Pain, cumulative trauma disorders and cardiovascular disease in professional of SAMU 192 Porto Alegre/RS

Dor, Dort e doenças cardiovasculares em profissionais do SAMU 192 de Porto Alegre/RS

ARTIGO ORIGINAL

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ABSTRACT: *Objective*: To determine the prevalence of musculoskeletal pain, Cumulative Trauma Disorders (CTD) and cardiovascular disease (CVD) and identify the associated factors in the emergency professionals of Porto Alegre/RS. *Methods*: 113 workers (37% of SAMU 192 Porto Alegre/RS) answered a questionnaire about work-related habits, occupational risks and the onset of CTD and CVD. Statistical analysis was performed using frequency tables, chi-square test and prevalence ratios (95%) through multivariate analysis (Poisson's regression model). Considering α=0.05. *Results*: All participants were in the overweight condition and showed high prevalence of pain (92.9%) and CTD (50.4%), and low CVD prevalence (8.8%). Age acted as a risk for pain. Factors associated with CTD were exposure to cold and heat, exposure to vibrations, physical exertion, no breaks in between activities, occupation, working hours and stress. The association between risk and CVD was not possible due to the low prevalence of CVD among workers. *Conclusion*: SAMU 192 professionals of Porto Alegre/RS showed high prevalence of pain and CTD, and low prevalence of CVD.

Key-words: Emergency medical services; Pain; Cumulative trauma disorders; Cardiovascular diseases.

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RESUMO: *Objetivo:* identificar a prevalência de dor musculoesquelética, distúrbios osteomusculares relacionadas ao trabalho (Dort), doenças cardiovasculares (DCV) e fatores associados em profissionais do SAMU 192 em Porto Alegre/RS. *Métodos:* 113 trabalhadores (37% da equipe do SAMU de Porto Alegre) responderam a um questionário de hábitos relacionados ao trabalho, riscos ocupacionais e aparecimento de DCV e Dort. A análise estatística foi realizada com tabelas de frequência, teste qui-quadrado e razões de prevalência – intervalo de confiança de 95% (IC 95%) – por meio de análise multivariável (modelo de regressão de Poisson), com α=0,05. *Resultados:* Todos os participantes estavam na condição de sobrepeso e apresentavam alta prevalência de dor (92,9%) e Dort (50,4%) e baixa prevalência de DCV (8,8%). A idade contribuiu para o aumento no risco de aparecimento da dor. Os fatores associados ao aparecimento da Dort foram exposição a frio, calor e vibrações, esforço físico, ausência de pausa nas atividades, profissão, regime de trabalho e estresse. A ligação entre os fatores associados e DCV não foi possível devido à baixa prevalência de DCV entre os trabalhadores. *Conclusão*: os profissionais do SAMU apresentaram alta prevalência de dor e Dort e baixa prevalência de DCV.

Descritores: Serviços médicos de emergência; Dor; Transtornos traumáticos cumulativos; Doenças cardiovasculares.

This study is part of the Master's thesis of Fabiana de Oliveira Chaise, named *Fatores de riscos à saúde cardiovascular e osteomuscular relacionados aos hábitos, estilo de vida e ao trabalho em profissionais do Samu 192 de Porto Alegre/RS* (2015), conducted under the Graduate Program in Sciences of Human Movement of Universidade Federal do Rio Grande do Sul.

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INTRODUCTION

Prehospital emergency care consists of any care procedures performed, directly or indirectly, outside the hospital environment, seeking to preserve life and/or minimize sequelae[1]. In Brazil, this type of service is called *Serviço de Atendimento Móvel de Urgência* (Mobile Emergency Care Service – SAMU), being standardized in 2003 throughout the whole Brazilian territory[2]. Currently, 123,429,882 million inhabitants have access to SAMU in the country, which corresponds to a 65% coverage of the Brazilian population[3].

Risk is considered any possible, probable or foreseeable danger, inconvenience, damage or fatality. The concept of risk to worker's health represents the possibility of an adverse effect or damage to an individual or community's well-being[4]. Emergency care workers are exposed to several occupational risks, ranging from physical (noise and vibration), chemical (dust and gases), biological (viruses and bacteria), accidental (unprotected equipment and probability of automotive accident) and ergonomic (environmental conditions of work, such as intense physical effort and weight lifting, and their organization, such as rhythm and lack of pauses)[5].

In addition, there are psychosocial risks, which encompass relationships in the work environment, as well as subjective perceptions and experiences of workers regarding the environment and the work being performed[6,7]. Psychosocial risks produce psychic overload[4] – therefore, their evaluation considers the level of stress and its triggers, as well as the worker's experience in relation to his job dissatisfaction[7]. Commonly, these are contemplated within the group of ergonomic risks[4].

On the other hand, stress is a clinical picture in which there is a prolonged disproportion between the degree of tension of an individual and his capacity to support it, possibly triggering emotional disturbances[8]. In other words, stress is what happens when people face situations in which their behavioral set is insufficient for adaptation, usually occurring when demands exceed the skills[9]. As an example of factors that may trigger occupational stress, there is job dissatisfaction, work overload, decision making, and excessive pressure[8,9].

Cumulative Trauma Disorders (CTD) are very common in emergency care workers. CTD can be defined as:

> "Disorders that present as common characteristics: the appearance and evolution of insidiousness; complex multifactorial origin in which numerous causal factors interweave, among them repeated mechanical demands for prolonged periods of time; use of vibrating tools; forced positions; work organization factors, such as productivity requirements; competitiveness; and quality and production incentive programs. These use work intensification strategies and excessive control of workers, without considering their individual characteristics, personality traits and life history" (p. 425)[10].

The signs and symptoms of CTD are diverse: spontaneous pain or pain when moving; feelings of weakness, tiredness, numbness and/or tingling; and difficulty in using the limbs in daily activities. In addition, carefully investigating the location, intensity, manner and onset time of complaints and the duration and characterization of the time of evolution and identification of factors that contribute to the improvement or worsening of the condition is necessary[10].

One of the main causes of CTD onset is the excessive exposure to ergonomic risks[11,12] – although other factors may also be related to its emergence. On the other hand, cardiovascular diseases (CVD) are primarily associated with the early family history of the problem, obesity, sedentary lifestyle, ethnicity and psychosocial risks[13].

Thus, to meet work demands and the flow of care procedures, the SAMU worker needs some prerequisites, such as emotional balance and self-control, physical fitness for the job, ability to work as a team and willingness to comply with targeted actions[2]. In addition, the contact with the suffering and death of patients and the risks they are exposed to during the care procedure can negatively influence the mental health of these workers triggering stress[14].

The context of the SAMU of Porto Alegre falls within the international context of emergency care workers – and, to the best of our knowledge, there are no studies that specifically identify the health reality of this population. Thus, the objective of this study was to identify the prevalence of musculoskeletal pain, CTD and CVD, and to identify the associated factors in these professionals in the SAMU of the capital of the state of Rio Grande do Sul.

METHODOLOGY

This is a descriptive, cross-sectional, population-based study in which male and female workers of the SAMU of the city of Porto Alegre/RS, participated. Initially, the study project was presented to the general administrator

of the SAMU prehospital service, seeking authorization and collaboration. Following, after the coordinator showed interest, the researchers sought authorization from the Municipal Health Department of Porto Alegre to conduct the study. The authorization and cooperation from the Health Department were granted.

The initial contact with the reality of Samu workers occurred during the multiprofessional residency period in health of one of the researchers; this study comes from the master's project of this researcher, after the residency period. The study was further motivated by being conducted in a research group that investigates musculoskeletal pain and body posture.

The data collection period was conducted between March and December 2013. Workers were personally invited by the researchers in each of the decentralized SAMU bases. The collection followed the ethical standards required by the Brazilian Commission for Research Ethics and the Brazilian Health Council of the Ministry of Health (Conep/CNS/MS) and approved by the Research Ethics Committee of Universidade Federal do Rio Grande do Sul under No. 13186413.4.3001.5338. All workers voluntarily consented to participate in the study.

SAMU'S staff is composed of ambulance drivers, nursing technicians, nurses, emergency medical dispatcher and auxiliary dispatch phone operators (Tarm). All professionals were invited to participate in the study, and those who accepted the invitation were grouped for analysis purposes: mobile team (ambulance driver and nursing technician) and stationary team (nurse, medical dispatcher and Tarm). Employees who were on sickness or maternity leave during the data collection period and those who did not consent to participate in the study were excluded.

For data collection, a Brazilian questionnaire on work-related habits (QHT) was used. Content validity and reproducibility were confirmed in a previous study[15]. The QHT is an instrument composed of open and closed questions that seeks to investigate the universe of work considering aspects of working hours, occupational risks, stress in the work environment and onset of CVD and CTD.

Data related to three cores were extracted from the QHT: musculoskeletal pain, CVD and CTD. Regarding the presence or not of the latter two, this study was exclusively based on the participant's responses and not on clinical data or exams. For the CVD core, were investigated the self-report of these diseases and its associated factors, such as stress from work organization, smoking, alcohol consumption, sedentary lifestyle, obesity, systemic arterial hypertension and diabetes mellitus. For the musculoskeletal pain and CTD cores, were investigated the regions of pain, frequency and intensity in the past three months, the CTD presented and its associated factors, such as work organization, environmental factors and possible overloads of body parts.

Each Porto Alegre SAMU worker received a printed QHT with an Informed Consent Form from the researchers' hands. SAMU workers had seven days to return the filled questionnaires to the researchers. Participants were instructed to respond the questionnaire individually and to provide faithful answers to the questions, without communicating to other research participants.

All answers were coded and tabulated, being submitted to statistical analysis in the SPSS software, version 18. Descriptive statistics were used through frequency tables to describe workers' profiles. The chi-square test was used to verify the links between factors associated with CVD. Prevalence ratios (PR) and their respective 95% confidence intervals (95% CI) were also calculated using multivariate analysis, using Poisson's regression model. The significance level established was α=0.05.

RESULTS

Out of 300 questionnaires delivered to SAMU workers, 113 were returned to the researchers. Therefore, for analysis purposes, the studied population were 113 workers, representing 37% of the total number of SAMU workers in Porto Alegre.

Cardiovascular disorders (CVD)

The sociodemographic profile of SAMU workers indicated a predominance of male workers (63.6%) in the mobile team and female workers (72.2%) in the stationary team. Both presented body mass index (BMI)>25 kg/m^2, which is considered by the World Health Organization (WHO) as an index of overweight (Table 1). Most workers – 91.2% (n=103) – did not present CVD, and 8.8% (n=10) reported suffering from or have already suffered from heart failure, cardiac arrhythmia, infarction and stroke.

Table 1 – Sociodemographic profile of SAMU 192 workers from Porto Alegre/RS, divided by teams (mobile and stationary)

	Mobile team (n=77)	**Stationary team** (n=36)
Sex % (n)		
Male	63.6% (49)	27.8% (10)
Female	36.4% (28)	72.2% (26)
Age (years) $\bar{x}\bar{x}$(SD)	42.5 (±9.2)	39.4 (±9.3)
Height (m) $\bar{x}\bar{x}$(SD)	1.7 (±9.2)	1.63 (±8.3)
Body mass (kg) $\bar{x}\bar{x}$(SD)	79.4 (±17.4)	77.6 (±19.7)
BMI (kg/m²)	26.9 (±5.2)	27.8 (±7.5)
Schooling % (n)		
Complete elementary school	10.4% (8)	
Incomplete elementary school	5.2% (4)	
Complete high school	42.9% (33)	25% (9)
Incomplete high school	5,2% (2)	
Complete higher education	10.4% (8)	13.9% (5)
Incomplete higher education	22.1% (17)	5.6% (2)
Graduate education	3.9% (3)	50% (18)
Graduation studies in progress		5.6% (2)

Among workers, modifiable (smoking, sedentary lifestyle, BMI, hypertension, stress and diabetes), non-modifiable (heredity for coronary disease and age) and ergonomic (work regime and overtime) associated factors for CVD were identified. The occupational history of working time was also considered as an associated factor. Relating associated factors and CVD was not possible due to the low prevalence of CVD among the participants. Thus, connections between the associated factors themselves were made – however, only hypertension presented significant associations with other factors (Table 2).

Hypertension showed significant association with BMI, age and time working. Considering these associations, prevalence ratios showed that overweight participants were 13% more likely to present arterial hypertension than a worker in normal weight conditions. Regarding age, those over 40 years were 22% more likely to present hypertension than someone under this age group. Finally, with regard to the occupational history of time working, participants who worked for eleven years or more were 15% more likely to present hypertension than other professionals (Table 2).

Table 2 – Factors associated with systemic arterial hypertension, chi-square test (x^2) and prevalence ratios of SAMU 192 workers from Porto Alegre/RS

Associated factors	N (%)	Hypertension		
		N (%)	x^2	PR (95% CI)
BMI				
Normal	41 (36.3)	5 (4.9)	0.010*	1
Overweight	72 (63.7)	17 (23.6)		1.13 (0.77-1.65)
High cholesterol				
No	97 (85.8)	18 (18.6)	0.223	1
Yes	16 (14.2)	3 (6.2)		1.10 (0.80-1.55)
Age				
Up to 39 years	51 (45.1)	1 (2.0)	<0.001*	1
40 years or more	62 (54.9)	18 (29)		1.22 (0.85-1.75)
Smoking				
No	83 (73.5)	17 (20.5)	0.080	1
Yes	30 (26.5)	5 (6.7)		0.90 (0.59-1.36)
Sedentary lifestyle				
No	50 (44.2)	12 (24)	0.063	1
Yes	63 (55.8)	7 (11.1)		0.90 (0.64-1.27)
Diabetes				
No	104 (92)	16 (15.4)	0.167	1
Yes	9 (8)	5 (33.3)		1.05 (0.53-1.93)
Heredity				
No	60 (54.5)	10 (16.7)	0.925	1
Yes	50 (45.5)	8 (16)		0.99 (0.70-1.40)
Time working				
Up to ten years	82 (72.6)	10 (12.2)	0.033*	1
Eleven years or more	31 (27.4)	9 (29)		1.15 (0.65-1.65)
Working hours				
Less than 12 hours	26 (23)	5 (15.4)	0.824	1
12 hour work shift	87 (77)	15 (17.2)		1.01 (0.67-1.52)
Overtime				
No	19 (16.8)	3 (10.5)	0.422	1
Yes	94 (83.2)	17 (18.1)		1.06 (0.67-1.70)
Stress in decision making				
Not exposed to	14 (12.4)	4 (28.6)	0.209	1
Exposed to	99 (87.6)	15 (15.2)		0.91 (0.47-1.76)
Time and speed when performing work				
Not exposed to	9 (8)	2 (22.2)	0.651	1
Exposed to	104 (92)	17 (16.3)		0.94 (0.45-1.94)
Teamwork				
Not exposed to	19 (16.8)	5 (26.3)	0.225	1
Exposed to	94 (83.2)	14 (14.9)		0.92 (0.50-1.66)
Relationship with the administration				
Not exposed to	36 (31.9)	7 (19.4)	0.609	1
Exposed to	77 (68.1)	12 (15.6)		1.00 (0.63-1.58)
Payment				
Not exposed to	23 (20.4)	4 (13)	0.588	1
Exposed to	90 (79.6)	16 (17.8)		1.06 (0.65-1.71)
Working hours				
Not exposed to	28 (24.8)	5 (17.9)	0.865	1
Exposed to	85 (75.2)	14 (16.5)		1.03 (0.61-1.76)
Pressure for productivity				
Not exposed to	33 (29.2)	6 (18.2)	0.803	1
Exposed to	80 (70.8)	13 (16.2)		1.03 (0.64-1.66)
Sleep deprivation				
Not exposed to	26 (23)	5 (19.2)	0.707	1
Exposed to	87 (77)	14 (16.1)		0.94 (0.57-1.52)

*Significant association

Pain and CTD

Study results indicated that the working regime of all members of the mobile team (100%) was 12 hours, on duty; while most of the stationary team (72.2%) worked less than 12 hours a day. For both, most professionals were in the range of up to ten years of service, performed monthly overtime and had no other employment relationship. Regarding work accidents, the mobile team presented a higher frequency for more than one type of accident, while the stationary team presented a higher frequency for a single type of accident (Table 3) – namely, physical and moral aggression.

Table 3 – Occupational profile of SAMU 192 workers from Porto Alegre/RS, divided by teams (mobile and stationary)

	Mobile team (n=77)	**Stationary team** (n=36)
Working hours		
Less than 12 hours		72.2% (26)
12 hour shift	100% (77)	27.8% (10)
Work shift		
Morning		13.9% (5)
Afternoon		19.4% (7)
Night	33.8% (26)	5.6% (2)
Morning and Afternoon	45.5% (35)	22.2% (8)
Alternate	20.8% (16)	38.9% (14)
Time working		
Up to ten years	67.5% (52)	83.3% (30)
Eleven years or more	32.5% (25)	16.7% (6)
Overtime		
No	6.5% (5)	38.9% (14)
Yes	93.5% (72)	61.1% (22)
Monthly load (hours) $\bar{x}\bar{x}$(SD)[a]	173.8 (±37.6)	200.6 (±66.2)
Other work relationship		
No	84.4% (65)	58.3% (21)
Yes	15.6 (12)	41.7% (15)
Work-related accident		
One type[b]	45.5% (35)	83.3% (30)
More than one type[c]	54.5% (42)	16.7% (6)

[a] Monthly workload including overtime
[b] Type of work accident: contamination by chemical and biological substances, piercing material, physical and moral aggression, and automotive accident.
[c] Combination of more than one type of work accident among those described in [b]

The prevalence of musculoskeletal pain among Porto Alegre SAMU workers was 92.9% (n=105). The most affected regions of the body were the back and lower limbs (35.2%), the back (33.3%), and the back and upper limbs (17.1%). Regarding the frequency and intensity of musculoskeletal pain, the highest values were in the back region (33.3%, n=35) and back and lower limbs (35.2%, n=37). Regarding the intensity of pain, the region of the back (29.5%) and of the back and lower limbs (31.4%) presented a high prevalence of moderate and severe pain. There were no significant associations between pain and occupational variables – however, the sociodemographic

variable "age" had a significant connection (p=0.008) to pain, corresponding to 62 workers aged 39 years or older, 87.1% (n=54), who reported having it. Results indicate that those who were 39 years old or older were 6% more likely to develop musculoskeletal pain than workers of other age groups.

CTD prevalence was 50.4% (n=57) in workers of the Porto Alegre SAMU. CTD reported were wrist tendinopathy (39%), intervertebral disc displacement (11%), bursitis (7%) and tenosynovitis (3%).

In the mobile team, significant connections (p <0.05) were found between all associated factors described and CTD (Table 4). Prevalence reasons confirmed that such factors behave as a risk to workers. Physical (exposure to vibrations, such as the constant and loud noise of the ambulance siren and the excessive oscillation of the engine of these vehicles during transport) and ergonomic (e.g., lack of rest in between activities) risks must be highlighted: professionals who are exposed to these risks are 39% and 36% more likely, respectively, to develop CTD than workers who are not exposed to them. Given the fact that the stationary team was less exposed to CTD than the mobile team, it was considered that there is no risk of CTD for this group (PR=1).

CTD also had a significant association with musculoskeletal pain (p=0.02). Of the 105 workers who reported pain, 53.3% had some CTD. The results of the prevalence ratio indicate that those who had musculoskeletal pain were 36% more likely to have CTD than the others.

Table 4 – Factors associated with CTD, chi-square test (x^2) and prevalence ratios of the mobile team of SAMU 192 workers from Porto Alegre/RS

		CTD		
Associated factors	**N (%)**	**N (%)**	**x^2**	**PR (95% CI)**
Exposure to heat and cold				
Not exposed to	12 (9.8)	5 (36.4)	0.048*	1
Exposed to	101 (90.2)	53 (52.5)		1.036 (0.59-1.81)
Exposure to vibrations				
Not exposed to	22 (18.8)	4 (19)	0.010*	1
Exposed to	91 (81.2)	53 (58.2)		1.39 (0.95-1.11)
Physical Effort				
Not exposed to	15 (12.5)	5 (35.7)	0.018*	1
Exposed to	98 (87.5)	52 (53.1)		1.19 (0.73-1.95)
Breaks in between tasks/activities				
Never	99 (87.5)	55 (56.1)	0.003*	1.36 (0.81-2.28)
Always	14 (12.5)	5 (14.3)		1
Occupation				
Drivers and technicians	76 (67.9)	44 (57.9)	0.030*	1.16 (0.83-1.61)
Nurses, doctors and Tarm	36 (32.1)	13 (36.1)		1
Working hours				
Less than 12 hours	26 (23.2)	9 (34.6)	0.048*	1
12 hour shift	87 (76.8)	48 (55.8)		1.15 (0.79-1.67)
Stress, time and speed when performing work				
Not exposed to	12 (8)	7 (22.2)	0.070*	1
Exposed to	101 (92)	56 (53.4)		1.25 (0.68-2.30)

*Significant association

DISCUSSION

Regarding CVD, this study found that all workers are in the overweight condition (Table 1). A similar result was found in a previous study[16], which analyzed the prevalence of risk factors for CVD in paramedics, finding BMI>25 in 79% of the sample. When under the overweight condition, lipids circulating in the bloodstream in the form of triglycerides and cholesterol may increase, characterizing dyslipidemia and leading to cardiovascular events[12]. We must also highlight that in this study, 14.2% (n=16) of the workers reported having high cholesterol.

Dyslipidemia favors the deposition of low density lipoprotein on arterial walls, forming thickened and hardened lesions located in the intima layer of the arteries, called atherosclerotic plaque. These plaques may partially or totally obstruct the lumen of the arteries, causing an increase in systemic blood pressure and insufficient blood supply to organs and tissues[7]. The deposition of plaques, and aging, in which there is stiffening in the arteries, causes an increase in peripheral vascular resistance, leading to high blood pressure levels; thus, the combination of these two factors are known to lead to the susceptibility of development of hypertension and hypertrophic cardiopathies[17]. Given this context, this study found a significant association between overweight BMI and arterial hypertension and between ages over 40 years and arterial hypertension.

Occupational stress is an important associated factor for arterial hypertension[9]. Furthermore, the overload of stimuli during the periods of occupational activity functions as predisposition to an increase in cardiovascular activity, causing greater variability of blood pressure and higher blood pressure levels[8]. Although most workers are exposed to occupational stress and any of the variables that may represent it, no significant association with arterial hypertension was found in this study.

The association between arterial hypertension and time of work in SAMU was significant. These findings corroborate an earlier study[18], in which, in a 15-year cohort, it was observed that doctors of the *Hospital das Clínicas* of Goiás presented increased blood pressure, overweight and dyslipidemia. However, this data is related to the increase in age, since those who have worked for longer periods in SAMU also present increased age, something already related to arterial hypertension.

In a previous study[19], the presence of hypertension, dyslipidemia and stress was identified in health professionals of the University Hospital of *Universidade Federal de Santa Catarina*; in nurses and nursing technicians, it was concluded that stress, sedentary lifestyle, BMI, arterial hypertension and obesity are associated factors for the development of CVD[20]. The results of all these studies are in line with those from this study – however, among the professionals of SAMU, it was not evidenced that stress increases the risk of developing hypertension.

In this study, most workers stated that they did not have CVD, and only 8.8% of them reported the occurrence of the situation. We must note that the professionals who participated in this research are highly exposed to most of the factors associated with the onset of CVD, as confirmed in Table 2. Thus, we can speculate that, in the long term, these workers may develop some disease within this spectrum: the occupational and living habits of these workers would have to be followed for a longer period to detect this occurrence.

Regarding musculoskeletal pain in SAMU workers, the prevalence was high (92.9%), with higher preponderance on the back and lower limbs (35.2%) among all the other regions in the last three months. This result corroborates previous findings[8]: among 930 paramedics evaluated, 50.5% reported pain in the back and lower limbs. However, the relationship of pain and work activities was not confirmed in this, since the association was not significant.

Pain was significantly associated with age. Workers aged 39 years or more are 6% more likely to have .pain than the others, confirming the results of Studnek et al.[11], who observed a tendency to increase pain with advancing age. The first limitation of this study is the lack of research on the fact that the population above 39 years of age is also the one with the longest time working in this professional activity. Even then, among the workers who reported pain, half had a longer time working, while the other half did not. Thus, we can speculate that this factor does not seem to have influenced the result found.

A possible source of musculoskeletal pain is the handling of patients in the most diverse conditions, such as the removal of victims from inside vehicles and difficult to reach places, environments with restricted physical space, and the need to contain agitated patients, among others[12]. Kim et al.[21], when evaluating paramedics, found that 70% of musculoskeletal injuries are related to patient management. This study did not question SAMU workers about the origin of musculoskeletal pain or its possible relations. However, exposure to physical strain had a significant connection with CTD, being considered an associated factor for its appearance (Table 4).

The occurrence of CTD is related to the biomechanical risk of the developed task, in addition to the psychosocial and organizational risks related to the work[22]. Biomechanical risk, contemplated in ergonomic risks, comprises muscular adaptations and modifications that the body must perform

when responding to the biomechanical demands of a task, as well as the interaction between workload, repetitive effort, inadequate postures and vibration[10]. Organizational risks, also within ergonomic ones, refer to the aspects of the organization, supervision and accomplishment of the work. On the other hand, psychosocial risks are related to the subjective perceptions that a worker has of the organizational factors, and may demand psychological pressures[5]. Stress, related to time and speed in the accomplishment of the task, was identified as an associated factor for CTD (Table 3). This is believed to be related to a) the demand generated by the patient, who uses the health care provided by the workers, and b) the purpose of prehospital care, which is to reach the victim as soon as possible after the occurrence of some impairment to their health and provide appropriate resolubility to the case[23]. Gallagher & McGilloway[24] argue that the time pressure to perform tasks can have an effect on the physical and mental health of workers.

We must note that job satisfaction seems to exert fundamental influence on workers. Dissatisfaction can result from feelings of indignity – due to the obligation of performing an uninteresting and meaningless task –, uselessness – due to not knowing what one's work represents in the whole of the activities in the company – and disqualification – both due to payment issues and due to the valuation of work, in aspects such as responsibility, risk or required knowledge[6]. Therefore, worker's health is related to the congruent relationship between the structure, functioning of organizations and the well-being of the people who work in them[22].

Furthermore, work regime was another variable that behaved as a risk for CTD: those who work a 12-hour shift are 15% more likely to develop them than other workers. In addition, the increase in hours worked impacts productivity – a previous study has reported[25] that increasing the workload to more than 8 hours a day decreases worker productivity. Although the productivity of SAMU workers has not been evaluated in this research, we highlight the need for the thorough investigation of this issue. The lack of breaks in between activities was also identified as a factor associated with CTD in this study (Table 4). When evaluating the factors associated with musculoskeletal injuries, Broniecki et al.[26] identified that ambulance workers were more likely to have an injury because they were not able to take sufficient breaks during work hours.

CTD reported by the SAMU workers were tendinopathy, bursitis, tenosynovitis and intervertebral disc displacement. Such high incidence of wrist tendinopathy (39%) is speculated to be caused by the excessive vibration of the vehicle engine and the speed used for emergencies, the physical effort and the lack of breaks among drivers and technicians, for example. This reality may cause negative impacts on the Brazilian Unified Health System (SUS) in the medium-term, and must be considered in the proposition of actions that minimize the risks inherent to these professions.

A second limitation of this study is the fact that the health conditions were reported by the participants, not obtained through laboratory tests and/or medical evaluations, which may have impaired the results for CVD. However, data collection through self-report of those being investigated is common in this type of study. Nevertheless, the use of a questionnaire as the only data collection source is in fact a limitation insofar as the individual filling of the questionnaires and the non-communication between participants were not controlled; moreover, the questionnaire did not use adequate scales for stress assessment, and mental disorders were informed in an open question, and options of the different types of disorders were not explicitly offered for the participant to indicate. An interesting option to overcome this limitation would be to associate the use of the QHT questionnaire with the conduction of individual interviews and/or the inclusion of open and descriptive questions. This strategy would help to clarify some of the factors related to organizational and psychosocial aspects – but mainly, it would provide information for the understanding of the causes and possibilities of change of harmful factors to workers' health, as well as the strategies used by them to stay healthy.

A third limitation of the study is the lack of complementary information on the organizational and psychodynamic aspects of work, given that these seem to be one of the occupational risks that influence the health of SAMU workers the most.

Finally, it is important to highlight the need for further studies and deepening of the harmful aspects related to work in SAMU professionals, since these studies can subsidize intervention actions conducted by health services. Thus, studies that identify the prevalence and the harmful agents related to work point to a rich field yet to be studied.

The formulation of intervention strategies starts with an ergonomic analysis of labor – through a constructive and participatory process for the resolution of complex problems –, a study of the population of workers and an examination of complaints and dissatisfactions[5]. The results of this study showed the preponderance of pain, CTD and CVD and the associated factors that influence the health of SAMU professionals, contributing both to foment intervention actions and to academic debate. These results should aid in the knowledge about the reality of these professionals and in the understanding of their dissatisfactions, which

are initial requirements when seeking means to transform this type of work.

Given this context, we comprehend that from the initial evaluation given by the results of this study, the general administration of the SAMU prehospital service, in a joint action with the Municipal Health Department, may consider interventions to assist the functioning of the team. In other words, actions aimed at discussing the organization and satisfaction at work can be implemented, avoiding new cases and the aggravation cases that already exist. These actions can be spaces for discussion, individual and collective therapy, occupational gymnastics, training on occupational risks and their prevention and review of the workload of each worker, among others. In addition, the need for transformation in the conditions of work organization and all other aspects that are contributing to the sickness of this population are evident when researching this theme. It should be noted that the results of this study have already been presented to the workers in each of the decentralized bases, as well as the to the SAMU administration and staff, as an initial health promotion action.

CONCLUSION

It was concluded that the professionals of SAMU 192 of Porto Alegre/RS presented high prevalence of pain (92.9%) and CTD (50.4%) and low CVD prevalence (8.8%). Age acted as a factor associated with the onset of pain. The risks associated with the onset of CTD were physical (exposure to cold, heat and vibrations), ergonomic (physical exertion, lack of breaks in between activities, profession and work regime) and stress.

Relating associated factors and CVD was not possible due to the low prevalence of CVD among the participants. Considering the relationships between the associated factors, arterial hypertension had a significant association with BMI, age and time working. Furthermore, factors associated with stress were considered: the profession (ambulance driver and nursing technician), all variables that involve pressure for productivity and all variables that involve sleep deprivation. However, it should be noted that the study of risks and associated factors that contribute to the illness of the SAMU team requires further research.

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