworth Sleepiness Scale to quantify sleep quality.

Results: There was a predominance of poor sleep quality in the groups that work in shifts, with a higher percentage in those that always work in shifts. Good sleep quality prevails more in the group that never takes shifts. There was a higher prevalence of poor sleep quality in the group that reported working mainly in rotating/variable shifts. Taking into account the three periods (day/morning, afternoon and night), there is a higher prevalence of poor sleep quality in the group that refers to working more than one period of the day, with the night shift representing higher percentage of poor sleep quality.

Discussion: The results of this study are consistent with the results of other investigations and are similar to other professionals who work in shifts, highlighting the negative impact shift work has on sleep and, consequently, on these workers health.

Conclusions: For the study sample, shift work proved to be a deteriorating factor in sleep quality, with the rotating shift and the night shift being the ones with the highest prevalence of poor sleep quality.

Keywords: Sleep, Sleep Wake Disorders, Sleepiness, Shift Work, Police.

INTRODUCTION

Sleep is a complexly structured vital process, considered as an unconscious and reversible state defined by well-organized and structured processes. (Antunes et al., 2008; Buysse, 2014).

The alternation between periods of sleep and wakefulness leads to physiological changes such as body temperature, heart rate and hormone production. This cycle is particularly important because it allows the neurological restoration essential for growth, learning, memory maintenance and the proper functioning of the organism (Alóe et al., 2005; Zanuto et al., 2015).

Sleep has three stages: wakefulness, sleep NREM (Non-Rapid Eye Movements) which is subdivided into N1 phase, N2 phase and N3 phase, and sleep REM (Rapid Eye Movements) (Zanuto et al., 2015). A disorder that affects one of these phases can lead to a decline in sleep quality and, as a consequence, in quality of life, with a higher incidence of metabolic and cardiovascular diseases such as: arterial hypertension, stroke, myocardial infarction, obesity and diabetes mellitus. It can also interfere with the development of simple and

daily activities such as driving a vehicle, increasing the risk of road accidents (Akerstedt et al., 2002; Gan et al., 2015; Luyster et al., 2012; Vyas et al., 2012).

To estimate whether sleep quality is affected, we apply the Pittsburgh Sleep Quality Index (PSQI) which applies scores to evaluated parameters such as sleep duration, sleep latency and the number of awakenings. The overall PSQI value ranges from 0 to 21, in which higher scores indicate worse sleep quality, and a score greater than 5 is considered poor sleep quality (Del Rio et al., 2017).

The assessment of drowsiness propensity can be made by applying the Sleepiness Scale of Epworth (ESE). It consists of a questionnaire that assigns a score taking into account the probability of falling asleep in daily activities, some of them known as “highly sleepy”. The score ranges from 0 to 24, with 0 to 6 being considered normal sleep, 7 to 8 being an intermediate value, and 9 to 24 being abnormal sleepiness (Bertolazi et al., 2009; Johns, 1991). In addition to this more subjective method, more complex tests and exams such as the Sleep Latency Test and Polysomnography can be used (Bertolazi et al., 2009).

Human beings are regulated by biological rhythms. The sleep/wake cycle is one of the examples of this synchronization, influenced by endogenous and exogenous factors (Ciampo & Ciampo, 2016). When there is a change in exogenous factors, circadian rhythms are intrinsic and will continue to influence sleep, but their quality is compromised, which may be due to day-to-day changes (shift work), with emphasis on night work and long working hours (Luyster et al., 2012). Drowsiness may be due to limitations in sleep quality, which impairs rapid response to external stimuli, concentration, and the ability to perform activities such as driving (Bertolazi et al., 2009; Canani e Barreto, 2001).

Shift work is a very old practice, dating back to the beginning of social life and has evolved to respond to modern society. For this reason, this form of work organization responds to certain services and now includes night and irregular hours, to ensure full-time availability such as hospitals or security services. This diversity of work schedules is usually divided into two forms. It can be fixed or variable shift. In the fixed shift, the worker has a certain schedule, which can be morning, afternoon or evening, with a constant frequency. In the variable shift, the worker alternates between hours, which can have a slow or fast rotation depending on the organization of the workplace (Simões et al, 2010). Although this way of working has been responding to the needs of society, it conflicts with the natural biological rhythms of the Human Being, interrupting the circadian rhythm, being considered a subtype of sleep and circadian rhythm disorders (Park & Lee, 2019).

Public Security Police (PSP) agents are responsible for “ensuring democratic legality, guaranteeing internal security and the rights of citizens, under the terms of the Constitution and the Law”.(Departamento de Recursos Humanos, 2021). These functions expose this class of professionals to several dangerous and traumatic situations, which condition the development of stress and, in more extreme cases, Burnout Syndrome (Machado, 2011). In addition to these events, they are also exposed to excessive workloads with shift services and night shifts (Fekedulegn et al., 2016; Ma et al., 2019). Taking into account the factors to which this profession is exposed, especially with the change in shift schedules, there is a break in the usual period of rest, which causes changes in the quality of sleep and consequently excessive daytime sleepiness, that is, during the period who should be awake and active (Garbarino et al., 2019).

Some studies carried out on the relationship between shift work and sleep quality in these professionals show that sleep quality is negatively affected due to shift work and especially night shift work. The results of the study of Gerber et al. (2010) in which shift workers have more sleep complaints compared to fixed-time workers. In the article by Bernardo et al. (2018) a percentage of 79.2% of poor sleep quality was obtained and 68.6% belonged to rotating shifts. Fekedulegn et al. (2016) showed an overall prevalence of poor sleep quality of 54%, of which the shift that presented the worst results was the night shift.

The general objective of this study was understand the quality of sleep of Police agents.

MAIN BODY OF THE ARTICLE

Materials and Methods

Observational cross-sectional study with a quantitative approach, in order to obtain a profile of the sample obtained by the non-probabilistic snowball sampling technique.

Of the total number of Police staff in 2021, the population had a total of 20,557 professionals at its service, of which 89.75% are male and 10.25% are female. 1877 questionnaires were collected, of which 165 are

female and 1712 are male, aged between 21 and 68 years, with an average of 42.53 ± 9.3 years, fulfilling the inclusion criteria contained in the protocol of data collection.

Study protocol

The data used for the preparation of this study were collected in Portugal through the dissemination of a link by the population to be studied using Google Forms, between October and December 2020.

The following questionnaires were used and adapted: sociodemographic questionnaire, to collect sociodemographic variables; Pittsburgh Sleep Quality Questionnaire, to score sleep quality; Epworth Sleepiness Scale, to assess the degree of sleepiness. All subjects read and accepted informed consent before accessing the questionnaire.

For sample eligibility, some inclusion criteria were applied: PSP agents had to be active, not have a diagnosis of any sleep disorder and not be under sleep-inducing therapy. In order to guarantee anonymity, each questionnaire received was coded. Body Mass Index (BMI) values were calculated using the formula $BMI = \text{Weight (kg)} / (\text{Height (m)} \times \text{Height (m)})$, PSQI and ESE and then divided by classes. The nominal qualitative variables were studied: sex; marital status; type of shift and time of day and ordinal qualitative variables: educational qualifications; category; seniority of service; time in the current unit and how often you work in shifts. The quantitative variables collected were: age; height; Weight; global PSQI score; ESE.

Statistical analysis

The software used for the statistical treatment of the data was the IBM SPSS Statistics® software from IBM Corp, version 20.

Quantitative data were described with measures of central tendency and dispersion. Qualitative data were described through absolute and/or relative prevalence (N and/or %).

The normality of the distribution of variables was evaluated by the Kolmogorov-Smirnov test, and the non-parametric statistical test of independent samples Chi-square was later used to analyze the relationships between the variables necessary to achieve the intended objectives. Statistical tests were considered statistically significant for a p-value < 0.05 .

Ethical issues

The investigation was submitted to an ethics committee that gave a positive opinion to its accomplishment.

The research team declares that it has no conflict of interest and declares to respect all the principles expressed in the Declaration of Helsinki.

RESULTS

The sample made up a total of 1890 individuals, of which 13 were excluded for not responding or responding incoherently to essential questions for the investigation, in the end the sample obtained was 1877 individuals. Of these, there was a predominance of males (91.2%) and the age group between 41 and 50 years (37.8%), with a mean age of 42.53 ± 9.3 years.

Regarding marital status, the majority were married or in a de facto union (74.3%). As for educational qualifications, the main one mentioned was secondary education, with 65.6% of the individuals studied. The body mass index (BMI) presented an average of $26.27 \pm 3.1 \text{ kg/m}^2$, with the majority being overweight (53.3%).

At a professional level, there was a prevalence of the post of main agent (48.5%), with a seniority of more than 5 years (86.4%) and more than 5 years in the current unit (58.4%).

In terms of shift work, the majority reported always working in shifts (61.7%), with the rotating/variable shift being the most referenced (72.6%) and in both periods of the day (46.2%).

The ESS presented an average of 8.3 ± 5.1 . After dividing by classes, it appears that 43.7% have normal sleep, 13.4% have intermediate sleepiness and 42.9% have abnormal sleepiness.

The PSQI presented an average of 7.6 and 3.1 of standard deviation. After division by classes, it appears that 26.4% have good sleep quality, 73.6% have poor sleep quality.

Sociodemographic Characteristics and Sleep Quality

Through the statistical analysis, it is verified that the quality of sleep is influenced by age and educational qualifications, not having presented a significant value in the correlation between the variables "Gender", "BMI" and "marital status" with sleep quality (Table 1).

Table 1 - Distribution of sociodemographic variables by sleep quality

Sleep Quality						
		Good Sleep Quality		Poor Sleep Quality		
		N	% of the total	N	% of the total	p-value
Sex	Feminine	47	2,5%	118	6,3%	0,288
	Male	448	23,9%	1264	67,3%	
Age	21 to 30 years	59	3,1%	191	10,2%	0,023
	31 to 40 years	109	5,8%	369	19,7%	
	41 to 50 years	187	10%	523	27,9%	
	51 to 60 years	139	7,4%	298	15,9%	
	61 to 70 years	1	0,1%	1	0,1%	
BMI	under normal weight	0	0,0%	2	0,1%	0,356
	Normal	174	9,3%	491	26,2%	
	Overweight	265	14,1%	735	39,2%	
	Grade I obesity	54	2,9%	132	7%	
	Grade II obesity	2	0,1%	20	1,1%	
	Grade III obesity	0	0,0%	2	0,1%	
Marital status	Single	81	4,3%	248	13,2%	0,750
	Married/de facto union	377	20,1%	1018	54,2%	
	Divorced / Separated	34	1,8%	106	5,6%	
	Widower	3	0,2%	10	0,5%	
Literary qualifications	up to 6th grade	1	0,1%	5	0,3%	0,0001
	up to 9th grade	29	1,5%	100	5,3%	
	Secondary	310	16,5%	921	49,1%	
	professional technical	33	1,8%	118	6,3%	
	course	6	0,3%	10	0,5%	
	baccalaureate	55	2,9%	150	8%	
	Graduation	56	3%	67	3,6%	
	Master's degree	5	0,3%	11	0,6%	
Other						

Legend: N=number of subjects; %=percentage; BMI= Body Mass Index.

Occupational Characteristics and Sleep Quality

Taking into account the relationship between the job position/graduation and the quality of sleep, a statistically significant relationship was observed with a p-value of 0.0001 between these two variables (Table 2), the same was not true for seniority. service and sleep quality (Table 3) in which there is no statistically significant relationship.

Table 2 – Distribution of the “category” variable by sleep quality.

Sleep Quality						
		good sleep quality		poor sleep quality		
		N	% of the total	N	% of the total	p-value
Category	Chief Superintendent	1	0,1%	1	0,1%	0,0001
	Superintendent	6	0,3%	3	0,2%	
	quartermaster	8	0,4%	11	0,6%	
	superintendent	7	0,4%	6	0,3%	
	commissioner	42	2,2%	39	2,1%	
	Deputy Commissioner	22	1,2%	24	1,3%	

	Chief Coordinator	71	3,8%	201	10,7%
	Main Boss	21	1,1%	24	1,3%
	Coordinating Agent	4	0,2%	8	0,4%
	Main Agent	220	11,7%	691	36,8%
	Agent	93	5%	374	19,9%

Legend: N=number of subjects; %=percentage. The percentage shown refers to the total.

Table 3 - Relationship of “Long-time of service” with the quality of sleep.

		Sleep Quality				
		Good sleep quality		Poor sleep quality		
		N	% of the total	N	% of the total	p-value
Seniority of service	Less than 1 year	20	1,1 %	46	2,5%	0,137
	From 1 to 3 years old	15	0,8%	68	3,6%	
	From 4 to 5 years	22	1,2%	84	4,5%	
	More than 5 years	438	23,3%	1184	63,1%	

Legend: N=number of subjects; %=percentage. The percentage shown refers to the total.

When we analyze Table 4, we observe the existence of a statistical significance between the quality of sleep and the time of the individuals in the unit where they currently are, with a p-value of 0.036.

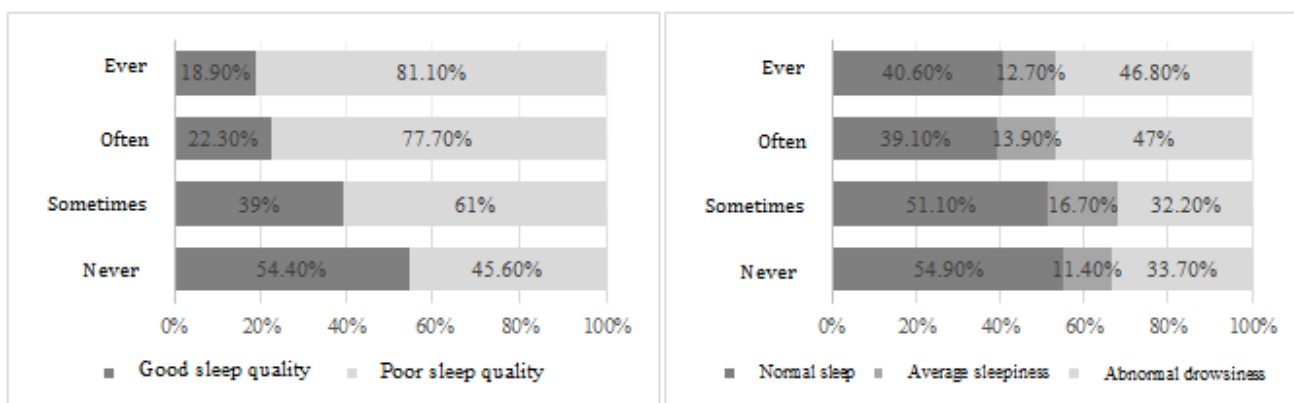
Table 4 - Relation of "Time in the current unit" with the quality of sleep.

		Sleep Quality				
		Good sleep quality		Poor sleep quality		
		N	% of the total	N	% of the total	p-value
Time in current unit	Less than 1 year	63	3,4%	203	10,8%	0,036
	From 1 to 3 years old	108	5,8%	238	12,7%	
	From 4 to 5 years	34	1,8%	135	7,2%	
	More than 5 years	290	15,5%	806	42,9%	

Legend: N=number of subjects; %=percentage. The percentage shown refers to the total.

Shift work and sleep quality

Ever be seen that in the groups that work in shifts, there is a predominance of poor sleep quality and daytime sleepiness (Figure 1). It is also clear from the analysis of these graphs that good sleep quality and normal sleep prevail in the group that never performs shifts.



A - Sleep quality

B - Daytime sleepiness

Figure 1 – Relationship between sleep quality and daytime sleepiness with shift (p=0,0001).

When verifying the sleep behavior with the type of shift, it appears that there is a higher prevalence of poor sleep quality and daytime sleepiness in the group that refers to working mainly in rotating/variable shifts (Figure 2).

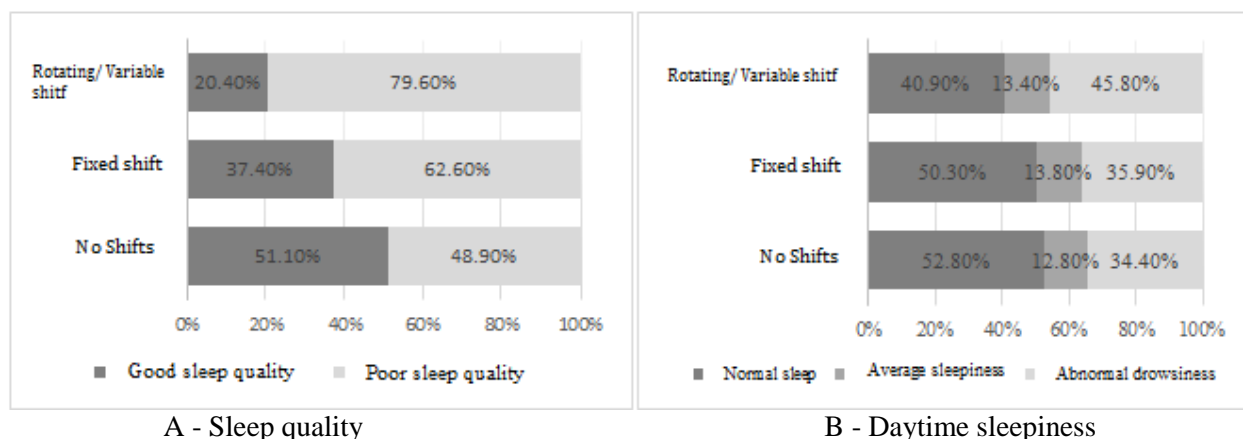


Figure 2 - Relationship between sleep quality and daytime sleepiness with the type of shift ($p=0,0001$).

Taking into account the three periods studied (day/morning, afternoon and night), it is observed that there is a higher prevalence of poor sleep quality and daytime sleepiness in the group that refers to working in more than one period of the day, being the shift night, which represents a higher percentage of poor sleep quality and abnormal sleepiness, as can be seen in figure 3.

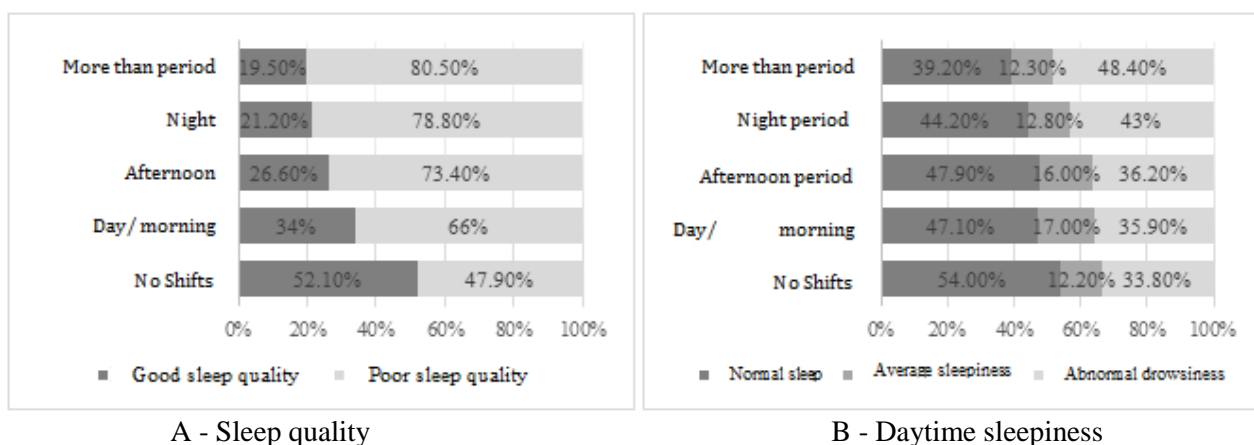


Figure 3 - Relationship between sleep quality and daytime sleepiness with the period in which the shift runs ($p=0,0001$).

DISCUSSION

Sleep quality can be impaired by factors such as shift work. This linkage may be related to exposure to sunlight or lack thereof and other biological rhythms that disrupt the circadian rhythm (Fekedulegn et al., 2016). Behavioral risk factors have also been associated with poor sleep quality, but in the present study there was no significant relationship between BMI and sleep quality.

Aspects that could affect sleep quality assessed by the global PSQI score were studied in PSP agents at national level. As expected, a higher percentage of males than females was obtained. In a longitudinal study of officers enrolled in the program "Buffalo Cardio-Metabolic Occupational Police Stress", it was observed that the majority of the sample was male (72%), were married and were overweight or obese (81%), which is in line with the results found in the sample studied. In the aforementioned investigation, it was also observed that 49.6% worked predominantly in the day shift, 28% in the afternoon shift and 22% in the night shift, and that the prevalence of poor sleep quality was 53.9%, with 43.9% in the day shift, 59.8% in the afternoon shift and 69.1% in the night shift, showing a significant relationship between the period in which the shift takes place and poor sleep quality (Fekedulegn et al., 2016).

The results achieved in PSP individuals corroborate these data, noting that the prevalence of poor sleep quality was 73.6%, with a predominance in groups that perform shift work (always, frequently or sometimes), assuming a percentage still highest, 81.10%, in individuals who always work shifts. It was also noticed that in the group that refers to rotating/variable shift work there is a higher prevalence of poor quality of 79.60%, while in the fixed shift it was relatively lower with a percentage of 62.60%, which was also

related to the results of the study by Gerber et al, 2010, carried out on 460 elements of a police force in Switzerland, which concluded that shift work always contributes to a decrease in sleep quality.

Taking into account the period in which the shift normally takes place, a prevalence of poor sleep quality was observed, of 80.50% in the group that reported working mainly in more than one shift period. Analyzing the quality of sleep by shift, we observed that the highest percentage of poor sleep quality was obtained by those who work the night shift with 78.80%, followed by those in the afternoon (73.40%) and finally of those who work during the day/morning period (66%).

In the study “Influence of Work Characteristics on the Association Between Police Stress and Sleep Quality” from Ma et al., 2019, 356 police officers participated and an average PSQI score of 6.5 ± 3.4 was obtained. Although it was a lower value than that found in PSP agents (7.6 ± 3.1), it still represents poor sleep quality with $PSQI > 5$. The same was found in the investigation carried out by He et al, 2019, in 177 individuals from the prison police, where it was noticed that the quality of sleep is worse in this class of police security professionals with an overall PSQI score of 7.47 ± 3.80 compared to normal adults and is affected by sex, age, job classification and other factors.

In the battalion of the Military Police of Teresina, Piauí in Brazil, a study was carried out with some results identical to those found. Although in this study the smaller sample was smaller ($n=32$), the mean age was 44.34 ± 5.63 years, most participants were married (71.87%), the mean weight was 81.87 ± 14.03 kg, height 1.69 ± 0.06 m and BMI 28.43 ± 3.82 kg/m², with most participants being overweight (46.87%) and class I obesity (31.25%). Of the participants, 71.87% reported poor sleep quality, 18.75% were classified as having a sleep disorder and only 9.37% with good sleep quality. The mean of the global PSQI score, as in the previously mentioned studies, presented values of poor sleep quality (8.06 ± 3.60) (Santos Chaves & Shimizu, 2018). All these results obtained by this investigation in Brazil are in agreement with the results found in the studied sample.

The study “Physical activity and sleep quality in military police” showed high percentages of poor sleep quality and a lower percentage of abnormal daytime sleepiness. In this study, 438 participants were analyzed and the PSQI, ESE questionnaires and a form with sociodemographic and occupational information were used. The percentage of poor sleep quality was 79.2%, of which 89.6% are male, 95.1% are private, 68.6% work rotating shifts and 61.7% had normal daytime sleepiness (Bernardo et al., 2018). It is thus possible to verify that from the relationship of the results found in the bibliographic review and the results found in the PSP agents, they are in agreement, corroborating the reported data.

The data obtained for the profession studied are similar to those of other professionals who also work in shifts, such as nurses and industrial workers (Valdeni Manoel Bernardo et al., 2015). According to the results of the study by Zencirci and Arslan, 2011, 79.1% of nurses had poor sleep quality with an average overall PSQI score of 7.32 ± 3.42). In the article by Simões et al, the results showed that, also in industrial workers, the quality of sleep was unsatisfactory, in this case in 50% of the participants, having obtained an average global PSQI score of 5.7 (Simões et al., 2010).

Poor sleep quality has been associated with negative physical, mental and emotional impacts, which can harm the social, family, academic, professional and economic environment. In the short term it mainly affects day-to-day performance, causing fatigue and excessive daytime sleepiness, impairing concentration, reaction time, memory and mood. In the long term, it has been linked to the development of diseases such as obesity, type II diabetes mellitus, cardiovascular disease, high blood pressure, depression, anxiety, asthma and arthritis (Raposo, 2016).

The use of the PSQI questionnaire and the sample size contribute as an extremely strong point to the results of this investigation in the assessment of sleep quality, however it would be interesting to understand the urban/rural context of the individuals studied in order to understand whether this sociodemographic variable has an impact in the quality of sleep, which is a limitation of the study.

This study contributes to the knowledge about the prevalence of poor sleep quality in the class of professionals of the public security police in Portugal and aims to encourage the implementation of more interventions in the field of sleep hygiene, with the aim of improving not only the quality of sleep of these professionals, but also in the long term, their quality of life.

Effectively, despite verifying that there are many factors that contribute to the poor quality of sleep, both in this work and in all the bibliography used, it appears that some are decisive and that must be mitigated, in order to restore a holistic quality of life. people.

CONCLUSION

Shift work proved to be a deteriorating factor in sleep quality, with the rotating shift and the night period being the ones with the highest prevalence of poor sleep quality..

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