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Correlation between quality of life and sleep quality of military firefighters

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ABSTRACT

Introduction: Among the professions that are impacted by the work context, the military firefighter is mentioned, who carries out activities with danger, physical and emotional exhaustion, which can have an impact on quality of life. **Objective:** To analyze the relation between quality of sleep and quality of life of Brazilian Military Firefighters. **Methods:** Research with a quantitative, transversal, correlational and analytical approach, carried out with 129 military firefighters working in Rio Grande do Sul, Brazil, that had been performing operational and administrative assistance for more than six months. Questionnaires containing socio-occupational and lifestyle data, the Pittsburgh Sleep Quality Index and the World Health Organization Quality of Life to assess quality of life were used. Descriptive and analytical statistics were used. **Results:** The analysis of quality of life shows a higher average in the physical domain (77.52), a direct correlation between the physical domain and the other quality of life domains, and inverse correlations between global sleep quality and the domains of quality of life. Regarding sleep quality, a higher percentage of poor classification (71.3%) is observed in military firefighters. **Conclusion:** There was a predominance of workers with poor sleep quality and good perception of general quality of life. An inverse correlation was identified between sleep quality and the domains of quality of life. When comparing quality of life with sleep quality domains, a significant difference was identified.

Keywords: firefighters; quality of life; sleep; occupational health; nursing.

INTRODUCTION

Health and disease are dynamic processes, directly related to the productive development procedures in historical moments[1]. Among the professions that suffer the impact of the work context, are the military firefighters, who carry out their activities with high risk, physical and emotional stress that can have repercussions on their quality of life. The firefighter's function is not only to rescue and fight fires; they also work in a preventive way, by inspecting buildings, giving educational talks in communities and schools[2].

The work context of these professionals requires the execution of activities that demand physical effort, technical precision, and immediate action in occurrences[3], and expose them to situations of intense stress and traumatic incidents[4]. The activities performed by these professionals are divided into administrative, related to bureaucratic, office and building inspection services, and operational, which main functions are firefighting, search, rescue and salvage of people and goods, and pre-hospital care.

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Added to these situations is the exposure to risks inherent to the organization of work, such as working the night shift. Research conducted with American firefighters with the objective of evaluating the quality of sleep identified physical safety compromised by altered psychological functioning, and a greater likelihood of poor performance or injury at work resulting from minimal sleep interruption[5]. The quality of sleep is related to its duration, and lack of sleep can have negative effects on health[6].

Long-term changes in sleep quality and architecture have been linked to cognitive impairment, and while the incidence of sleep disturbances may increase with aging, there is additional weakening of sleep-dependent memory consolidation in relation to neurodegenerative diseases, including dementias and Alzheimer's disease[7].

Sleep is directly related to quality of life, and situations that can influence this relation include time pressure and control, unsatisfactory working conditions, siren noise, heavy lifting, and not valuing the profession[8]. Quality of life refers to an individual's satisfaction with life conditions and includes satisfaction with health, occupation, family life, relations, general life, and safety, and implies physical, emotional, and social well-being[9]. When assessing the quality of life of Korean firefighters, it was found that the most closely associated factor with the worst perception of this variable was socio-psychological health stress, followed by occupational stress, depression, and field of work[10].

Therefore, considering the particularities of the firefighter's work and the work context, our objective is to analyze the relation between quality of sleep and quality of life in Brazilian Military Firefighters.

METHODS

Cross-sectional, exploratory, and descriptive research with a quantitative approach. It was carried out in the State of Rio Grande do Sul, Brazil, in the 4th Military Fire Brigade, which serves 33 municipalities in the region of coverage and includes seven platoons. The study was carried out with a population of firefighters who performed operational and/or administrative assistance, working in the function for more than six months in view of the adaptation to the work routines period. Those on leave of any kind were excluded.

The population was 223 firefighters. Based on the established criteria, five firefighters were excluded, two with less than six months of service and three on leave for health treatment. After identifying the readable population of 218, a sample calculation was performed with a 6% error and 95% confidence level, which resulted in a minimum sample size of 123 military firefighters.

The collection occurred between April and June 2018 and was carried out by undergraduate and graduate students trained for data collection and linked to the research group Work, Health, Education, and Nursing, research line Health/Psychic suffering of workers at the Federal University of Santa Maria. Prior to data collection, an appointment was made with the person responsible for the command in the municipality.

On the scheduled date, the military firefighters were individually invited to participate in the research. The objectives, the voluntary and confidential nature of the participation, and the right to withdraw from the study at any time were explained. With the consent of the firefighter, the Informed Consent Form was handed out, in two copies, asked to be read and then signed with the terms exposed, and one copy was collected immediately.

After that, the data collection instruments were handed out and the participants were instructed as to how to fill them out themselves, and a time or new date was scheduled to collect the instruments. It is noteworthy that up to three attempts were made to collect the questionnaires.

A questionnaire containing socio-occupational and lifestyle data (age, length of service, gender, child, use of medications, concerns about risk, risk experiences at work, existence of a place to rest, and physical activity practice); the Pittsburgh Sleep Quality Index (PSQI)[11] and the World Health Organization Quality of Life Questionnaire (WOQOL-BREF) were used.

The PSQI has seven components, with a scale that varies the score from zero to three points, in which its sum can vary the overall score between zero and 21 points: the higher the score, the worse the quality of sleep. For a better association analysis, we categorized the variable in sleep quality as "good" (zero to five points) and "bad" (> five points), as used in the scientific literature[12].

The WOQOL-BREF has 26 questions, two general questions about quality of life and 24 distributed in four domains: physical domain (DF), psychological domain (DPisc), social relations domain (SRD) and environment domain (AMD)[13]. The analysis of quality of life was made from the sum of the mean of each domain, multiplying this mean by four, to make the domain results comparable to the scores used in the WHOQOL-100. A proprietary syntax was used to enable isolated data analysis. The score ranges from zero to 100, and the highest score corresponds to the best quality of life[14]. It should be noted that in questions three, four and 26 the scores must be inverted: not satisfied takes the score 1=5, 2=4, 3=3, 4=2, and very satisfied takes the score = 1.

Descriptive statistics (relative frequency, absolute frequency, mean, maximum and minimum) and measures of dispersion (standard deviation) were used. The associations between variables were verified using Fischer's exact test or chi square test. The Mann Whitney test was used to compare sleepiness and the quality of life domains. The analysis of internal consistency was evaluated according to Cronbach's alpha coefficient. For correlation analysis Spearman's Correlation Coefficient was used, and, in

all analyses, it was considered a statistically significant association when $p<0.05$.

The project was authorized by the command of the fire department and subsequently approved by the Research Ethics Committee of the Federal University of Santa Maria, under opinion 2.562.016.

RESULTS

After identifying the eligible population of 218 people, the sample size was calculated and after that all the firefighters present at the workplace on the previously scheduled dates (n=155) were invited. It is noteworthy that 10 firemen (6.45%) did not accept to participate in the survey and 16 (10.3%) did not return the questionnaires within the established period. Thus, 129 firefighters participated in the research.

The data showed that the mean age was 37.93 years (±10.00), and the mean time in the profession was 14.02 years (±10.31). Table 1 shows that there was a predominance of males (93.0%), with high school education (49.6%). Regarding the position held, most firefighters are soldiers (66.7%), with the function of firefighting (65.1%).

Table 1: Characterization of the military firefighters in the southern region of Brazil. Rio Grande do Sul, Brazil (n=129).

Variables	%	N
Sex		
Female	9	7.0
Male	20	93
Education		
High School	64	49.6
Technical Education	8	14.0
Higher Education	39	30.2
Post-graduation	8	6.2
Position held		
Soldier	86	66.7
Cable	1	0.8
Sergeant	37	28.7
Lieutenan	2	1.6
Oher	3	1.6
Function		
Firefighting	84	65.1
Ambulance rescue and salvage	16	12.4
Aquatic rescue/diver	8	6.2
Rescue with dogs	2	1.6
Administrative	19	14.6
Religious Belief		
Yes	98	76.0
No	31	24.0
Consumption of alcoholic beverages		
Yes	76	58.9
No	53	41.1
Smoking		
Yes	6	4.7
No	123	95.3
Total	129	100

The quality-of-life assessment questionnaire showed Cronbach's alpha value equal to 0.86. Figure 1 shows a higher mean in the physical domain (77.52) and a lower mean in the environment (68.53). In general, it is observed a good evaluation of quality of life (74.11).

It can be seen in figure 2 that the highest average (88.57) was identified in the item "mobility" (Physical Domain) and the lowest (59.88) in the item "physical environment" (Environmental Domain).

Table 2 shows a direct correlation between the physical domain and the other domains of quality of life, and inverse correlations between the global PSQI and the domains of quality of life.

Regarding the quality of sleep, Table 3 shows a higher percentage of bad sleep (71.3%) in the military firefighters.

DISCUSSION

We identified the predominance of male workers and firefighters with the function of firefighting (operational), data similar to those found in American and Korean studies[15,16]. It is worth mentioning the identification of female firefighters in the workforce. Regarding this, it is noteworthy that in some studies the suppression of the female population was found, a fact identified in the exclusion criteria[17,18] or in the results, because it is a small portion of the headcount[19,20].

The quality-of-life assessment showed a better perception in the physical domain, which is related to the military firefighters' functional capacity. This domain includes questions about mobility, pain and discomfort, and ability to work, which suggests that for the participants of this study these are situations that do not impair their quality of life. Authors state that the physical capacity of firefighters to perform a certain task depends on the type, time to complete it, physical performance, and the environment where the task will be performed, which is related to the success of the activity[21]. The military firefighter has a work activity that requires

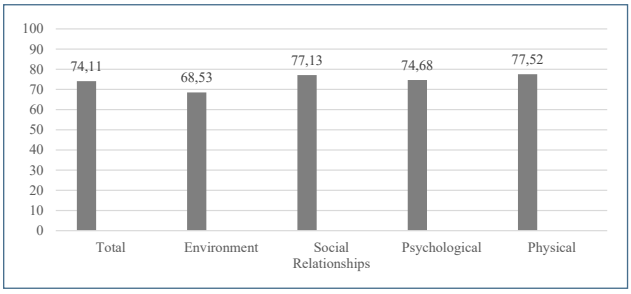

Figure 1: Assessment of quality of life in firefighters. Rio Grande do Sul, Brazil (n=129).

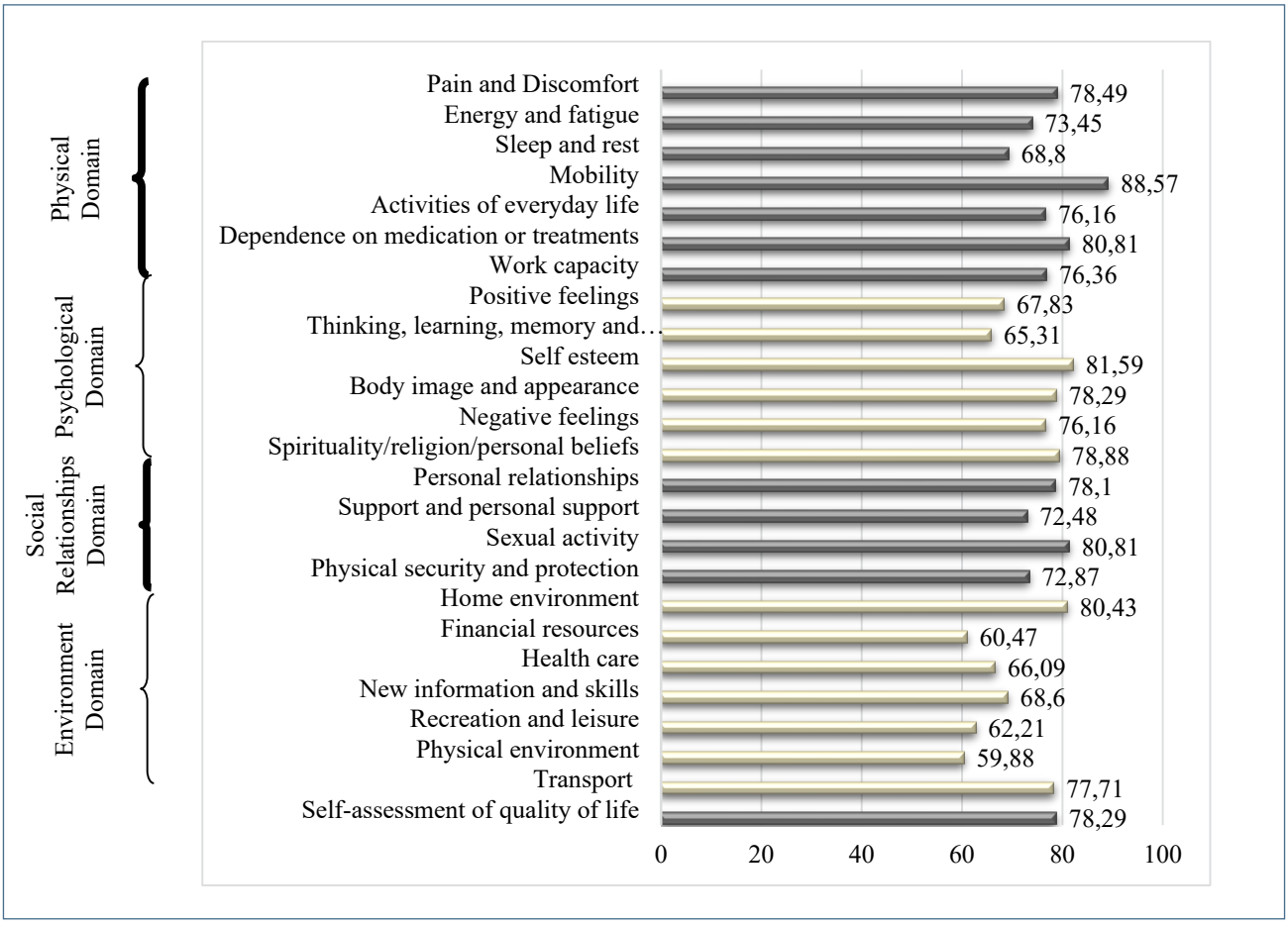

Figure 2: Analysis of WHOQOL-Bref items in military firefighters in southern Brazil (N=129).

Table 2: Correlation matrix of the domains of quality of life, quality of sleep, age and time at work, Rio Grande do Sul, Brazil (n=129).

Variables	Working Time	Physical Domain	Psychological Domain	Social Relations domain	Environment Domain
Age	0.888*	0.076	-0.041	-0.069	-0.002
Physical d.	0.022	1.000	0.592*	0.557*	0.573*
Psychological d.	-0.024	0.592*	1.000	0.634*	0.600*
Social Rel. d.	0.096	0.557*	0.634*	1.000	0.631*
Global PSQI	0.077	-0.521*	-0.458*	-0.411*	-0.400*

*Significant correlation p<0.001. Spearman's Correlation Coefficient.

Table 3: Sleep quality of military firefighters. Rio Grande do Sul, Brazil (n=129).

Sleep quality classification	N	%
Good	37	28.7
Bad	92	71.3
Total	129	100%

training, physical fitness, and psychological control to perform the work calls[22].

The social relations domain, second with the best average, covers relations established with friends, relatives, and whether the patient received any kind of support from these people when necessary. Thus, it is understood as a personal and subjective experience, which can contribute to the individual's satisfaction with life. Having good relations in the work environment and autonomy to perform one's functions are conditions that are positively related to job satisfaction and the low probability of wanting to change jobs[23].

The psychological domain, the third with the best perception by the firefighters, refers, among other items, to thinking, learning, memory, and concentration, important items in the immediate and unpredictable action that requires a constant state of alert. The prolonged state of alertness can lead to physical and mental exhaustion, fatigue, sleep disorders, illness, and irritability[8].

The physical and mental health of firefighters is affected by exposure to a variety of stressors, such as firefighting[22].

Mental health integrally influences the individual, as in the response time of actions and attention during care. Korean researchers identified a positive correlation between military firefighters quality of life and the occupational identity, social support, and post-traumatic growth variables[9]. Therefore, it is important to have a healthy environment inside and outside of work, to have leisure and resting hours to provide mental balance and good relations with the people around them. Authors suggest that adopting a healthy lifestyle collaborates with quality of life, because in the relation between health and quality of life, health care has a favorable impact on personal satisfaction, especially in the cognitive, social, physical, and emotional dimensions, and on personal productivity[24].

An inverse correlation was identified between the social relations domain and the psychological domain, indicating that the better the self-esteem, body image, and appearance, the better the personal relations and social support. A significant inverse association was also identified between the physical and the psychological domains. Thus, the worse the perception of quality of life related to pain and discomfort and activities of daily living, the worse the self-esteem, memory, and concentration. Authors refer that satisfaction at work is related to the worker's behavior with the work environment, because their attitudes lead to good performance and directly impact productivity[25].

Satisfaction at work has an influence on quality of life, since if the workplace is pleasant and encourages the worker, the tasks will be more pleasant to perform. In a workplace with rigid rules of behavior and hierarchy, such as in military barracks, it is important to have places for collective interaction, which may result in the engagement of workers and better productivity of the activities.

The environment domain presented the worst perception of quality of life. Health demands can influence the quality of life of workers, contributing to increased suffering at work and illness, because some health problems, such as gastritis, stress, and insomnia, can result from work organization and work activities and, consequently, influence the general perception of quality of life[21].

There was a direct correlation between the environment domain and the psychological domain, indicating that the better the positive feelings and self-esteem, the better the perception of physical safety and protection and health care. A direct correlation was also identified between the environment, physical, and social relations domains. The worse the firefighters' physical safety and security, the worse their pain, discomfort, and personal relations. A study identified that these people, who work in the operational service, have the worst results on the perception of quality of life when compared to the administrative staff (p=>0.05), thus, this assessment can have repercussions on health and well-being, besides interfering in their daily work[21].

Regarding the quality of sleep, it has an important function for the individual and its deprivation can cause disturbances in intellectual and mental performance capacity and mood stabilization that can be avoided through prevention. The data analysis showed a poor evaluation of the quality of sleep in most of the firefighters, data similar to research carried out with North American[26], Portugal[27], Seoul[28] and Iran[20] firefighters.

The poor evaluation of sleep predominated among firefighters. It is important to mention that in a 24-hour shift, during the day, the workers may attend to firefighting incidents and accidents with victims trapped in wires, which can contribute to keep the worker alert and hinder rest. A study conducted in Iran suggests a relation between occupational stress and poor sleep, constituting a labor risk[20].

When correlating the quality of sleep and the physical domain, a direct correlation was identified. That is, the worse the quality of sleep, the worse the perception of quality of life, in issues such as sleep and rest, and ability to work. When sleep is impaired, the more hours with lack of sleep accumulated, it can result in increased sleepiness, which can contribute, in the long term, to fatigue[29], being capable of affecting the worker's health.

About this, authors consider that the military lifestyle usually include continuous operations, either in training or deployed environments, and these stressful environments present unique challenges for service members trying to achieve a consolidated restorative sleep. In the long term, chronic sleep and circadian rhythm disturbances may be associated with other sleep disorders such as insomnia, obstructive sleep apnea, and excessive daytime sleepiness[30].

Sleep quality correlated inversely with the psychological domain, social relations. These data allow us to conclude that firefighters who perceived negative feelings are related to worse sleep quality. About this, a study identified a relation between the negative feelings coming from work, such as shame and guilt, and the occurrences of post-traumatic stress disorder symptoms and suicide risk among firefighters[31]. Moreover, the worker who has a bad evaluation of the quality of sleep may face difficulties in social relations and coexistence.

The firefighters' work environment, through the assignments or risky occurrences, problems in the interactions with colleagues and superiors, sleep deprivation related to shift work, demand for physical conditioning, deployment and separation from the family, and additional non-combatant work (assignments such as disaster relief) constitute situations that can influence the perception of quality of life[32,33]. Thus, based on the identification of an inverse correlation between sleep quality and the environment domain, we concluded that firefighters with worse sleep quality are at risk regarding physical safety and protection, which predisposes them to health problems.

When comparing the domains of quality of life and quality of sleep, we found that among the firefighters with good quality of sleep, the highest score (best perception of quality of life) was

in social relations domain, and the lowest in the environment domain ($p<0.05$). The workers with bad sleep quality evaluation had the highest score in the physical domain and the lowest in the environmental domain ($p<0.05$). We identified worse perception in the quality of life of firefighters with poor assessment of sleep quality when compared to workers with good quality, which allows us to conclude that the constructs are interrelated.

The results of this study point to relations between quality of life and quality of sleep. However, to promote healthier processes, it is necessary to invest in interventions in the workplace. The demands of health can influence the quality of life of the worker, contributing to the increase of suffering at work and illness, because some health problems, such as gastritis, stress, and insomnia, can result from the organization of work and work activities and, consequently, influence the general perception of quality of life[34].

The data points to the need for actions focused on the prevention of health problems of these workers, being necessary to organize moments to reflect on the implications of work overload on the performance of professionals and their health. It is important to have intervention measures in the firefighters' lifestyles so that they do not get sick and maintain their current quality of life.

The limitations refer to the cross-sectional design, which limits the ability to establish causal relations, and to the use of questionnaires with self-reported data, without subjective assessments.

Conclusion

The analyses allowed us to identify that among the 129 firefighters surveyed, there was a predominance of workers with poor quality of sleep and good perception of overall quality of life, with the physical domain presenting the highest average and the environmental domain the lowest. An inverse correlation was identified between the quality of sleep and the domains of quality of life. When comparing the domains of quality of life with good or bad quality of sleep, a significant difference was identified.

The results may contribute to the construction of health knowledge regarding the population studied and may help in the planning of actions that favor the sleep of military firefighters. Based on that, future longitudinal research is suggested, using standardized interviews or mixed methods as sources of information, which could provide more detailed information about the quality of life and sleep and, later, intervention research should be carried out with these workers, so that nursing and military firefighters can build alternatives for sleep hygiene and quality of life, intervening in risk factors to reduce health problems.

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