

## OCCUPATIONAL ACCIDENTS AMONG AMBULANCE DRIVERS IN THE EMERGENCY RELIEF<sup>1</sup>

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*We analyzed the occurrence of occupational accidents (OA) among ambulance drivers in Emergency Relief (ER), with a view to disclosing the types of events and their causes. A quantitative-qualitative study was carried out through the interview of 22 workers in a city in São Paulo, Brazil. The subjects were male, between 36 and 40 years old (40.9%), married (81.82%), with uncompleted primary education (40.9%), individual (90.9%) and family (54.55%) income between two and four Brazilian minimum wages, not performing any other paid occupation (45.45%). The majority of the OA were typical, due to an excess of exercises and vigorous and repeated movements (42.11%) and aggression through body strength and other means (26.33%). The OA occurs mainly because drivers carry out tasks that do not suit their professional formation.*

*DESCRIPTORS: work; accidents, occupational; ambulances; emergency relief; emergency medical services*

## ACCIDENTES DEL TRABAJO DE CONDUCTORES DE AMBULANCIA QUE BRINDAN ATENCIÓN DE URGENCIA

*Fue estudiada la frecuencia de accidentes del trabajo (AT) con chóferes de ambulancia que brinda Atención de Urgencia (AU), buscando encontrar los tipos de accidentes y sus causas. La investigación fue cuanti-cualitativa, para lo cual fueron entrevistados 22 trabajadores de una ciudad en el Estado de São Paulo. Los sujetos eran de sexo masculino, con edades entre 36 y 40 años (40,9%), casados (81,82%), con educación primaria incompleta (40,9%), sueldo individual (90,9%), sueldo familiar (54,55%) entre dos y cuatro sueldos mínimos y sin otra ocupación (45,45%). La gran mayoría de los AT fueron típicos, por exceso de ejercicios, movimientos enérgicos y repetidos (42,11%) y daño por fuerza corporal y otras formas (26,33%). Los AT se dieron principalmente porque los chóferes realizaban actividades que no iban de acuerdo con su formación profesional.*

*DESCRIPTORES: trabajo; accidentes de trabajo; ambulancias; socorro de urgencia; servicios médicos de urgencia*

## ACIDENTES DE TRABALHO COM MOTORISTAS DE AMBULÂNCIAS QUE REALIZAM SOCORRO DE URGÊNCIA

*Estudou-se a ocorrência de acidentes de trabalho (AT) com motoristas de ambulância que realizam Socorro de Urgência (SU), buscando evidenciar os tipos desses eventos e suas causas. A investigação foi quanti-qualitativa, entrevistando-se 22 trabalhadores que atuam em uma cidade paulista. Os sujeitos eram masculinos, com idade entre 36 e 40 anos (40,9%), casados (81,82%), com Ensino Fundamental incompleto (40,9%), renda individual (90,9%) e familiar (54,55%) entre dois e quatro salários mínimos e sem outra ocupação (45,45%). A maioria dos AT foram típicos, por excesso de exercícios e movimentos vigorosos e repetidos (42,11%) e agressão por meio de força corporal e outros meios (26,33%). Os AT ocorrem, principalmente, porque os motoristas executam tarefas não condizentes com a sua formação profissional.*

*DESCRIPTORES: trabalho; acidentes de trabalho; ambulâncias; socorro de urgência; serviços médicos de emergência*

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## INTRODUCTION AND OBJECTIVES

**D**uring practical teaching of college students in Emergency Care (EC) situations, we empirically observed the work of drivers from an Ambulance Central (AC) in the interior of São Paulo State, Brazil. Classified under code CBO: 9-85.90 in the Brazilian Job Classification into "other drivers of automobiles, buses, trucks and similar vehicles"<sup>(1)</sup>, they drive ambulances to transport patients to health services and, moreover, carry out EC, in most cases alone and without any Professional preparation for this purpose. Therefore, they are known in the region as emergency drivers (ED).

The observations revealed that they are exposed to different occupational risk situations/factors, including the possibility of suffering Occupational Accidents (OA). These events occur due to job practice, at the service of the company, or due to the realization of special insureds' work, provoking physical injuries or functional disorders that can cause death, permanent or temporary loss or decrease of work capacity. Although it is known that they have to be notified, reality has shown that they are insufficiently notified, which ends up limiting research and knowledge about these accidents<sup>(2)</sup>. The less professionally prepared the workers are to perform their tasks, the greater the possibility of suffering OA.

Studies on OA among ambulance drivers are scarce. However, research has been done on professional drivers, addressing the unsafe conditions in which they drive the vehicles<sup>(3)</sup>, the importance of drunk driving as an accident cause<sup>(4)</sup>, the non acknowledgement of their work, the need to drive on inappropriate roads and being subject to criminality and violence<sup>(5)</sup>, the risk of accidents due to sleepiness<sup>(6-7)</sup>, fatigue<sup>(8)</sup> and due to the considerable range of physical, chemical and biological agents and anti-ergonomic situations they are exposed to, which can cause work-related diseases<sup>(5)</sup>, besides other problems.

In view of these factors and attempting to increase knowledge about the subject, this study was elaborated with the following objectives: identify the occurrence of OA among ambulance drivers in EC, as well as the types and causes of these accident events.

## METHODOLOGY

*Research design:* this is a descriptive study, with a quantitative-qualitative approach, of OA in the daily reality of ED's professional activities.

*Study site and characteristics:* the study was carried out in a city in the interior of the State of São Paulo, in an AC that transports patients in severe cases and also attends people without resources for transport to hospitals or other health services. The service employs 26 ED, 23 of whom work 12-hour shifts followed by 36 hours of leisure and three work 8-hour day shifts. Other employees are four nursing aids and four telephone operators working 12-hour shifts followed by 36 hours of leave. As they are few, the aids only accompany some of the drivers in the ambulances, helping them in EC, but leaving other drivers without their help. At the time of data collection, the city did not offer Emergency Medical Services (EMS).

*Inclusion and exclusion criteria and number of research subjects:* the study participants were over 18, worked as ED for the AC for at least a year and agreed to participate in the research. Four recently hired drivers without job experience were excluded, who were used for testing the data collection form. In accordance with these criteria, 22 ED participated in this study.

*Ethical procedures:* before starting data collection, copies of the research Project were sent for analysis by the Review Boards of the School of Medicine and the Municipal Secretary of Hygiene and Health in the city where the AC was located, and approval was obtained. The workers were informed about the kind of study, objectives, methods and expected benefits, potential risks and possible inconveniences. The free and informed consent term was elaborated, in which the subjects manifested their voluntary participation in the study. All subjects gave their consent, in compliance with Brazilian standards<sup>(9)</sup>.

*Methodological procedures:* data were collected through semistructured interviews, with the help of a form, whose script consisted of two parts. The first contained data related to sociodemographic characteristics (gender, age, civil status, education level, individual and family income and other occupation); the second part addressed the subjects' experiences related to the OA they were exposed to, asking the following question: *have you already suffered some kind of OA as an ED in your daily work? If yes, report on your experiences, with respect to the OA you have been exposed to while working as an ED. Explain the type of accident, where it occurred, how it occurred, why it occurred, what you did (measure taken) and what measure was taken by your employment institution.* The form was elaborated by the researchers and presented to four faculty members, who were experts in occupational health

and opined on its contents, clarity and objectiveness. Next, the form was pretested through an interview with the above mentioned recently hired drivers, which revealed the need for adjustments in the language the questions were formulated in, with a view to a better understanding.

After improving the form, the interviews were previously arranged with the service head and according to the ED's monthly work scale. They were held by the researchers in the ED's work space in a room reserved for this goal. One of the subjects was on leave and was interviewed at his home. The statements were recorded and later transcribed and typed; then, the tapes were listened to again to correct the transcriptions. Each worker was identified with the letter I (interviewee), followed by a number from 1 to 22.

Data were collected in the first two weeks of January 2002. Expert recommendations were used for the qualitative analysis of the information<sup>(10-11)</sup>. To continue the analysis, we exhaustively read all interviewees' answers, which were categorized and grouped according to the OA's causes/ICD<sup>(11)</sup> codes.

For quantitative analysis, we used descriptive statistics, as well as the International Statistical Classification of Diseases and Related Health Problems (ICD)<sup>(11)</sup> to categorize and group the statements related to the OA's causes/ICD codes.

## RESULTS

Data related to the ED's sociodemographic characteristics are presented below.

Table 1 – Sociodemographic characteristics of emergency drivers from an Ambulance Central, 2002, (n=22)

Most Frequent	Characteristics		Complementary	f	%
	f	%			
<b>Age range</b>					
36-40	9	40,9	30-35	1	4,55
			41-45	6	27,29
			46-50	3	13,63
			51-55	3	13,63
<b>Civil Status</b>					
Married	18	81,82	Single	4	18,18
<b>Education Level</b>					
Unfinished basic education	9	40,9	Secondary education	13	59,1
<b>Individual Income (in minimum wages)</b>					
2-4	20	90,9	5-7	1	4,55
			>7	1	4,55
<b>Family Income (in minimum wages)</b>					
2-4	12	54,55	5-7	7	31,82
			>7	3	13,63

Thirteen (59.09%) out of 22 ED at the AC mentioned that they had suffered 19 OA, that is, an average of 1.4 accidents per worker. All OA were typical or type, that is, they occurred during work, carried out for the company (AC) under study.

What the OA causes is concerned, they were categorized and the statements were grouped in relation to the following causes and ICD codes: X50 Overexertion and strenuous or repetitive movements, related to weight; Y04 Assault by bodily force and Y08 Assault by other specified means; W01 Falls on same level from slipping, tripping and stumbling; W20 Struck by thrown, projected or falling object and W22 Striking against or struck by other objects; W54 Bitten or struck by dog and W44 Foreign body entering into or through eye or natural orifice<sup>(11)</sup>.

## DISCUSSION

All 22 drivers are men, a common fact in this professional category<sup>(3,6)</sup>. As to age, most workers are between 36 and 40 years old (40.9%), followed by 27.29% between 41 and 45 years; thus, the subjects are not so young and are in their highly productive phase. Most of them are married (81.82%) and have not finished basic education (40.9%); 59.1% finished secondary education.

Despite recommendations for all EMS vehicle drivers to have finished basic education and defensive driving training<sup>(12)</sup>, this does not happen at the AC under study. Only 31.82% of these workers have this education level and two (9.09%) informed this kind of training, considered as the set of procedures to prevent risk situations, previewing reactions from other drivers and pedestrians, allowing from rapid decision making when confronted with sudden danger<sup>(13)</sup>.

The driver should be over twenty-one and willing to perform the activity<sup>(12)</sup>. According to the interviews, the participants informed this willingness and that they like their job. However, despite dealing with sick persons and accident victims, they lack knowledge about the care they need to take in view of exposure to contagious diseases and about the means they can use for adequate protection on the job.

As to monthly income, most participants (90.9%) gain between two and four minimum wages, an amount they consider insufficient or very low. One (4.55%) participant receives between five and seven wages and another (4.55%) more than seven

minimum wages. Monthly family income comes from monthly income, in addition to other sources of income the ED and/or (an)other family member(s) receive. Most families gain between two and four minimum wages (54.55%), 31.82% receive between five and seven wages and three (13.63%) more than seven minimum wages.

When asked about the existence of another paid job, 10 (45.45%) said they did not have any, five (22.72%) work as plumber/electrician/bricklayer/painter, two (9.09%) informed owning a small company, two (9.09%) were drivers in other services, one (4.55%) assembled furniture, another (4.55%) private driver/bricklayer or general maintenance worker, and one (4.55%) works in motorcycle part manufacturing.

It is observed that 12 (54.54%) ED have another paid job, that is, do extra work. It can be inferred that, due to this routine, they do not have enough time left for an adequate rest, which can create tiredness and increase the probability of OA, besides different illnesses.

In a study of urban transport drivers, it was evidenced that general living and work conditions, as well as the work environment (noise, various polluting agents, vibration), besides other factors, can determine different situations in the workers' lives, exerting a negative influence on their health<sup>(5)</sup>.

As described earlier, with respect to the 19 OA suffered by 13 ED, it was evidenced that these were basically typical accidents. None of them was related to collisions, although the workers drive around in traffic during their job, with cars whose maintenance they report to be deficient. A study of workers at a Mobile Intensive Therapy Unit describes that the ED must be directly responsible for the maintenance and good conservation of the vehicle and, in case of some irregularity, he must provide for repair as quickly as possible. A preventive maintenance policy for these vehicles is important, with repairs and periodical substitution of parts, in order to avoid excessive wear-and-tear and removing the ambulance from its activities<sup>(14)</sup>.

In this study, the only collision report was with protection walls between highway lanes. Neither patients nor the ED were injured, as described below.

*(...) it was raining a lot (...), although I was driving slowly, the car slipped (...) I hit the wall, but there was no fatal victim, nothing (...). There was a patient in the ambulance (...) I pulled over, I got the ambulance off the highway (...) first I went to rescue the patient (...) thanks God nothing happened (111).*

As there were no injuries, the accident was not considered as an OA. The percentage of accident victims is important: 59% of the 22 ED; in this group of 13 victims, five (38.46%) reported they had suffered more than one AO, while eight (61.54%) drivers had one accident each during their entire work time. Four of the five drivers with more than one accident event suffered two accidents each and one three accidents. These can be considered multiple accident victims.

The occurrence of these accidents can be related to the fact that the ED do not only drive vehicles, but also exercise the functions of EMS workers, of helping/rescuing the people they are going to transport, both severely and less ill patients, besides transporting them between health services and their homes, as explained before. Thus, they perform tasks that are different from what they are supposed to do. This is aggravated by the fact that they have neither experience nor training to do so.

Consequently, the AC delivers an extensive social service, as it attends the population 24 hours per day and ends up filling the voids left by other social actors and institutions<sup>(15)</sup>.

The following are possible OA among mobile ICU workers, including drivers: mechanical defects of the ambulance, movement of this vehicle in traffic, restricted internal space, severity of care, use of biomedical equipment, electric installation of the ambulance or electronic equipment<sup>(14)</sup>.

In this study, eight (42.11%) OA among the ED were due to overexertion and strenuous or repetitive movements. This may be due to the fact that they work alone and constantly need to ask help from passers-by and patients' family members, who sometimes refuse and/or do not always manage to help them. They often find women and children at the homes, without sufficient physical strength to help them carry the stretchers with the patients. Thus, they said that the effort hurts their back, revealing pain and other complaints. These causes are related to carrying weight, as reported below.

*(...) I suffered an accident once (...) taking a stretcher on my own (...) (13).*

*(...) I suffered an accident (...) I went to pick up an old lady, she had fallen on the floor and was very heavy (...) (16).*

*(...) I went to pick up a patient and there was a flight of stairs (...) and the person who was helping couldn't carry the weight, released the weight on top of me (...) (117).*

In this research, the participants' complaints of back pain reveal that they may be caused by the

worker's physical effort to hold the patients they transport on their lap or on the stretcher. This is due, then, to the excess weight they are obliged to carry on their own (weight of the stretcher and patient's weight). In addition, every day, they remain seated on ergonomically incorrect car seats and are subject to the vibrations of the engine. In this respect, a study that reviewed 14 years of literature about the illness experiences of drivers evidenced a 57% prevalence rate of back pain in 2045 Danish drivers, besides significant hospital intervention rates due to herniated lumbar disk. A sedentary life and vibration of the whole body were appointed as possible factors that contributed to the development of back pain<sup>(5)</sup>. In general, the vibrations provoke other symptoms in the human body: tiredness, joint pain, back pain, bone injuries, among others. The combination between the sitting position and the vibrations is harmful for the spine<sup>(14)</sup>, and can provoke pains.

OA can cause physical and/or functional damage or death in the workers, besides economic and material losses to companies. Injuries can happen through contact with an object, a substance or another person, because the worker is exposed to the risks involved in these objects, substances, people or conditions and, also, through movements by another person<sup>(14)</sup>.

Among the ED, the OA were related to contact with people and/or objects they met/handled due to their work. Various statements denounced the problem of the stretcher's excessive weight. The researchers weighed the empty stretchers and proved that each of them, articulated and made of aluminum, weighs 37 kilos, while another simpler model weighs 20 kilos. When adding up the weight of the stretcher (37 kilos) and that of an obese patient, weighing 140 or 160 kilos for example, situations mentioned by the ED, it is estimated that these professionals end up carrying between 177 and 197 kilos. A Brazilian study of a Mobile Intensive Care Unit team showed that many work activities involve lifting, transporting and unloading heavy objects and instruments, besides the transport and moving of obese patients and patients who cannot move. Transporting patients alone demands an exaggerated amount of effort from the muscles, and can be aggravated by the bad conditions of the equipment and the employees' lack of technical preparation<sup>(14)</sup>.

In this study, if a patient weighs about 50 kilos, and we add the weight of the stretcher, the total

weight carried is between 70 and 87 kilos, which seems to be common during the work day. In addition, the ED are often alone to carry the patients, which demonstrates weight overload during their work. Moreover, they have to overpass obstacles like stairs, sewers and soil roads to transport the people to the ambulance and, later, in hospital, help to remove them from the stretcher and onto the bed or hospital stretcher.

Existing laws on ergonomics explain about carrying weight and relate it with the manual transportation of loads and not people. They do not establish a load limit to be carried by the worker either<sup>(16)</sup>.

As to other causes of OA, different types of assault correspond to five cases (26.33%), including three caused by bodily force (Y04) and two by other specified means (Y08), each corresponding to 15.8 and 10.53%. This situation illustrates the violence that happens in general and in the labor world in particular. This originates in the production mode and takes form in the organization of the work process. It provokes exhaustion, suffering, illness and work-related death; what is violent at work ends up being related not to work in itself, but to its organizational, technical and social structure<sup>(17)</sup>.

The following statements exemplify assaults suffered by the participants.

*(...) I had a problem with a patient who punched me with his elbow (...) an alcoholic and he punched me with his elbow and head so much that it bled (...) I went to rescue him in the middle of the street, he got up and assaulted me (...) (18).*

*(...) I went to pick up a patient (...) as I picked him up, the guy twisted (...) I got a bit injured, I observed it, I worked a lot (...) the whole night (...) (115).*

*(...) I went to pick up a patient who was drunk, aggressive, pregnant and had HIV (...) she scratched me (...) (116).*

*(...) I have already been bitten (...) by a psychotic patient (...) it was a matter of closing the door and walking around the block (...) he assaulted his mother, started to punch her (...) he came on to me, I tried to defend myself and fell, I tripped on the sidewalk and fell (...) (117)*

*(...) there was a bite I got from a psychiatric patient (...) (121).*

These forms of aggressive or abusive behavior that happen during work can cause physical, psychological damage or inconvenience to their victims, whether these are intentional or accidental targets. In this respect, in recent years, accidents

and violence have turned into important problems and stand out in health statistics, besides causing after-effects and death<sup>(17)</sup>. Thus, the ED were assaulted in different ways by the users they attempted to attend.

As to OA caused by falls, when adding up all types of falls and their impacts, this corresponded to 10.52% for each. Falls on same level from slipping, tripping and stumbling (W01) (10.52%) are illustrated by the following statements.

*(...)I stopped at the Municipal Hospital, there's that ramp, (...) as I opened the door, I slipped because it's very narrow there (...) (111).*

*(...) an accident that happened to me was (...) at the door of the emergency service, I got into the ambulance (...) and when I got out I slipped (...) (116).*

Struck by thrown, projected or falling object (W20) and Striking against or struck by other objects (W22), responsible for 5.26% each, can be better understood through the reports below:

*(...) it was when the stretcher fell on top (...) I went to pick up a patient who fell down on the street and the patient was obese and I had to put him on the stretcher, then I asked a boy who was passing by (...) (19).*

*(...) I brought down a patient, a man (...) and the stretcher (...) fell on my legs (...) (115).*

Cause W54, related to Bitten or struck by dog (5.26%) can be illustrated by the following statement:

*(...) a psychotic patient (...) when I got into the house, (...) the dog came from behind (...) "He caught me", but he "caught" me really strong (...) (115).*

Foreign body entering into or through eye or natural orifice (W44) (5.26%) happened in the following circumstance:

*(...) a delivery I did (...) when I cut the umbilical cord the blood got into my eye (...) (121).*

According to this statement, the ED are constantly exposed to the risk of OA involving biological material and have contact with different disease-causing agents, such as bacteria, fungi, bacilli, parasites, protozoa and virus, among others<sup>(2,14)</sup>. In the statement where the OA was due to contact with blood, the worker is exposed to the risk of catching blood-borne diseases, such as hepatitis B and HIV/AIDS.

These reports about the causes of these OA demonstrate that the ED at the AC perform EC. Some cities in the country have a structure EC or EMS service, whose team includes health professionals. However, without proper training, the function of the AC drivers in this study ends up being deviated, that is, they assume tasks of health workers, who should be part

of the ambulance team. This is a source of concern as, many times, they have not even taken any course in the health area. Thus, the actual tasks they carry out replace the ones they are supposed to; their lack of knowledge, associated with the deviation in their function, can lead to some illnesses similar to those of health professionals, as well as those transmitted by the lack of hand washing between handling one patient and another.

Thus, the declared functions of the ambulance drivers at the AC neither correspond to the actual function they perform, nor to their true responsibility, as they carry out more complex activities than that. The tasks they actually perform are not only those they are supposed to do, as they get into the homes of patients, take care of them until they arrive at the emergency service, negotiate their removal to hospital with the patients/relatives, calm down violent patients and people's anguish and despair, and even deliver babies. Without these workers, who should be called "drivers-attendants-paramedics-psychologists-midwives", the AC would not work<sup>(15)</sup>.

Thus, the ED's exposure to the risk of OA occurrence is evident. The organization and implantation of an SEM can minimize this situation, as its establishment includes a multidisciplinary team to perform many of the functions currently done by the 22 ED under study.

## CONCLUSIONS

Besides activities related to driving motor vehicles, the ED at the AC carry out a diverse range of other activities. These tasks actually differ from their prescribed function, as they end up getting involved in client care as well and have close contact with patients. Thus, besides the risks specific of their job category, they are exposed to occupational risks. The causes of the OA they were victims of evidence that they are subject to biological, physical, chemical risks and ant-ergonomic situations, among others, in line with literature about the subject<sup>(5,14)</sup>.

Many of the OA related to these workers could be minimized if there were a team of health workers specialized in pre-hospital urgency/emergency care. Thus, ambulance drivers would not have to assume other functions than that of driving these vehicles, taking risks and suffering OA of different causes and, also, subjecting themselves to other possible problems that can alter their health.

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