

Occupational stress, sleep quality and obesity in Military Police Officers - Narrative review

Estresse Ocupacional, qualidade do sono e obesidade em Policiais Militares - Revisão narrativa

Estrés laboral, calidad del sueño y obesidad en Policía Militar - Revisión narrativa

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Abstract

Stress was considered by the United Nations as the disease of the 20th Century, being present in more than 90% of the world population, including military police officers. This group of professionals has been in the front-line of the pandemic caused by the Coronavirus and is exposed to daily situations of high emotional stress and traumatic work events, which can cause several health problems, namely occupational stress, sleep problems and obesity. This study aims to conduct a narrative review of the influence of psychosocial environment on the development of occupational stress and consequences on the military police officer's health. Two platforms, namely PubMed and Google Scholar were used to search for relevant scientific publications on the topic; 148 publications from 2010 to 2020 were analyzed, 71 of which were included in this review. It is estimated that 25% to 35% of the global burden of disease may be due to environmental factors. The stress prevalence in military police officers is higher than the average in the civilian population worldwide; due to an alternate work schedule that does not always respect the circadian characteristics of each individual, and with direct influence on sleep quality and obesity incidence. Public health policies should be taken in the short term in order to improve life quality of these professionals.

Keywords: Occupational stress; Sleep; Circadian rhythm; Obesity; Police.

Resumo

O stress foi considerado pelas Nações Unidas como a doença do século XX, estando presente em mais de 90% da população mundial, incluindo oficiais da polícia militar. Este grupo de profissionais tem estado na linha da frente da pandemia causada pelo Coronavírus e está exposto a situações diárias de elevado stress emocional e a eventos traumáticos de trabalho, que podem causar vários problemas de saúde, nomeadamente stress ocupacional, problemas de sono e obesidade. Este estudo visa conduzir uma revisão narrativa da influência do ambiente psicossocial no desenvolvimento do stress ocupacional e das suas consequências para a saúde dos policiais militares. Duas plataformas, nomeadamente PubMed e Google Scholar, foram utilizadas para procurar publicações científicas relevantes sobre o tema; foram analisadas 148 publicações de 2010 a 2020, 71 das quais foram incluídas nesta revisão. Estima-se que 25% a 35% do peso global da doença pode ser devido a factores ambientais. A prevalência do stress nos agentes da polícia militar é superior à média da população civil a nível mundial; devido a um horário de trabalho alternativo que nem sempre respeita as características circadianas de cada indivíduo, e com influência directa na qualidade do sono e incidência de obesidade. As políticas de saúde pública devem ser tomadas em curto prazo, a fim de melhorar a qualidade de vida destes profissionais.

Palavras-chave: Estress ocupacional; Sono; Ritmo circadiano; Obesidade; Polícia.

Resumen

El estrés fue considerado por las Naciones Unidas como la enfermedad del siglo XX, estando presente en más del 90% de la población mundial, incluidos los policías militares. Este grupo de profesionales ha estado en la primera línea de la pandemia causada por el Coronavirus y está expuesto diariamente a situaciones de alto estrés emocional y

eventos laborales traumáticos, que pueden causar varios problemas de salud, a saber, estrés laboral, problemas de sueño y obesidad. Este estudio pretende realizar una revisión narrativa sobre la influencia del entorno psicosocial en el desarrollo del estrés laboral y las consecuencias en la salud de los policías militares. Se utilizaron dos plataformas, PubMed y Google Scholar, para buscar publicaciones científicas relevantes sobre el tema; se analizaron 148 publicaciones desde 2010 hasta 2020, de las cuales 71 se incluyeron en esta revisión. Se estima que entre el 25% y el 35% de la carga global de la enfermedad puede deberse a factores ambientales. La prevalencia del estrés en los policías militares es superior a la media de la población civil en todo el mundo; debido a un horario de trabajo alternativo que no siempre respeta las características circadianas de cada individuo, y con influencia directa en la calidad del sueño y la incidencia de la obesidad. Deberían adoptarse políticas de salud pública a corto plazo para mejorar la calidad de vida de estos profesionales.

Palabras clave: Estrés ocupacional; Sueño; Ritmo circadiano; Obesidad; Policía.

1. Introduction

Environmental factors, such as the working environment, can directly influence the breakdown of the body homeostasis and, consequently, the emergence and development of diseases (Peters et al., 2017). The concept of homeostasis was developed by Walter Cannon (1929), who proposed that the ultimate function of all physiological mechanisms is the maintenance of homeostasis, which should be understood as "the maintenance of the stability of the internal environment" (McEwen et al., 2015; Souza et al., 2015). The environment that surrounds people's work is considered as a potentializer of positive and/or negative repercussions on worker's health. Labor relations can produce health, physical and emotional well-being, or, on the other hand, can be marked by the development of MetS (Metabolic Syndrome), which one could be increased by a psychological and chronic stress (Hartley et al., 2011); associated a short sleep duration (Wu et al., 2012); development dyslipidemia, abdominal adiposity, reduced glucose tolerance and hypertension (Garbarino & Magnavita, 2015). Police officers have been found to be at a high risk for MetS and coronary heart diseases (Janczura et al., 2015).

According to the World Health Organization (WHO, 2013), mental health is a well being feelings in which individual is able to use his or her own skills, recover from routine stress to be productive and contribute to his community, social group and workplace; i.e. his global environment. It is estimated that 25% to 35% of the global burden of disease may be due to those environmental factors, therefore, understanding the way in which these interfere with health is of paramount importance in the development of preventive Public Health policies. (Di Fabio, 2017).

Being a police officer is recognized a dangerous occupation, once, they are daily submitted to unexpected and stressful situations related to violence and crime. An American study has found a much higher occupational fatality rate in police officers when compared with the national average (Chang et al., 2015). Nowadays, they are one of the professional groups in the front-line of Coronavirus pandemic. Their work was already stressful and demanding before the COVID-19 period, especially in the so-called "violent cities", for example, Tijuana (138,26 murders/100.000 population), Acapulco (110,50), Caracas (99,90). According to Brazilian Forum of Public Security, Rio de Janeiro has a homicide rate 37,6/100.000 population in 2018. They are daily exposed to chronic occupational stress, which may lead to severe health consequences, such as, post-traumatic stress disorder (Queiroz et al., 2020; Stevelink et al., 2020), poor sleep quality (Ferrie et al., 2011; Pinto et al., 2018), obesity (Estrela & Mendes, 2018), depression (Stevelink et al., 2020), among others (O'Hara et al., 2013).

Brazil is one of the countries with the highest rates of intentional violent deaths in the world, highlighting the following figures for the year 2018: intentional homicides (48,951 occurrences); armed robbery (1,929 occurrences); bodily injury followed by death (868 occurrences), resulting in 57,341 violent deaths with an average of 157 deaths per day. Brazilian police officers are part of this universe of conflicts with a high rate of violent deaths, totaling 343 (three hundred and forty-three) police officers killed in 2018, of which 256 (two hundred and fifty-six) were killed during off-duty time, that is, 75% of the officers killed in 2018 died during off-duty time (Anuário, 2019). In 2018, 89 (eighty-nine) police officers died in Rio de Janeiro. This number corresponds to 26% of the total number of deaths of police officers in the country (Público, 2015); and in

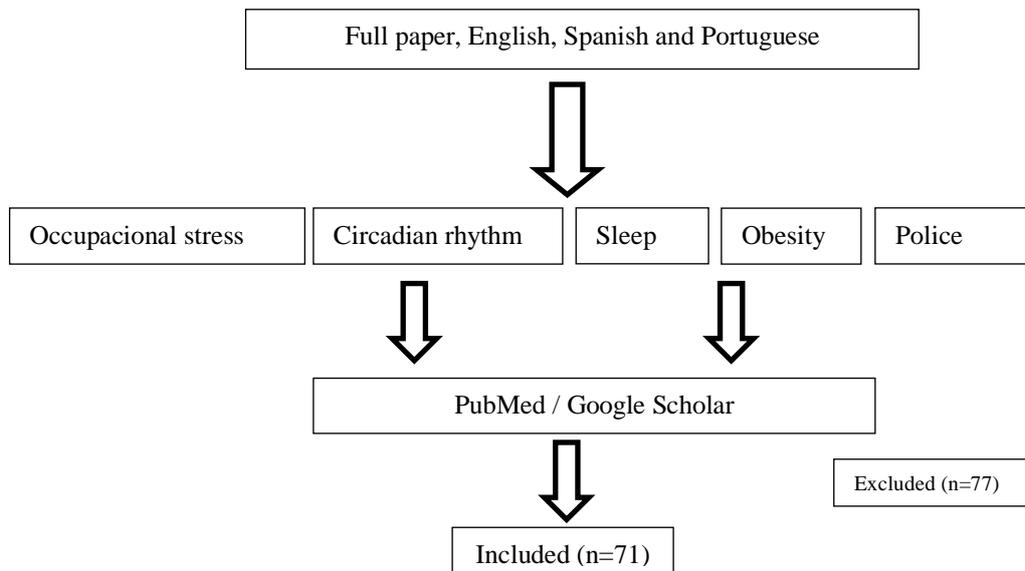
2019, 339 (Three hundred thirty-nine) agents suffered some type of injury during their shifts; 46% higher than last year, with 21 deaths (IG, 2020). According Magaloni & Cano (2016), one third of the entire police force analyzed had witnessed another police officer being shot, 20% had seen a colleague killed, and more than 7% of the officers had been shot and wounded at least once.

Therefore, this narrative review aims to discuss the influence of the psychosocial environment on the development of occupational stress and its consequences on the health of military police officers.

2. Methodology

This study was a Narrative review; which is characterized by not using explicit and systematic criteria for the search and critical analysis of the literature. Therefore, the material collected through the bibliographical survey is organized by origin and, based on its analysis, allows the researcher to prepare essays that favor contextualization, problematization, and a first validation of the theoretical framework to be used in the investigation undertaken (USP, 2015; Pereira et al., 2018).

Figure 1 - Literature search scheme.



Source: Authors.

In order to search relevant scientific publications, PubMed and Google Scholar were used. The literature review research began on July 2019 and was extended until March 2020. Publications out of this period were excluded, as well as, those not conducted on human beings. The inclusion criteria were publications written in English, Portuguese or Spanish, and open access. The key words used in the search were “occupational stress”, “circadian rhythm”, “sleep”, “obesity” and “police”. One hundred forty-eight articles were analyzed by their title and abstract, of which 71 were selected in accordance with the aforementioned inclusion and exclusion criteria. Papers that did not have a well-defined methodology were excluded. (Figure 1)

3. Results and Discussion

3.1 Stress, health and work

Stress is considered as a set of physiological and behavioral changes; with repercussions on the immune system; caused by an internal or external agent (stressor agent) of physical or psychosocial nature, which disrupts the body's homeostasis and in turn requires an effort of adaptation (Bartlang et al., 2014). The response to that stressful stimuli can vary, depending on the level of predictability, intensity, duration and nature of the stressful stimulus, and on the subject's expectations (McEwen et al., 2015). Stress was considered by the United Nations Organization (UN, 1992), as the disease of the 20th Century, affecting more than 90% of the world population and has been considered a global epidemic (Estrela & Mendes, 2018). An unfavorable psychosocial work environment can be a threat to the worker's mental health, potentially developing neurasthenia and burnout, among others (Nieuwenhuijsen et al., 2010).

3.2 Environment and stress

Social, emotional, and psychological costs linked to stress are high, as an example, U.S spends 200 / 300 billion of dollars per year; in U.K. 17% of all missed days of work are linked to stress and in Japan 10 thousand dies per year are associated to work excess (Santos & Wagner, 2006). In addition, Estrela e Mendes (2018) reported that stress has been blamed for driving up business costs by \$50 billion to \$75 billion a year, mainly in human resources and health plans. Therefore, they are linked to decrease in productivity and the high rate of absence from work (Lipp et al., 2017). WHO (2001) estimates that 25% of the entire world population will experience stress symptoms, or even depression, at least once in lifetime (Theorell et al, 2015). Stress arises in exactly those people who, are unsure about the response that should be given to incoming stimuli, and develop an uncertainty about that issue and consequently, about their life (Peters et al., 2017).

Psychological stress is common in our society. Recent research (Oken et al., 2015) indicates that 25% of North - Americans present high levels of stress, while 50% have experienced a major stressful event in the last year. Chronic psychological stress increases the risk of health problems and contributes to neurological, psychiatric metabolic and cardiovascular diseases, such as epilepsy, Parkinson's disease, Multiple sclerosis, sleep disorders, post-traumatic stress disorder, eating disorders and others (Oken et al., 2015). Therefore, psychosocial environment can be a potential risk factor for stress-related disorders. High job demands, low job control, lack of coworker support, low supervisor support, low procedural fairness, and a high imbalance in effort reward increase the chances of developing stress-related disorders. (Nieuwenhuijsen et al., 2010)

On the other hand, the increase of personal satisfaction at work, which is dependent on worker's age, educational level and experience, leads to a decrease in occupational stress (Hosseinpouarfard et al., 2012).

3.3 Stress in military police officers

Three types of stressors directly affecting the human being have been identified, namely physical, cognitive, and emotional stressors. Physical stressors, by definition, come from the external environment, such as noise, intense and/or persistent cold or heat, accidents, hunger, pain; or those that predominantly interfere in the individual's body, such as excessive physical exercise, overeating, drugs addiction, etc. Cognitive stressors are evaluated as threatening the integrity of the individual or his/her assets (physical or psychosocial), such as the imminence or experience of a robbery, involvement in a discussion and selection for a job, tests. And finally, emotional stressors are related to feelings of loss, fear and anger, among others, or events, such as marriage, divorce, changes (of home, school, city) in which the affective component becomes more prominent (Hartley et al., 2014).

The inherent characteristics of the military police job that define the work environment reflect its risks, living with violence, the constant risk of death, and excessive workloads are factors that can change psychological normality and compromise the military police officers life quality. Several activities performed by military police officers are highly, risky, as they are daily related to a diversity of violence and crime situations (Makara-Studzińska et al., 2020). In fact, these examples of adverse situations faced by military police officers make this job one of the most prone to stress, and consequently, more susceptible to the development of chronic diseases associated with morbidities (Price, 2017). Thus, it is necessary to go beyond and understand the environmental, psychological, social, and physical dimension of this work environment to promote the improvement of the quality of life of police officers. In worldwide military police officers a high emotional burden associated with traumatic work events frequently lead to psychiatric disorders, including post-traumatic-stress disorders, depression, sleep disorders and, in more extreme cases, suicide. (O'Hara et al., 2013).

The activities most prone to occupational stress are those related to public safety (Can and Hendy, 2014), as in the case of military police officers are inserted, who absorb feelings that are often unpleasant and demotivating. They have to face potentially dangerous situations that can cause physical and mental damage, or even death during the performance of their duty (Kaur et al., 2013; Almale et al., 2014; Weltman et al., 2014). During these daily activities, occupational stress is common in everyone in the police organization and at various levels of hierarchy (Almale et al., 2014). Although, physical and psychological threats are inherent to police work (Almeida et al., 2017) and as these situations are becoming more recurrent, the accumulated stress can damage both personal and social dimensions of military police officer's lives (Siegrist & Li, 2018)

It is important to highlight that the development of stress in military personnel should be analyzed through an inter-individual variability, because it is not closely associated with the number of interventions they have undergone or performed in a given period of time, or even whether these interventions were considered traumatic. In fact, it's assessment may be different for each individual (Hosseinpourfard et al., 2012). In addition, two other important factors have been associated with occupational stress in police officers, namely the number of working years as a police officer and the age of military personnel. Indeed, the longer these factors are, the greater the chances of developing stress, because they seem to be directly associated with hierarchy and discipline, with making important decisions for the corporation, its members, and the entire society (Selokar et al., 2011). In addition, older individuals usually have a family and partner(s) with children, which further increases responsibility and existing internal psychological conflict (Sattler, 2014). Also reduced social support and self-resolution according to the high levels of psychological and physical exhaustion experienced, and the deterioration of professional and personal relationships have been associated with the risk of developing stress in military personnel (Katsavouni et al., 2016).

In a study with 1837 policemen (n=1207) and military firemen (n=108), civilian policemen (n=454), criminal experts (n=68); 77% are male and others 23% female from Mato Grosso (Center-Western region of Brazil), it was diagnosed that 52% of these subjects presented significant ($P=0.005$) stress symptoms against the national average of 35% (Lipp et al., 2017); of which are 606 (six hundred and six) policemen, 45 (forty-five) firemen, 258 (two hundred fifty-eight) civilian policemen and 42 (forty-two) criminal experts. Of these 52% with stress symptoms, 3% were in the initial phase, called "alert phase", 75.5% were in the "resistance phase", 6.12% in the "near-exhaustion phase" and 9.5% in the most severe and compromising phase of stress, the "exhaustion phase" with a predominance of psychological symptoms in 61.8% of those evaluated ($P=0.002$).

3.4 Stress, sleep and circadian rhythm in elite military police officers

Military police officers share illness and death profiles of the general population according to age, gender, social group, or membership in a specific risk group (Theorell et al., 2014). In this sense, illness should be understood from its relationship with specific sociodemographic variables and aspects of the contemporary work process that influence the occurrence of occupational stressors. Over the years, there has been a significant increase in the participation of women in the labor market, thus making it necessary to evaluate the impact of the variable gender on illness related to work stress, especially

because some studies have shown higher stress in women, resulting from the social gender organization itself (Theorell et al., 2014).

Physical, cognitive and emotional stressors can act isolated or together, directly affecting the individual's sleep (Almeida, 2012) and, notably, elite military police officer's (Lipp et al., 2017). These professionals are also shift-workers, who besides being exposure to the aforementioned stressors, may suffer a desynchronization of the circadian rhythm, which may put them at risk of suffering from reduced sleep. (Hittle & Gillespie, 2018).

It should be noted that stress was negatively correlated with daytime sleepiness and sleep quality in elite athletes, such as the elite police officers under analysis, working in cities with high levels of violence and crime. In fact, a high prevalence of excessive daytime sleepiness (EDS) was observed in these military personnel with great risk of work accidents and poor quality of life and additional lack of attention and concentration, which can compromise their lives and the lives of other citizens ((Silva and Paiva, 2016; 2019a; 2019b; Elliott and Lal, 2016; Wirth et al., 2017; Pinto et al., 2018). Two recent studies reported that 22.7% of Brazilian elite military police officers working in Rio Grande do Sul demonstrated EDS and 60% of US police officers suffered from sleep disorders (Pinto et al., 2018; Bond et al., 2013).

3.4 Elite military police officers, shift work and circadian rhythm

Sleep and circadian rhythm disruptions are also commonly seen in many sectors of society, especially in shift workers. Shift work can be defined as employment at any work schedule other than a regular daytime schedule (09:00 AM/5:00 PM) (Vyas et al., 2012). The full spectrum of shift work involves regular evening hours, rotating shifts, split shifts, on-call or occasional shifts, 24-hour shifts, irregular hours, and other non-daytime hours. It is estimated that 18% to 20% of the North American and European population work in this system (Kervezee et al., 2020).

Shift work is known to alter the normal circadian rhythm, sleep habits and work-life balance, causing fatigue and stress, being an important factor in the development of chronic diseases; thus, being characterized as a Public Health problem (Hackam et al., 2012).

Each individual live under specific conditions that influence his/her biological clock, which are strongly related to the presence or absence of sunlight and influence his/her chronotype. Chronotype is defined as the property of the circadian timing system, presenting evidence that morningness or eveningness may result from a combination of genetic, sociodemographic (age and gender), individual (personality, lifestyle, working conditions) and environmental factors, such as geographical latitude (Schiavo et al., 2013).

Therefore, the biological clock drives or alters sleep patterns, alertness, mood, some physical abilities (such as strength), blood pressure, and other aspects of human physiology and behavior (Silva et al., 2016b).

According to the American Academy of Sleep Medicine and the Sleep Research Society (2015), the recommended amount of sleep needed for a healthy adult is, at least, 7 hours per night. A study developed by the United States Center for Disease Control and Prevention (CDCP) showed that individuals who sleep less than 5 hours a day are 42% more likely to develop obesity, 40% more likely to have diabetes, 69% more likely to have hypertension and 62% are more likely to have a stroke (CDCP, 2012). These data are corroborated by another research developed in 2015, where over 50% of 796 Taiwanese police officers were diagnosed with poor sleep quality, and whose sleep disturbances were associated with obesity (Chang et al., 2015; WU et al., 2014; Garbarino and Magnavita, 2015).

The shift worker normally presents a high prevalence in EDS and high probability of occurrence of short "naps" during working hours. These behaviors have been directly associated with high indexes of accidents at work, which in the case of military personnel, can cost their lives and other's, as mentioned before (Pinto et al., 2018; Smith et al., 2018; Brum et al., 2020). In fact, scientific evidence is growing and suggest that shift work, especially the night one, is detrimental to workers'

health and safety (military personnel included) with a direct relationship with obesity and increased risk of suffering from type 2 diabetes, depression, and cancer (Ghanbary et al., 2017).

The development and application of work schedules based on the individuals' chronotype have been demonstrated a significant improvement in the quality of life of shift workers (Bhatti et al., 2014), as a result of the decrease in circadian dysfunction and the consequent improvement in hormone levels, quality of life, sleep and, consequently, in the increase of pleasure in performing daily work activities (Vetter et al., 2015; Luyster et al., 2012).

3.6 Shift work, reduced sleep and obesity

It is known that a sedentary lifestyle, high amounts of daily energy intake and persistent short sleep duration are considered to induce obesity (Brum et al., 2020). Furthermore, these factors may be potentiated when present in shift workers, especially during night shifts (Bhatti et al., 2014).

Obesity is considered a multifactorial disease and a Public Health problem (Jastreboff et al., 2019) that can result in other health complications, such as, reduced life expectancy (Estrela and Mendes, 2018). In addition, sleep deprivation has a negative effect on the hormone-energy correlation due to negative changes in the endocrine metabolism mainly related to the glucose metabolism disorders and insulin and nocturnal cortisol production. These present a direct correlation with decreased nocturnal satiety, contributing to the onset and development of overweight and obesity (Schiavo et al., 2013; De Lorenzo et al., 2019).

From 183 countries over a 33-year time series, it was found that the world overweight and obesity prevalence average between the years 1980 and 2013 was of 27.5% in adults. A gradual increase in obesity was then observed, especially in developed countries, an increase detected mainly with advancing age and in males. In developing countries, the opposite was observed regarding the obesity-sex association (Marie et al, 2014). In Brazil, a recent study conducted by the Ministry of Health found that more than half of the population (51%) is overweight, with an annual increase rate of 1.37% in relation to overweight and 0.89% in relation to obesity, with a projection for the year 2022 of 2/3 of the adult population of the capitals of Brazil being overweight, which becomes very worrisome (Marie et al., 2014). On the other hand, other authors associate obesity as a predictor of depression (Luppino et al, 2010).

As mentioned before. elite military police-work demands and requests that the individual have ideal athletic conditions, or close to it, to develop his functions in optimal levels. However, this is not what is observed in many parts of the world. For example, in Iowa (in the USA), a large part of the military population do not practice physical activities on a regular basis during spare time; 80% of the policemen were overweight or obese (Heinrich et al., 2020). In Russia (n=182; 153 men and 29 women), with an average age of 27.1 ± 7.3 years (range = 18–48 years); Mean BMI, WC, and BF% values were, respectively, 25.7 ± 8.4 kg/m², 86.4 ± 7.1 cm, and $21.0 \pm 6.0\%$ for men and 25.6 ± 5.4 kg/m², 82.2 ± 12.7 cm, and $33.1 \pm 7.5\%$ for women. In addition, BMI weight status categories showed that 53.6% (n = 82) of men were normal weight, while 41.8% (n = 64) were overweight, and 4.6% (n = 7) were obese. For women 58.6% (n = 17) were normal weight, 24.1% (n = 7) were overweight, and 17.2% (n = 5) were obese using BMI (Heinrich et al., 2020). In Quebec (Canada), Two thousand, ninety-nine (2,099) male (age: 40.8 ± 9.2 years) and 756 female (age: 37.9 ± 7.9 years) police officers have been evaluated. The prevalence of obesity (body mass index ≥ 30 kg/m²) and diagnosed hypertension was respectively 21.1, and 14.3% in male and 7.3 and 4.1% in female police officers, respectively (Gendron et al., 2019). In Buffalo (New York), 281 police officers (71.5% men) from the Buffalo Cardio-Metabolic Occupational Police Stress Study (2011-2016); were observed about the relationship between levels of 25-hydroxyvitamin D (25(OH)D), a biomarker for vitamin D status and adiposity levels. The prevalence of obesity (BMI ≥ 30) was 50.7% in men and 21.3% in women. Mean levels of 25(OH)D were 32.4 ng/mL in men and 34.4 ng/mL in women and adiposity measures were inversely associated with 25(OH)D, but differed between female and male officers (Gu et al., 2019). These findings show that health and life quality are also influenced by culture. In a study with

1876 Brazilian elite military police officers in the state of Espírito Santo, it was found that 60.9% of these officers were obese (33.8±7.4 age; 87.0±10.5 Kg; 27.6±2.3 BMI; 8.8±7.6 years of military service) and 12.3% suffered from depression (12.3±6.1) (Vancini et al., 2018). However, authors did not find any association between obesity and depressive traits, but rather linked them directly to the number of working years and occupational stress. The association between shift work, sleep disorders, metabolic syndrome, and other diseases reinforces the need for medical monitoring of these professionals.

4. Conclusion

The environment that military police officers are involved in may have a potentiating effect on the development of psychological disorders, such as high levels of stress. Consequently, occupational stress may become a trigger point for the emergence of other health problems, including reduced sleep, obesity, among others. When considering these aspects together in shift workers, negative consequences can be observed in result of the circadian rhythm disruption, putting these professional's health at risk.

Therefore, longitudinal studies; correlated to occupational stress, MetS, sleep quality, and abdominal adiposity; developed from changes in the routine and work shifts of these military police officers; are needed, as they can provide a better and wider understanding about these professionals of great importance for the society, especially in this time of pandemic. Future preventive policies regarding the policeman's potential excessive stress should be seen as of great importance for his life quality, good job performance and citizens and societies' well-being and security.

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