

RISK PERCEPTION AMONG WORKERS WITH PREVIOUS OCCUPATIONAL ACCIDENTS IN PRE-HOSPITAL SETTINGS

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ABSTRACT

Objective: to identify the risk perception of workers with previous occupational accidents in Mobile Emergency Care Services.

Method: this quantitative and analytical study with a cross-sectional design was conducted with 265 professionals working in pre-hospital settings from 57 cities in the state of Rio Grande do Sul, Brazil. An online questionnaire addressed sociodemographic characteristics, previous occupational accidents and the workers' occupational risk perceptions rated on a five-point Likert scale. The analysis included descriptive statistics, mean, standard deviation, median, and associations were verified using the Mann-Whitney test; the level of significance was established at $p < 0.05$.

Results: the occupational risks the workers more frequently reported were: exposure to blood (4.43); exposure to contaminated secretion/excretion (4.36); contact and handling of hygienization products (4.28); exposure to bacteria (4.25); lifting and transporting heavy loads (4.25); and exposure to viruses (4.23). A significant association was found between the risk perception of workers with previous occupational accidents and chemical ($p=0.001$), physical ($p=0.006$), ergonomic or psychological ($p=0.000$) risks, and accidents ($p=0.000$).

Conclusion: association between the risk perception of workers who had previously experienced occupational accidents was significant, suggesting that workers may not identify or trivialize risks before they experience an accident. Therefore, actions are needed to encourage changes in behavior so that workers identify risks and prevent occupational accidents, such as adopting personal and collective protective equipment and improving the work conditions in pre-hospital settings.

DESCRIPTORS: Prehospital care. Accidents, Occupational. Ambulances. Occupational risks. Workers.

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PERCEPÇÃO DE RISCOS ENTRE TRABALHADORES QUE SOFRERAM ACIDENTES DE TRABALHO NO AMBIENTE PRÉ-HOSPITALAR

RESUMO

Objetivo: identificar a percepção de risco entre trabalhadores que sofreram acidentes de trabalho no Serviço de Atendimento Móvel de Urgência.

Método: estudo quantitativo e analítico, com delineamento transversal, realizado com 265 trabalhadores atuantes em ambiente pré-hospitalar em 57 municípios no estado do Rio Grande do Sul, Brasil, por meio de um questionário *online* contendo variáveis acerca das características sociodemográficas, ocorrência de acidentes de trabalho e percepção de riscos ocupacionais, avaliada com escala Likert de cinco pontos. Para análise, utilizaram-se estatísticas descritivas, média, desvio padrão, mediana e o teste de associação Mann-Whitney com nível de significância estatística de $p < 0,05$.

Resultados: os principais riscos ocupacionais identificados pelos trabalhadores foram: exposição a sangue (4,43); exposição à secreção/excreção contaminada (4,36); manuseio e contato com produtos de higienização (4,28); exposição a bactérias (4,25); levantamento e transporte manual de peso (4,25); e exposição a vírus (4,23). Verificou-se associação significativa de percepção de risco entre os trabalhadores que sofreram e os que não sofreram acidentes de trabalho para os riscos químicos ($p=0,001$), físicos ($p=0,006$), ergonômicos ou psicológicos ($p=0,000$) e de acidentes ($p=0,000$).

Conclusão: a identificação da percepção de riscos ocupacionais entre trabalhadores que sofreram acidentes de trabalho mostrou-se significativa, o que pode sugerir que antes de sofrer o acidente os trabalhadores podem não identificar ou banalizar o risco. Dessa forma, são necessárias ações que incentivam mudanças de comportamentos para identificação do risco e prevenção do acidente de trabalho, como a utilização de equipamento de proteção individual e coletiva e melhoria das condições de trabalho no ambiente pré-hospitalar.

DESCRITORES: Assistência pré-hospitalar. Acidentes de trabalho. Ambulância. Riscos ocupacionais. Trabalhadores.

PERCEPCIÓN DE RIESGOS ENTRE TRABAJADORES QUE SUFRIERON ACCIDENTES DE TRABAJO EN AMBIENTE PREHOSPITALARIO

RESUMEN

Objetivo: identificar la percepción de riesgo entre trabajadores que sufrieron accidentes de trabajo en el Servicio de Atención Móvil de Emergencia.

Método: estudio cuantitativo y analítico, con delineamiento transversal, realizado en 265 trabajadores actuantes en ambiente prehospitalario, en 57 municipios en el estado de Rio Grande del Sur, en Brasil, por medio de un cuestionario *online* que contenía variables acerca de las características sociodemográficas, la ocurrencia de accidentes de trabajo y la percepción de riesgos ocupacionales; esta fue evaluada con escala Likert de cinco puntos. Para el análisis, se utilizaron la estadística descriptiva, la media, la desviación estándar, la mediana y el test de asociación Mann-Whitney con nivel de significación estadístico de $p < 0,05$.

Resultados: los principales riesgos ocupacionales identificados por los trabajadores fueron: exposición a sangre (4,43); exposición a secreción/excreción contaminada (4,36); manoseo y contacto con productos de higienización (4,28); exposición a bacterias (4,25); levantamiento y transporte manual de peso (4,25); y exposición a virus (4,23). Se verificó asociación significativa de la percepción de riesgo, entre los trabajadores que sufrieron y los que no sufrieron accidentes de trabajo, con riesgos químicos ($p=0,001$), físicos ($p=0,006$), ergonómicos o psicológicos ($p=0,000$) y de accidentes ($p=0,000$).

Conclusión: la identificación de la percepción de riesgos ocupacionales, entre trabajadores que sufrieron accidentes de trabajo, se mostró significativa, lo que puede sugerir que antes de sufrir el accidente los trabajadores podrían no haber identificado o banalizado el riesgo. De esa forma, son necesarias realizar acciones que incentiven cambios de comportamiento para identificación del riesgo y prevención de accidentes de trabajo; por ejemplo, la utilización de equipamientos de protección individual y colectiva y la mejoría de las condiciones de trabajo en el ambiente prehospitalario.

DESCRIPTORES: Asistencia prehospitalaria. Accidentes de trabajo. Ambulancias. Riesgos laborales. Trabajadores.



INTRODUCTION

In Brazil, the *Serviço de Atendimento Móvel de Urgência* (SAMU) [Mobile Emergency Care Service] is intended to provide urgent or emergency care to the population to avoid suffering, sequelae, or even death. This service accesses victims in the most different sites such as homes, workplaces, and public roads to provide pre-hospital care.¹

Health workers providing pre-hospital care deserve special attention due to the particularities in which health care actions are performed, which expose them to occupational risks. The specificities of the care provided by health workers in pre-hospital settings expose them to various risks that contribute to illnesses, occupational accidents, and even death.²

According to the Brazilian Ministry of Labor and Employment, occupational risks include exposure to physical, chemical or biological agents as well as ergonomic/psychological risks and accidents, which are also considered in the development of the *Programa de Prevenção de Riscos Ambientais* [Environmental Risk Prevention Program].³

SAMU workers are more frequently exposed to occupational risks than those in hospital settings because their work processes involves providing care to victims at different locations and under the most varied circumstances. Consequently, workers are frequently subject to physical, chemical, biological, ergonomic, or psychosocial risks and accidents while providing direct and indirect care to patients.⁴

Health workers perceive occupational risks during work processes and understand that these risks are inherent to the type of professional activity they perform. This perception involves ergonomic risks, such as intense physical strain, chemical risks such as manipulating medications, and the risk of accidents, such as falls.⁵

Nursing workers note they have to improvise when providing care and experience a feeling of vulnerability, while the risks faced during activities become trivialized. Hence, information regarding exposure to occupational risks, their consequences, and safety measures need to be constantly reinforced.⁶

Considering the particularities of the work performed in a pre-hospital setting, the presence of occupational risks, and the occurrence of occupational accidents among professionals working in Mobile Emergency Care Services, this study poses the following question: what is the risk perception of workers with a previous experience with occupational accidents in the Mobile Emergency Care Service? The objective was to identify the risk perception of workers with a previous experience with occupational accidents in the Mobile Emergency Care Service.

METHOD

Qualitative and analytical study with a cross-sectional design. The SAMU 192 in the state of Rio Grande do Sul provides care to 262 cities distributed according to the regulation centers: State Central, which serves 139 bases that correspond to 243 cities; the Pelotas Regional Central, which serves 11 bases in 11 cities; Bagé Regional Central, responsible for five bases and five cities; Caxias do Sul Regional Central, which serves two bases in two cities; and Porto Alegre Municipal Central, which exclusively serves the city of Porto Alegre.

A total of 57 cities participated in this study. These cities' population comprises 1,352 workers, divided according to profession: drivers of emergency vehicles, nursing technicians and aides, nurses, and physicians. The sample size was calculated using EPI InfoTM 7, with a confidence level established at 90% and the error margin at 5%, so that a minimal sample of 225 participants was obtained.

Inclusion criteria were workers with an employment contract with the Mobile Emergency Care Service and providing care to patients through mobile units. Those exclusively working in administrative roles or the Medical Regulation Centrals were excluded.

Data were collected online from January 2016 to November 2017 using a digital form developed in the Google Forms. The form was sent to each of the workers' emails provided by the cities' local coordinators.

The form addressed the workers' sociodemographic characteristics, the occurrence of occupational accidents and risk perception regarding exposure to occupational risks in the workplace, among which chemical, physical, biological, ergonomic/psychological risks and accidents. This variable was rated on a five-point Likert scale (1-Never; 2-Rarely; 3-Sometimes; 4-Frequently; 5-Always).

A non-probabilistic convenience sample was composed of 256 workers distributed in mesoregions, according to Table 1.

Table 1 – Distribution of the participants according to the mesoregion of origin. Rio Grande, RS, Brazil, 2018. (n=265).

Variable	n	(%)
Mesoregion		
Mid-Western Ri-Grandense	12	4.5
Mid-Eastern Rio-Grandense	20	7.5
Metropolitana area of Porto Alegre	43	16.2
Northeast Rio-Grandense	52	19.6
Northwest Rio-Grandense	28	10.6
Southeast Rio-Grandense	93	35.1
Southwest Rio-Grandense	17	6.4

Microsoft Excel 2013 was used to tabulate data using double entry, and the Statistical Package for the Social Sciences version 24 was used for the statistical analyzes. Descriptive statistical analyzes were used, such as absolute frequency and percentage for sex, age range, and profession, while mean, standard deviation, and median were identified for the workers' occupational risk perception.

The Kolmogorov-Smirnow test ($p=0.009$) was used to verify the normality of data, and an asymmetric distribution was found. Hence, the Mann-Whitney non-parametric test was used to verify the association between the workers' risk perception and sex, occupational risk perception and the occurrence/non-occurrence of occupational accidents, and between types of occupational risks and occurrence/non-occurrence of occupational accidents. The level of statistical significance was established at $p<0.05$ for all the tests.

The study was developed with the co-participation of the State Health Secretariat of Rio Grande do Sul through the State Regulation Department of SAMU 192. Ethical aspects were complied with according to Resolution 466/12.

RESULTS

According to Table 2, 53.6% of the 265 study participants were men aged between 30 and 45. As for their professions, most were nurses (32.8%), followed by nursing technicians and aides (31.3%).

Table 2 – Description of the workers' sociodemographic characteristics. Rio Grande, RS, Brazil, 2018. (n=265).

Sociodemographic characteristics		n	(%)
Sex			
	Male	142	53.6
	Female	123	46.4
Age range			
	≤29	31	11.7
	30 to 45	198	74.7
	≥46	36	13.6
Profession			
	Ambulance drivers	72	27.2
	Motorlance drivers	04	1.5
	Nursing technicians or aides	83	31.3
	Nurses	87	32.8
	Physicians	19	7.2

A statistically significant association was found between sex and occupational risk perception concerning the handling and contact with medications and solutions ($p=0.021$), exposure to vibration ($p=0.021$), anxiety ($p=0.006$), psychological exhaustion ($p=0.012$), physical exhaustion ($p=0.045$), accidents with electricity ($p=0.032$), risk of fire and explosion ($p=0.012$), accidents with animals ($p=0.026$), and traffic accidents ($p=0.025$).

Table 3 presents the perceptions of workers regarding exposure to occupational risks in a pre-hospital setting. Note that the workers report they are frequently exposed to contaminated secretion/excretion (4.36) and blood (4.43), have to lift and transport heavy loads (4.25), are exposed to bacteria (4.25), have contact and handle hygienization products (4.28), handle medications and solutions (4.23), are exposed to viruses (4.23), are subject to intense physical strain (4.03), and work during the night shift and according to rotational shiftwork (4.00). Significant statistical association was also found between the risk perception of workers with previous experience with occupational accidents and chemical ($p=0.001$), physical ($p=0.006$), ergonomic or psychological ($p=0.000$) risks, and accidents ($p=0.000$).

Statistical association was also found between workers with previous experience with occupational accidents and risk perception regarding having contact and handling hygienization products (median=5.0; $p=0.000$); occupational accidents and exposure to excessive noise (median=4.0; $p=0.005$); occupational accidents and exposure to bacilli (median=4.0; $p=0.017$); occupational accidents and long working hours (median=4.0; $p=0.000$); occupational accidents and stress (median=4.0; $p=0.000$); occupational accidents and inadequate lighting, anxiety, physical exhaustion and psychological exhaustion (median=3.0; $p=0.000$); occupational accidents and physical arrangement, traffic accidents, and physical aggressions (median=3.0; $p=0.000$) (Table 3).

Table 3 – Occupational risk perceptions of workers with/without previous experience with occupational accidents. Rio Grande, RS, Brazil, 2018. (n=265).

	Occupational Risks	Occupational accidents		
		Mean(\pm sd)	Median	p
Chemical				0.001
	Exposure to dust	3.71(0.98)	4.0	0.176
	Exposure to fumes	2.85(1.08)	3.0	0.052
	Exposição to mists	2.92(1.01)	3.0	0.020
	Exposição to gases	2.19(1.07)	2.0	0.407
	Exposição to exhaust	2.43(1.09)	2.0	0.206
	Exposição to chemical substances, compounds, and products in general	2.77(1.12)	3.0	0.001
	Handling and contact with medication and solutions	4.23(1.02)	5.0	0.053
	Handling and contact with hygienization products	4.28(0.92)	5.0	0.000
Physical				0.006
	Exposure to cold	3.83(0.77)	4.0	0.011
	Exposure to heat	3.85(0.78)	4.0	0.011
	Exposure to rain	3.78(0.74)	4.0	0.037
	Exposure to humidity	3.75(0.80)	4.0	0.024
	Exposure to vibration	3.68(1.11)		0.012
	Exposure to abnormal pressure	2.57(1.25)	2.0	0.384
	Exposure to excessive noise	3.88(1.07)	4.0	0.005
Biological				0.167
	Exposure to viruses	4.24(0.81)	4.0	0.088
	Exposure to bacteria	4.25(0.85)	4.0	0.637
	Exposure to protozoa	3.36(1.19)	3.0	0.309
	Exposure to fungi	3.53(1.13)	4.0	0.320
	Exposure to parasites	3.40(1.18)	3.0	0.699
	Exposure to bacilli	3.74(1.01)	4.0	0.017
	Exposure to blood	4.43(0.65)	5.0	0.261
	Exposure to contaminated secretion/excretions	4.36(0.69)	4.0	0.098
Ergonomic/ Psychosocial				0.000
	Intense physical effort	4.03(0.82)	4.0	0.002
	Lifting and transporting heavy loads	4.25(0.80)	4.0	0.011
	Inappropriate postures	3.82(0.86)	4.0	0.001
	Strict productivity control	2.92(1.25)	3.0	0.751
	Accelerated rhythm of work	2.92(1.20)	3.0	0.071
	Night shift and rotational shiftwork	4.00(0.99)	4.0	0.171
	Long working hours	3.43(1.15)	4.0	0.000
	Monotony and repeatability	2.77(1.21)	3.0	0.246
	Stress	3.59(1.09)	4.0	0.000
	Work overload	3.12(1.18)	3.0	0.003

Table 3 – Cont.

	Occupational Risks		Occupational accidents
	Mean(\pm sd)	Median	p
Inappropriate lighting	3.17(1.11)	3.0	0.000
Anxiety	3.18(1.10)	3.0	0.000
Physical exhaustion	3.03(1.09)	3.0	0.000
Psychological exhaustion	2.82(1.18)	3.0	0.000
Accidents			0.000
Inadequate physical arrangement	2.77(1.15)	3.0	0.000
Using machinery and equipment without protection	2.17(1.07)	2.0	0.007
Defective equipment	2.29(1.03)	2.0	0.004
Accidents with electricity	2.09(1.01)	2.0	0.158
Fire/explosion probability	2.62(1.03)	3.0	0.278
Inappropriate storage of materials and equipment	2.09(1.03)	2.0	0.020
Accidents with animals	2.51(1.11)	2.0	0.002
Traffic accidents	3.20(1.45)	3.0	0.000
Physical aggressions	3.01(1.22)	3.0	0.000
Needlestick accidents	3.23(1.38)	3.0	0.002
Pedestrian crashes on the site	2.86(1.43)	3.0	0.058
Falls	3.04(1.23)	3.0	0.067
Rescue from heights	2.31(1.05)	2.0	0.646
Rope lifting	2.00(0.92)	2.0	0.678

DISCUSSION

According to the workers' sociodemographic characteristics, 53.6% were men aged between 30 and 45. As for the workers' professions, most were nurses (32.8%), followed by nursing technicians and aides (31.3%). A similar study addressing 162 workers also verified a higher number of men (74.7%), aged between 31 and 40, while most were drivers (46.3%), followed by nursing technicians (33.9%), physicians (13.0%), and nurses (6.8%).⁷ Attention is paid to the participants' professions because most of the SAMU ambulances provide basic life support, which requires a driver and a nursing technician.⁴

The workers more frequently reported the following occupational risks in pre-hospital settings: exposure to contaminated secretion/excretion; exposure to blood; lifting and carrying heavy loads; exposure to bacteria; having contact and handling hygienization products; contact with medications and solutions; exposure to viruses; intense physical effort; working night shifts and according to rotational shiftwork. These risks are related to the characteristics of the care provided, which mainly involve male victims.⁸⁻¹⁰ External causes stand out, following by risks of clinical nature. Among the equipment reported are rigid stretchers, cervical collar, splint with traction, dressings, and medication administration.⁸ Regarding work shifts, the night shift, between 6 pm and 5:59 am, presents that highest number of calls, following by the afternoon and morning shifts.⁹

This study reveals workers perceive various risks, among which chemical risks, such as exposure to and handling of medications, hygienization products, and dust. The chemical risks reported by other studies addressing SAMU workers include fumes/exhaust, chemical products, medications, and dust.⁴⁻⁷

A statistically significant association was found between the risk of handling and having contact with hygienization products and occupational accidents and between the risk of exposure to chemical products and occupational accidents. Note that sodium hypochlorite and glutaraldehyde products used to clean and disinfect surfaces and material used during and after care delivery are present in these workers' daily routine, exposing them to the risk of contamination.²

Regarding physical risks, especially those related to the elements (e.g., rain, cold, and heat), humidity, and vibration are reported by workers as being frequently present in pre-hospital settings and were statistically associated with occupational accidents. The work performed in a pre-hospital setting exposes workers to inclement weather, compromising health care delivery, resulting in stressful and challenging situations.¹¹

A statistical association was also found between loud noise and occupational accidents. The care developed by SAMU workers requires the use of an ambulance, which means workers are regularly exposed to loud noise, mainly due to the ambulance siren. Exposure to noise above 80Db can compromise the workers' hearing acuity. Even when exposed to lower levels of noise, hearing wear may compromise concentration and communication during the work process.¹²

The workers also perceived ergonomic/psychosocial risks such as intense physical effort, lifting and transporting heavyweights, working during the night shift, and according to rotational shiftwork, working in inappropriate postures, and stress. Another study also reports that the work performed by SAMU workers are subject to ergonomic/psychosocial risks, intense physical strain, the lifting and transporting of heavy loads, and inappropriate posture when providing care to patients, in addition to stress, which is inherent to this work.⁴

A statistical association was found between ergonomic/psychosocial risks and occupational accidents and between stress and occupational accidents. One study addressing occupational risk perception reports that stress, an accelerated rhythm of work, and excessive workload are conditions that predispose workers to accidents.¹³

Regarding the perception of biological risks, the workers report they are regularly exposed to blood, contaminated secretions/excretions, viruses, and bacteria. Indeed, a statistically significant association was found between exposure to bacilli and occupational accidents. Exposure to biological risks stands out in the work performed in pre-hospital settings considering that workers are often exposed to patients' blood when providing care. A total of 3,185 calls were reported from January to April 2014 by the SAMU in Rio Grande do Norte, Brazil, among which: 1,473 were clinical patients, 1,454 traumas, 79 obstetric patients, and 180 psychiatric patients.⁹ Biological risks represent a high rate of occupational accidents related to the type of activity.¹⁴

The workers report that the most frequent accidents are needlestick injuries and traffic accidents. A statistical association was found between occupational accidents with inappropriate physical arrangements, the use of machinery or equipment without protection, defective equipment, and accidents with animals, traffic accidents, needlestick accidents, and physical assaults. The type of service provided in pre-hospital settings exposes workers to work conditions that may lead to accident risks. The leading causes for patients requiring pre-hospital care include external causes such as pedestrian crashes, physical aggressions, gunshot injuries, motorcycle accidents, falls, and car crashes.¹⁰

As for accidents involving commuting, a study addressing records of occupational accidents among workers of the United States emergency service reports that the site where care is provided and traffic represents an important share of the accidents reported.¹¹ Therefore, it is necessary to encourage workers to recognize the risks present in the work environment and remain attentive to working conditions and adopt safety measures.¹²

Given the intense work demands, the accelerated rhythm of work, unpredictability of situations in which care is provided, standard precautions are characterized as one of the primary measures to avoid exposure to occupational risks. However, workers are continually facing risk situations and present risk behaviors. Even though protection means are available, workers need to be sensitized and become co-responsible for adopting safety devices.⁶

Workers should be encouraged to use personal protective equipment such as hearing protectors to prevent damage accruing from the loud siren noise; drivers should take defensive driving courses to avoid traffic accidents; receive psychological support and learn relaxation techniques to minimize stress and musculoskeletal diseases.⁴

CONCLUSION

This study shows a significant association between the risk perceptions of workers with previous experience with occupational accidents in the Mobile Emergency Care Service, suggesting these workers pay greater attention to the presence and exposure to occupational risks, which they previously did not perceive or trivialized. Therefore, actions are needed to promote workers' health in pre-hospital settings, emphasizing the different occupational risks present in their work routine, which may lead to occupational accidents and potential sick leaves.

Additionally, actions are needed to encourage changes of behavior, so workers identify risks and prevent occupational accidents, such as the use of personal and collective protective equipment; improving work conditions in the pre-hospital setting such as the physical infrastructure, providing material resources and equipment in sufficient quantities and serviceable condition, in addition to adequate staffing.

This study's limitations include a difficulty accessing the population during data collection, though the use of technology and social networking has advanced in the field of research. Even though the municipal health departments and the managers of the Mobile Emergency Care Service were previously contacted to obtain the workers' emails, digital access to the SAMU workers was restricted. Thus, workers from cities in the interior and metropolitan region of Rio Grande do Sul had problems to participate.

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NOTES

ORIGIN OF THE ARTICLE

Article extracted from the thesis - *Riscos ocupacionais e acidentes de trabalho entre trabalhadores do serviço de atendimento móvel de urgência (SAMU 192): um estudo no estado do Rio Grande do Sul*, presented to the Post-graduation Program of the Nursing at *Universidade Federal do Rio Grande*, in 2018.

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Discussion of the results: Goulart LS, Rocha LP, Carvalho DP.

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APPROVAL OF ETHICS COMMITTEE IN RESEARCH

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CONFLICT OF INTEREST

There is no conflict of interest.

HISTORICAL

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