

## Pain, health perception and sleep: impact on the quality of life of firefighters/rescue professionals<sup>1</sup>

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Objective: to evaluate the quality of life of firefighters and rescue professionals, and characterize their socio-demographic, health, work and lifestyle profile. Methods: cross-sectional study that used a socio-demographic, lifestyle, health, work data questionnaire and the WHOQOL-BREF quality of life aspects, in Fire Department bases, Civil Air Patrol Group of the Military Police and Rescue Group of Emergency Services. Results: ninety professionals participated in this study - 71 firefighters, 9 nurses, 7 doctors and 3 flight crew members. The average age of the group was  $36.4 \pm 7.8$  years; they worked about 63.7 hours per week; 20.2% reported pain in the last week and 72.7% had body mass index above 25 kg/m<sup>2</sup>. The average of the WHOQOL-BREF domains was: physical (74.6), psychological (75.2), social (76.5) and environmental (58.7). Significant association was found (Mann-Whitney test and Spearman correlation) between the WHOQOL-BREF domains and pain in the past six months, in the last week, health perception, job satisfaction, hours of sleep, domestic tasks and study. Conclusion: the main factors related to quality of life were presence of pain, health perception, sleep and domestic activity.

Descriptors: Work; Firefighters; Rescue Work; Quality of Life; Occupational Health; Nursing.

<sup>1</sup> Paper extracted from master's thesis "Firefighters and rescue professionals: work ability and quality of life", presented to Faculdade de Enfermagem, Universidade Estadual de Campinas, Campinas, SP, Brazil.

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## Introduction

Some professions, especially firefighters and rescue professionals, deserve special attention regarding health care, since they are exposed to extreme demands on the physical, mental and social spheres in their daily work and, therefore, are susceptible to different health risks<sup>(1)</sup>.

The need to include health professionals, especially nurses and physicians, in the rescue system and out-of-hospital salvations, led to the creation of the Rescue Group and Attention to Urgencies and Emergencies (GRAU) by the Ministry of Health of the State of São Paulo, consolidated by Decree No. 58,931, 2013, which currently has approximately 80 professionals, including doctors and nurses, and five operational bases, four located in São Paulo and one in Campinas<sup>(2)</sup>.

The professionals of Pre-Hospital Care (PHC) live expecting the emergency, which can generate fear of the unknown, emotional involvement, contact with the population and death. Therefore, they must be seen through a different perspective regarding working conditions, due to different everyday situations in an external and unprotected environment. The occupational risks become higher when related to flight for those who perform such transportation<sup>(3)</sup>.

Firefighters are exposed to stress and physical demands at work, both can cause psychological damage related to the psychic, social and professional life<sup>(4)</sup>. Rescue workers, such as firefighters, nurses, doctors and drivers have high incidence of stress, sleepiness and fatigue, despite being a not very studied activity<sup>(5)</sup>.

The World Health Organization (WHO) defines quality of life as the individual's assessment of their position in life in the scope of culture and values, considering their goals, expectations, standards and concerns<sup>(6)</sup>.

The objective of the study was to evaluate the quality of life of firefighters and rescue professionals and characterize their socio-demographic, health conditions, work and lifestyle profile.

## Method

Cross-sectional and descriptive study, whose data were obtained through the quality of life instrument WHOQOL-BREF<sup>(6)</sup> and Socio-demographic Data questionnaire, Lifestyle, Health and Work Aspects (QSETS)<sup>(7)</sup>.

Data collection occurred from August to October 2013, in Campinas, state of São Paulo, Brazil, in the six Fire Department bases; a base of the Civil Air Patrol Group of the Military Police (Águia Group) and Rescue Group for Urgent Calls (GRAU).

The studied population covered the military firefighters, workers of the Águia Group, and nurses and doctors from GRAU, in a total of 134 professionals who perform direct service to users. Of these, 110 were firefighters, ten from the air rescue services (four nurses, six flight crew members) and 14 from GRAU (seven doctors and seven nurses). Individuals who were not in labor activity during the data collection period and firefighters of the administrative sector were excluded.

The final sample was composed of 90 individuals with response rate of 72.6% (Table 1).

Table 1 - Distribution of the study sample and response rate. Campinas, state of São Paulo, Brazil, 2014

Groups	Assets	Eligible	Respondents	%	Categories
Firefighters	110	102	71	69.6	71 firefighters
GRAU	14	14	14	100.0	7 doctors and 7 nurses
ÁGUIA	10	08	05	62.5	2 nurses and 3 flight crew members
Total	134	124	90	72.6	

In the bases, one of the researchers introduced himself to the team, previously informed by their superior, who authorized the collection of data, inviting the professionals who voluntarily wanted to participate. They received a Free and Informed Consent Form, and the questionnaires were collected by the researcher.

After collection, the data were sorted and tabulated in Microsoft Excel<sup>®</sup> and exported to the SAS<sup>®</sup> statistical software (version 9.2), for descriptive and statistical

analysis, with significance level lower than 5%. For the correlations between quantitative variables we applied the Spearman correlation coefficient; for comparisons between the categorical variables, the Mann-Whitney test, and for the internal consistency of the WHOQOL-BREF domains, the Cronbach's alpha coefficient.

This research respected the Resolution 196/96 and was approved under CAAE 13727813.5.0000.5404 by the Research Ethics Committee, via Plataforma Brazil.

## Results

Of the participating professionals, 48 (54.5%) resided in Campinas or in its metropolitan region, 19 (21.6%) in São Paulo, and 21 (23.8%) in other cities; most of them (67 – 74.4%) were married or lived with a partner. The salary range of 55.6% of the respondents (50) varied between R\$1,555.00 and R\$3,172.00; 26 employees (28.8%) reported to be in the range between R\$3,172.00 and R\$4,851.00; and 15.6% (14) above this value.

Data concerning socio-demographic, work, lifestyle and health conditions characteristics are described in Table 2.

Table 2 - Distribution of absolute and relative frequencies of the variables socio-demographic, work, lifestyle and health conditions (n=90). Campinas, state of São Paulo, Brazil, 2014

Variables	n	%
Age (years)		
20 to 29	19	21.3
30 to 39	39	40.8
40 to 49	25	28.0
50 to 60	06	6.7
No information	01	
Sex		
Female	03	3.3
Male	87	96.7
Level of Education		
High school/undergraduate	51	58.0
Graduated from college/graduate	37	42.1
No information	02	
Perception of health status compared to people of the same age		
Worse/a little worse	3	3.3
Equal	14	15.6
Better	50	55.6
Much better	23	25.6
Currently studying		
No	75	83.3
Yes	15	16.7
Report of pain over the last six months		
No	62	68.9
Yes	28	31.1
Report of pain in the last week		
No	71	79.8
Yes	18	20.2
No information	01	
Has another job		
No	63	71.6
Yes	25	28.4
No information	02	

(continue...)

Table 2 - (continuation)

Variables	n	%
Time spent to get to work and back home		
Less than or equal to 2 hours	64	71.9
More than 2 hours	25	28.1
No information	01	
Job satisfaction		
Dissatisfied/a bit unsatisfied/indifferent	19	21.6
Satisfied/very satisfied	69	78.4
No information	02	
Sleep well on working days		
No	16	17.8
Yes	74	82.2
Sleep well on days off		
No	11	12.2
Yes	79	87.8
Smokes		
No	88	97.8
Yes	02	2.2
Ingests alcohol		
No	48	54.5
Yes	40	45.5
No information	02	
Body mass index		
Lower than 25	24	27.3
Between 25 and 30	53	60.2
Over 30	11	12.5
No information	02	

It should be noted that religious belief was mentioned by 90% of the participants (81), 72 (80.9%) performed domestic activities and 91.1% (72) physical activity, 62.5% (45) for more than 210 minutes per week. The medium Body Mass Index (BMI) was 26.3 kg/m<sup>2</sup> (SD±3.5).

Of those interviewed, 29 (32.2%) reported working overtime. Thirty-two (35.6%) have been unemployed. The average number of hours worked was 63.7 hours (SD±13.2), minimum of 24 and maximum of 100 hours per week.

In Figure 1, we observed the distribution of general average by facets and WHOQOL-BREF domains, highlighting the facets of domains related to environment, such as access to health services, financial resources and physical environment.

The average scores related to the WHOQOL-BREF domains were: physical of 74.6 (SD±13.1), median of 78.6, minimum and maximum of 35.7 and 92.9, respectively; psychological equal to 74.6 (SD±13.5), median of 79.2, minimum and maximum of 41.7 and 100.0; social relations obtained were 76.5 (SD±15.7), median of 75.5, minimum and maximum of 66.7 and 100.0; and environmental of 58.7 (SD±12.4), median of 59.4, minimum and maximum of 18.8 and 84.4. The domains obtained a Cronbach's alpha coefficient superior to 0.7.

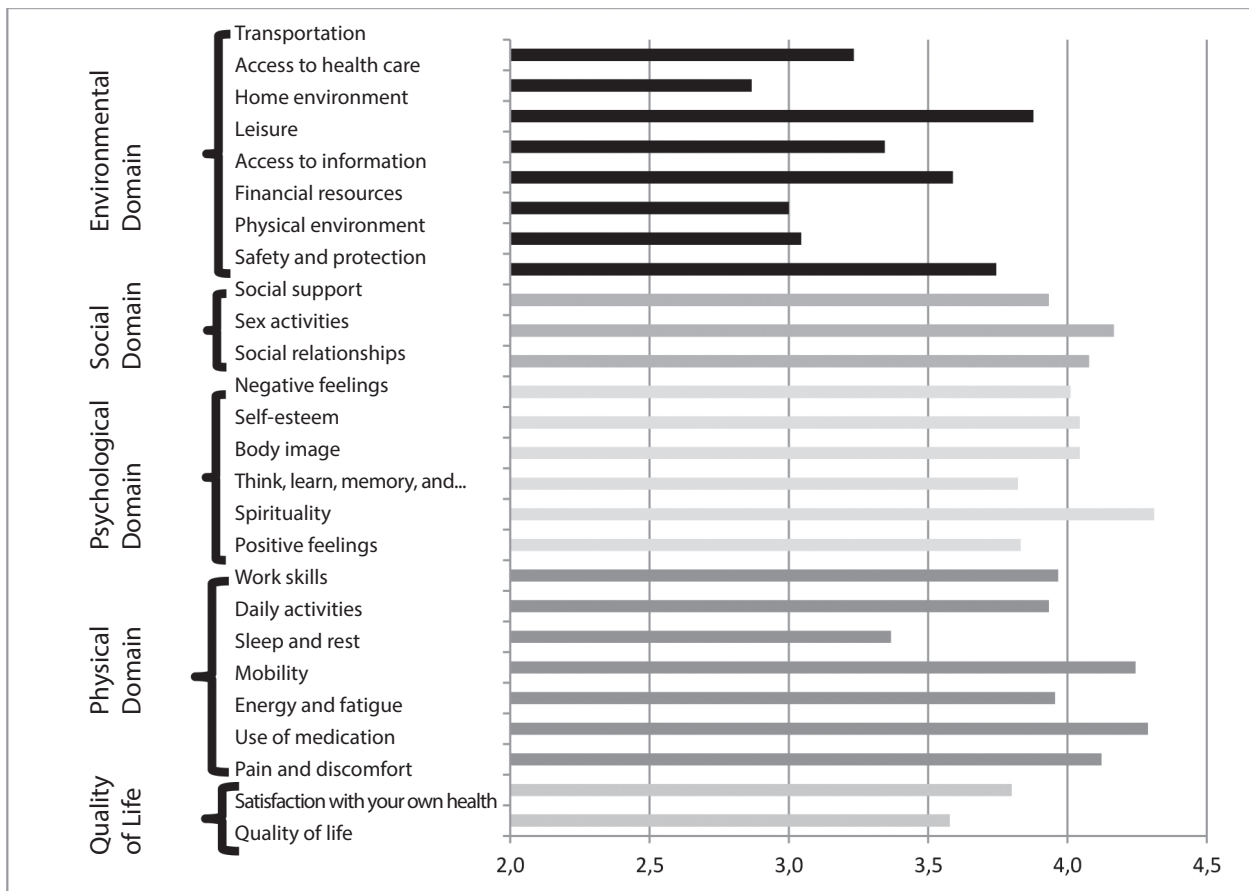


Figure 1 - Distribution of the WHOQOL averages by domains and facets, n=90. Campinas, state of São Paulo, Brazil, 2014

There was statistically significant association between the presence of pain in the last six months with the physical and environmental domains; presence of pain in the last week with the physical domain; perceptions of stress and health status when compared to

people of the same age with all domains; job satisfaction with psychological and environmental domains; hours of sleep with the physical domain; to perform domestic tasks and study with the psychological domain (Tables 3 and 4).

Table 3 - Association of WHOQOL-BREF domains with the realization of household chores, current study, report of pain over the last six months and in the last week variables. Campinas, state of São Paulo, Brazil, 2014

Domains	Variable	n	Average	SD*	Min <sup>†</sup>	Q1 <sup>§</sup>	Med <sup>  </sup>	Q3 <sup>¶</sup>	Max <sup>**</sup>	p-value <sup>††</sup>
Psychological	Household chores									0.0315
	No	17	81.1	7.5	70.8	70.8	83.3	87.5	91.7	
	Yes	71	73.5	14.0	41.7	62.5	75.0	83.3	100.0	
	Currently studying									0.0485
Physical	No	75	76.6	13.0	41.7	70.8	79.2	87.5	100.0	
	Yes	14	68.2	14.2	45.8	58.3	68.8	79.2	87.5	
	Pain six months									<0.0001
	No	62	79.0	8.9	57.1	71.4	80.4	85.7	92.9	
	Yes	28	64.7	15.4	35.7	51.8	67.9	75.0	92.9	
	Pain week									<0.0001
	No	71	78.4	10.0	50.0	71.4	82.1	85.7	92.9	
	Yes	18	59.5	13.7	35.7	50.0	62.5	71.4	78.6	

(continue...)

Table 3 - (continuation)

Domains	Variable	n	Average	SD*	Min†	Q1‡	Med	Q3¶	Max**	p-value††
Environment										0.0120
	No	62	60.9	10.6	34.4	56.3	62.5	65.6	84.4	
	Yes	28	53.9	14.9	18.8	45.3	56.3	60.9	84.4	

\*Standard Deviation

†Minimum

‡1st Quartile

||Median

¶3rd Quartile

\*\*Maximum

††Mann-Whitney Test

Table 4 – Association between the WHOQOL-BREF domains and lifestyle variables. Campinas, state of São Paulo, Brazil, 2014

Domain		Hours of sleep per day	Perception of health status compared to people of the same age
Physical	Spearman Coefficient*	0.3030	0.3521
	p-value	0.0043	0.0007
	n	87	90
Psychological	Spearman Coefficient*	0.1001	0.3637
	p-value	0.3591	0.0005
	n	86	89
Social	Spearman Coefficient*	0.0214	0.3373
	p-value	0.8442	0.0012
	n	87	90
Environment	Spearman Coefficient*	0.1933	0.2990
	p-value	0.0729	0.0042
	n	87	90

\*Spearman's rank correlation coefficient

## Discussion

The method to enter the military career occurs through contest, the allocation is random and depends on the position's availability. On the other hand, the 24-hour shift and 48 of rest favors the maintenance of the link by facilitating time of coming and going from work. WHO considers satisfaction with means of transport one of the facets to measure quality of life<sup>(6)</sup>. The results showed that 28% of respondents reported needing more than two hours to get to work, however, the statistical tests did not identify relation between transportation time and quality of life scores.

We observed that the average of worked hours per week in the sample is high (63.7 hours). The workload is an important predictor of health<sup>(3)</sup>, but, for this study, this association was not significant.

The large amount of time spent going and coming from work can interfere with the quality of life, especially when combined with the heavy workload of these professionals, especially firefighters, needs to be better planned to reduce exposure to occupational hazards.

In this survey, the majority (96.8%) of respondents were male, justified by the fact that women were only admitted in the Firefighters Corporation of the state of São Paulo in the 1990s<sup>(8)</sup>. It also reflects the difficulty that women still face to enter in a predominantly male universe. This reality is not just Brazilian, a North American study<sup>(9)</sup> discusses this difficulty and, despite Governmental and social incentives, just 3.7% of firefighters are women.

More than 50% of the respondents were older than 36 years. With the population's aging, the trajectory of life perspective must be adopted, with attention to determinants that interfere in active aging<sup>(10)</sup>. Only six participants (6.7%) were older than 50 years, showing that this profession and its requirements need to be better assessed to chart strategies that enable more time to these professionals in the working life. These data corroborate a research from Finland, in which the average age of firefighters was 35.7 years oscillating between 22 and 49 years<sup>(11)</sup>.

Most received between R\$1,555.00 and R\$3,172.00, a salary range above the national average

of R\$ 1,110.71<sup>(11)</sup>. We must emphasize that more than 42.1% of the participants had a college degree, what makes this average wage low and compromises the quality of life. The financial resources facet had one of the lowest averages in the environmental domain, as well as the lowest average (58.7) among the WHOQOL-BREF domains.

From the sample, 90% reported that they had a religious belief. Religiosity and spirituality have influence on firefighters' labor activities due to the exposure to frequent situations of stress, and efficiency in the recovery after the confrontation of these situations<sup>(12)</sup>.

We also found an unemployment history between 28.4% of the participants, with an average of 14.1 months, which can be one of the reasons why even with the heavy workload and exposure to risk situations, 78.4% of the respondents said they are satisfied or very satisfied with their work.

The firefighter profession requires physical fitness, and we identified physical activity as part of the daily life of this group, as 91.1% of participants reported to practice physical activity regularly and, of these, more than 62% for approximately 210 minutes of exercise per week. However, there was no significant difference in the association between the practice of physical activity and the WHOQOL-BREF domains. Another study, conducted with 625 American firefighters subjected to high-intensity training showed that those who participated in the activity were two times more likely to achieve the physical activity recommendations when compared to those who did not participate<sup>(13)</sup>.

Even with the high frequency of physical activity, the average BMI of the individuals was 26.23 kg/m<sup>2</sup>, and over 50% of workers were overweight. A North American research<sup>(14)</sup> showed that being overweight increases significantly the chances to contract occupational disease, to suffer accidents at work or to need days off. That is why actions to lower the BMI of these workers must be considered to reduce occupational hazards inherent to the work. Obesity decreases the physical resistance of these professionals and increases the risk of back pain, aside from being a risk factor for many diseases, especially the cardiovascular and metabolic ones<sup>(14)</sup>. We identified that this prevalence is higher, reaching 72.7% of the sample studied, when considered overweight and obesity. It stands out that, in that same group, 81.2% considered having the health status better or much better than other people of the same age, which suggests that obesity may not be considered a health problem for these workers.

Sleeping hours showed positive correlation with the physical WHOQOL-BREF domain ( $p=0.0043$ ). A Finnish study<sup>(15)</sup> performed with firefighters also highlighted the relation between quality of life and sleep patterns.

Being pleased with the job showed correlation with two of the four WHOQOL-BREF domains: psychological ( $p=0.0187$ ) and environmental ( $p=0.0065$ ). When considering the question "do you consider your health to be better or much better than people of the same age", there was positive correlation with all of the WHOQOL-BREF areas, demonstrating that the perception of well-being and positive feelings are directly related to quality of life.

Results show that at least 31.1% of the subjects complained about some kind of pain in their daily life and supports studies<sup>(3-16)</sup>, such as investigating the incidence of Work-related Musculoskeletal Disorders (WMSDs) in Korean firefighters, in which 11% of the subjects were suffering from pain, aside from the relation of stress in its development<sup>(16)</sup>. A Brazilian research, performed with pre-hospital service workers<sup>(3)</sup>, identified that the presence of pain was related to decreased capacity for work and there was prevalence of pain in 56% of the participants, demonstrating that the emergency service can be an important factor in the development of this symptom.

Smoking is a risk factor for many diseases and the percentage of smokers in the state of São Paulo is decreasing<sup>(17)</sup>. In this study, the prevalence of smoking was low (2.2%). Another Brazilian study, conducted with firefighters in the state of Minas Gerais, has also identified low prevalence of smokers in the corporation (7.7%) and linked smoking to low educational levels, intermediate range of monthly income, presence of psychiatric problems in the past, high exposure to traumatic events in life, social discrimination, operational stressors and low demand of work<sup>(18)</sup>.

Almost half of the individuals (45.5%) reported to consume alcohol regularly. A study with New York firefighters, showed that approximately 58% of the subjects ingest alcohol often<sup>(19)</sup>. Furthermore, the use of alcoholic beverage is related to the worsening of insomnia and depression and the frequent consumption of alcohol was attributed, mainly, as a relief of the high mental and physical demands of the job and social acceptability<sup>(19)</sup>.

Work-related accidents reached 11.3% of the participants and, although in this research statistical relationship with quality levels of life was not demonstrated, these accidents are related to

the presence of pain, job satisfaction, among other conditions that can influence these rates. A French study with firefighters accompanied the work accidents that occurred with 309 workers from that location, a relation between the time of the day and the amount of accidents was identified, concentrated in the nighttime and in the early hours of the morning, even though the peak calls do not occur in these periods<sup>(20)</sup>.

Scores of the four WHOQOL-BREF domains showed an average similar to a study developed in Croatia<sup>(21)</sup> with firefighters, given that the results obtained by domain in this research and the Croatian one were, respectively: physical 74.6% and 80.8%; psychological 75.2% and 73.7%; social relationship 76.5% and 75.9% and, finally, the environmental domain presented difference because, in the research, the percentage was 58.7% compared to 70.8% of the international study. The environment domain includes aspects related to the country's structure, such as means of transport, security and access to health, therefore, this divergence may be due to differences in the regions studied.

In the physical domain, we highlight sleep and rest aspects with an average lower than the other and, in this study, at least 17% of workers reported having trouble to sleep. Problems with sleep were also identified in a research with pre-hospital service workers, conducted in the same region of this study<sup>(3)</sup>. A study with American firefighters identified that 37.2% had change in sleep and were more prone to cardiovascular disease, diabetes, depression and anxiety<sup>(22)</sup>.

In the psychological domain, two aspects drew attention due to low average scores: regarding the ability to think, concentrate and memory and on positive thoughts. The high average of the spirituality aspect called attention. An international study reported a relationship between positive thinking and spirituality and good quality of life<sup>(23)</sup>. The spiritual link helped firefighters to overcome post-traumatic stress<sup>(12)</sup>. Therefore, the high score of this aspect is of extreme importance.

The relationship domain with the environment, which explores issues related to housing, security, freedom, financial resources, access to health services and transport conditions presented the lowest averages. The average regarding security and protection was 3.7, value that that can be justified by the current public security crisis in the country. An international non-governmental organization, The Social Progress Imperative<sup>(24)</sup>, assessed the quality of life in various countries and, in 2014, it assessed

the level of personal safety in 132 countries, ranking Brazil in the 122<sup>nd</sup> position, what can justify the lack of security identified in the results of the sample studied. The lack of access to health services, transportation, leisure and information also stands out in this domain, all items directly related with the management of public services that require reflections and actions to improve the quality of life levels<sup>(24)</sup>.

As limitation of the study, we point out the non-participation of professionals distant from work and administrative workers, which may represent a bias in the study.

## Conclusion

WHOQOL-BREF scores were high in the physical, psychological and social relation domains, the lowest score occurred in the environment domain. Aspects that stood out negatively were: sleep and rest, ability to perform everyday activities, have positive thoughts, ability to think, learn, memory and concentration, safety and protection, physical environment, financial resources, access to information, access to leisure, home environment, access to health care and transportation.

Variables that showed statistical relationship with the WHOQOL-BREF domains were: health perception compared to people of the same age, hours of sleep, be satisfied with the work, be studying and performing domestic activity.

We emphasize that the creation of this group of doctors and nurses (GRAU) shows important perspective of growth in the number of nursing professionals that perform their function under conditions similar to these professionals.

Nursing professionals are part of the multidisciplinary team that can act to intervene in the risk factors workers are exposed, to reduce the harms to health. It is important to meet this group of workers, with workload above the national average, who coexists with pain, report problems with sleep and whose work performance is interfering with their quality of life.

We expect that the data collected in this study will serve as a base for other researchers to investigate the specific characteristics of these professionals, and to be used by the fire service managers to help them discuss their routines and possibilities to improve their living and working conditions and, finally, to assist public policymakers in decision-making.

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