

# The binomial work-health in the transit of Curitiba city

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**Abstract.** The working activity in traffic of the big cities complex interacts with the environment is often in unsafe and unhealthy imbalance favoring the binomial work - health. The aim of this paper was to analyze the relationship between work and health of taxi drivers in Curitiba, Brazil. This cross-sectional observational study with 206 individuals used a questionnaire on the organization's profile and perception of the environment and direct observation of work. It was found that the majority are male, aged between 26 and 49 years and has a high school degree. They are sedentary, like making a journey from 8 to 12 hours. They consider a stressful profession, related low back pain and are concerned about safety and accidents. 40% are smokers and consume alcoholic drink and 65% do not have or do not use devices of comfort. Risk factors present in the daily taxi constraints cause physical, cognitive and organizational and can affect your performance. It is concluded that the taxi drivers must change the unhealthy lifestyle, requiring a more efficient management of government authorities for this work is healthy and safe for all involved.

Keywords: Work, health, taxi driver, ergonomics.

## 1. Introduction

The relationship between work and health highlights a historical evolution and still ergonomic effort for obtaining conditions favouring the promotion of health and specific protection related to existing risks in situations experienced by worker.

The 19th century marked by the Industrial Revolution, was a period of great oppression for workers, but also originated the first studies about the man in professional activity, including an essay where the term ergonomics was first used [1]. With industrial development, the car became a means of transporting passengers, replacing a small rental car called *cabriolet*, with an appliance which facilitated payment of use depending on the distance, called the *taximeter*, originating the title: taxi [2].

The laborative context of taxi driver consists of a pay system based on productivity, in which the temporal exigency and flow intensity of vehicles and pedestrians can generate anxiety. In addition to the personal and patrimonial responsibility, once it carries passengers, the job has physical characteristics with repetitive effort and static posture that generate constraints due to the fact that they keep driving for long hours, all this in a chaotic environment such as transit.

The number of professionals in this category and a possible intervention in work situation

urged the development of the study since Curitiba has a fleet of more than 2252 vehicles, taxis, with approximately 5000 active drivers [3].

Thus, the worker's health continues to be featured in the scientific ambit, a tireless search for solutions that enable better living and working conditions. Ergonomics, adapting the work to the individual, creates strategies for the development of construction and promotion of health and the need for specific protection to the existing risks. The goal of this research was to analyze the relationship work-health of taxi drivers.

The relationship between work and health complex has shown that on the one hand it is admitted that the work is detrimental to health; on the other hand health is necessary for the execution of the work. It also has a positive role in the development of health to consider that the worker himself can detect the existence of warning signs and modify his procedures, avoiding constraints [4][5].

Health can be considered a hard thing to be conquered. For too long the concept of health as "the absence of pathologies, without disability, without restriction to social life, without economic misery" predominated. In turn, the World Health Organization has defined it as the complete physical, mental and social well-being.

However, health is a dynamic process and not static, it is a state in persistent change, which

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evolves with its own work. So it would be more appropriate to say that this binomial is the result of the construction of its own health, in which mind and body must be in the best possible conditions [6].

Dejours et al [7] highlights that the job is structured when the individual feels pleasure and satisfaction doing it, his identity are also built. However it can become pathogenic when suffering, having an illness or death. In an attempt to stay in balance the worker needs to develop coping strategies and defense mechanisms, whether working in groups or alone and isolated as the taxi driver. When rupturing this balance the pathology may appear.

For the same author, organization of work is from the one side the division of task that leads some individuals to decide for others, the work to be performed and the pace to be followed. On the other hand the organization is the division of men, the hierarchy defining work relations. Accordingly, it is seen that some organizations are harmful to the worker's psychic balance, causing mental and physical diseases.

Although committing the same activity, there are variations in the requirements of the Professional category of driver, especially related to the type of vehicle, year of manufacture, working link, type of transport, passenger and cargo traffic and the location where the work is developed.

The taxi driver usually spends hours working in a flat position. The prolonged activity produces muscle fatigue and leads to decreased motor activity, increasing the reaction time which is sometimes one of the reasons for causing accidents. In addition to that, depending on the time you're working, the younger drivers tend to be more at risk, furthermore if they are driving for hours and at night [8].

When it comes to health and work, it's worth mentioning that the ergonomics adopts three approaches: a palliative to compensate for the shortcomings of the individual, a preventive with the intention of preventing the occurrence of pathogenic situations, incidents and/or accident and an active to allow each one to build its own wellness-oriented health and physiological aging [9]. It also emphasizes the importance of education in this process.

Ergonomics looks for covering all interfaces and dimensions of work, organizational, physical and cognitive where the adaptability and performance of the worker regarding to the requirements of the tasks are inserted [5]. It can be said that the taxi driver is subjected to three dimensions above.

Driving motor vehicles requires the completion of activities in sitting posture with great attention to the request of drivers to

continuously monitoring the environmental and operational conditions that influence their decisions after the perception of tactile, visual and auditory stimuli triggering motor responses in equipment: pedals (clutch, brake, accelerator) and steering wheel not mentioning the attention given to the passenger(s) by the taxi driver.

For Murrel [10] ergonomics is the scientific study of the relationship between man and his working environment, in which the individual develops their role, tools, machines, methods, and consider the relationships inside and outside of work.

On this question, Rozestraten [11] gives attention to the fact that the person to ergonomics is a worker that thinks, acts, feels and expresses itself in the form of interindividual (gender, age, body size, experience, skills) and intra-individual (mental and physical transformations of the worker by reason of temporal variations in short, medium and long term) variability that permeate a dynamic situation of work as the transit is.

The ergonomics of transport is part of a growing number of workers. The development of car industry in the metropolitan region of Curitiba attracted investment to the region, arising from an encouraging policy to the productive modernization process. This reflected not only in urbanization and the need for skilled labor, but also in other areas. In spite of that, the social impact brought not only positive results [12].

The increase in population and vehicles fleet, by the proportion of cars in relation to the number of inhabitants, puts the city of Curitiba as one of the most motorized of Brazil. Even having one of the best collective public transportation, workers still use more cars as a means of locomotion. The fact is that the infrastructure improvements were not enough to the adequate traffic flow. If, on the one hand the above-mentioned development has provided an increase in labour demand of taxi driver, on the other hand it made dislocation difficult, increasing the routes.

Rozestraten [13] indicates that the transit is the "set of people and vehicles displacement on public roads within a conventional system of standards, which aims to ensure the integrity of its participants". It emphasizes three subsystems in the transit system: the thoroughfare, the vehicle and the man – the more complex and capable to make the system chaotic. The Brazilian Traffic Code defines transit as "the use of the thoroughfare by people, vehicles and animals, isolated or in groups, conducted or not, as a mean of circulation, stop, parking and loading or unloading operation".

It is worth remembering that the work is a multidimensional and complex object: the

economic dimension, as subsistence activity, the psychological dimension, either for personal creation or fulfillment and social dimension. It is through it that the men get their existence, the principle of their own progress. Thus, every job has a socio-economic character [9]. Santos e Fialho [14] also considers the influence of working methods, communication between posts and inside the posts, timetables and work shifts, workers' training, organization and technology presented in the organization and the wage policy.

Leplat [15] warns that the ergonomics should seek criteria aiming to safety, comfort and satisfaction of the employee, prevailing the harmony of man-task system.

The comfort and effectiveness of the driver's dislocation are key elements in the quality of transport. Thus, the ergonomics of the taxi driver can also be directed to the workspace, the comfort of seats, the limitation of vibration and acceleration, climatization, soundproofing, lighting installations and commands access. All of them are important elements in which the driver can collect interpret and process the information stemming from internal and external environment [16] [5].

Through ergonomic studies can verify the risk that the worker is subject such as chemical, biological and psychosocial so that preventive measures are reviewed and applied.

## 2. Method

This was a cross-sectional observational study conducted in several parts of the city of Curitiba, in November 2008 in celebration of the day the taxi driver. The social construction of the evaluation began with an informal interview with an experienced taxi driver, trade union, seeking to level the initial demand and management.

### 2.1. Participants

The sample consisted of 206 taxi drivers.

### 2.2. Instruments

As data collection instrument used was a questionnaire with open and closed questions about the profile, organization and perception of work environment [17]. Was performed direct observation of the work taking into consideration the vehicle and traffic as a whole.

### 2.3 Data Analysis

The analysis of results was performed by descriptive statistics, percentage. It was used a Microsoft Office Excel 2007.

From the results we designed a brochure and a banner with educational guidelines, the first being distributed and placed second in Rodoferroviária, local high concentration of taxi drivers.

## 3. Results and discussion

It was found that among the 206 respondents, 69% were aged between 26 and 49 years; 96% belong to males and 58% the second degree. As to the living habits: 40% are smokers, 48% consume alcoholic drink from 3 to 4 times per week and 20% practice physical activity, so 80% are sedentary. 51% feel stressed, with 71% reported mood and motivation to do the work. The family approves the profession (74%) and 94% like what they do. 47% refer to pain, with prevalence in the lumbar region. As for the stress level, 51% have seen themselves stressed out and 29% reported feeling sadness, fatigue or irritation on the day of the questionnaire application (table 1).

Table 1  
Profile taxi driver of psychosocial

Variables Analyzed	Values	Percentage	
age	18 – 25	10	5%
	26 – 35	57	28%
	36 – 49	84	41%
	over 50	55	26%
sex	female	8	4%
	male	198	96%
instruction	0° degree	1	0%
	1st degree	52	25%
	2 nd degree	119	58%
	3rd degree	20	10%
	tecnic	1	0%
	no answer	13	6%
lifestyle	smoking	82	40%
	consume alcoholic	99	48%
	practice physical activity	65	20%
opinion of the family	excellent	24	12%
	good	128	62%
	bad	38	18%
	rubbish	4	2%
	no answer	12	6%
like work	yes	194	94%
	no	96	47%
region pain	cervical	5	2%
	lumbar	44	21%
	shouder	2	1%
	wrist	3	1%
	legs	5	2%
	complainant	29	14%
	other	7	3%

stress	yes	106	51%
mood today	happy/motivated/wiling	147	71%
	tired/angry/sad	59	29%

Source: Direct research

When questioned about the organization of work and comfort, most taxi drivers (56%) has an income exceeding 2.500 reals, and 11% have another job, 83% is owner of the vehicle that works, 72% have a daily working journey from 8 to 12 hours and 47% is taxi driver for over 10 years. As to the path traversed, 71% are on average more than 10 races per day and 54% between 100 and 200 km, of which 56% have already refused to carry passengers. Referred to as the needs of comfort: radio (91%), power steering (76%), panic button (67%), air conditioning (64%), the seat and steering wheel regulator (31%) and space (13%). 38% have already been assaulted at least once and 39% have already suffered some kind of accident at work (table 2).

Table 2  
Work organization and comfort

Variables Analyzed		Values	Percentage
rent	less 1.000	16	8%
	1.000 to 2.500	75	36%
	2.500 to 4.000	62	30%
	above 4.000	53	26%
another job employment contract	yes	22	11%
	owner	170	83%
working time	employee	36	17%
	above 10 years	97	47%
	2 to 5 years	39	19%
	5 to 10 years	49	24%
daily working journey	above 10 years	97	47%
	6 hours	17	8%
	8 hours	61	30%
	10 hours	23	11%
	12 hours	64	31%
	15 hours	12	6%
	18 hours	2	1%
	24 hours	16	8%
average runs a day	no answer	11	5%
average km/day	yes	115	56%
	less than 10 km	59	29%
	more than 10 km	147	71%
	less than 100 km	21	10%
	100 to 200 km	111	54%
comfort neds	above 200 km	25	12%
	no answer	49	24%
	air conditioning	131	64%
	Panic botton	138	67%
	space/comfort	26	13%
	power steering	154	76%
assault at work	radio	188	91%
	steering wheel regulator	63	31%
	yes	78	38%
accident at work	yes	79	39%

Source: Direct research

In the Figure 1 are represented the issues that most concern to taxi drivers, including security (61%) and accidents (18%).

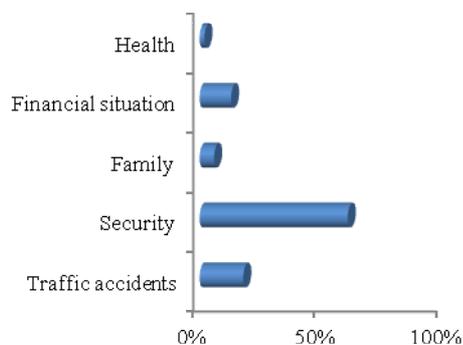


Figure 1

Concerns types

Cruz [18] considers the individual behind the wheel consists of a number of aptitudes, personality, habits and attitudes set, physiological needs (food, sleep, rest), psychological and sociocultural (security, convenience, self-fulfillment, acceptance). The balance between these variables will depend on the capacity to provide them, overcome them or adapt them, allowing the normal psychophysical functioning individual.

Chen et al. [19] [20] point out that the taxi drivers differ from other professional drivers, because of the exposure to physical and psychosocial risks in the work environment. Correlated the permanence in a sitting position and long periods in the direction with the pain in the knees of drivers and determined that new studies are fundamental because the epidemiological data in this area are scarce. In the literature review for this article it was noted that the most ergonomic researches founded mention bus, tractors and trucks drivers.

Raanaas and Anderson [21] found that the taxi driver has a high risk of musculoskeletal problems and factors related to lifestyle as: sleeping in the car during the breaks, experience of violence, body mass index (BMI) high, unhealthy eating habits and little physical exercise contribute to unbalance the relationship between health and work. It may be affirmed that the inappropriate lifestyles are cause for concern in the workplace because they affect the health and well-being with consequences for both individuals and businesses [22].

In another study, musculoskeletal disorders in the lumbar region, shoulders and knees respectively in this order, were the most

prevailed in drivers. After standardization by age, the author noted that the problems of knees were more frequent in taxi drivers [23]. In this study the region with most complaining of pain was the lumbar spine.

Through direct observation was found to carry out manual movement loads, such as lift or hold baggage, pushing wheelchairs or helping people with disabilities to support themselves, disregarding the basic ergonomic concepts.

Studies using magnetic resonance have shown that drivers are exposed to vibration risks mainly in the region of the spine [24]. It should be considered to the risk of vibrations: vehicle type, average speed and how many hours are spent driving [25].

Myamoto et al [26] verified the prevalence of low back pain in 20% of taxi drivers and suggested that manufacturers had more attention to the comfort of the seats of vehicles.

However drivers also received guidelines concerning the treatment of other diseases besides the back pain, psychological counseling and improves the quality of life. It should also mention that the seat height and steering wheel and the distance between them, as well as the distance between pedals and seat and backrest are fundamental parameters to ensure comfort and safety of the driver. But the results showed that the most important for the comfort of taxi drivers in this study is the radio and then the power steering. It is necessary to clarify these factors professionals consistent of the working environment like pressure, temperature, vibration, noise, lighting, posture and body movements, information received by the hearing, sight, smell and proprioception, the relationship between dials and controls and anthropometric characteristics are also essential topics for ergonomic studies with the objective of facilitating the interface between the driver, vehicle and traffic [27].

For taxi driver the slow traffic also damages the work, sometimes it fails to meet customers and some of them end up giving up on getting the taxi because of the delay, In addition, they complain and they blame the taxi driver.

It is convenient to mention that the height of the seat and steering wheel and the distance between them, as well as the distance between the seat and pedals and the seat-back angle are basic parameters to ensure comfort and safety of the driver. The results demonstrated that the most important for the comfort of taxi drivers is the radio followed by power steering.

It should be considered that the organization of work of the taxi driver can be a source of stress due to long hours, night work irregular shifts and increasing the possibility of fatigue. Stress can be defined as "a set of psychological

disorders or mental suffering associated with work experiences [28] [29].

The drivers of this study is a risky behavior that influences health, are smokers, sedentary and consume alcoholic beverages during working hours. Kobayashi and cols. [30] investigating the variation of heart rate on taxi drivers who smoke during the day and evening, found that during the night there is an increased heart rate after 5 minutes of smoking. They concluded that the responses of the autonomic nervous system may be an additional increased risk of heart disease.

The World Health Organization estimates (OMS) that alcohol consumption reduces more than ten percent of productivity, and that 25% of accidents at work and about 60% of fatal industrial accidents can be all associated. According to the OIT (International Labour Organization) [31] overall, 3.5% of the working population is dependent on alcohol and 25% are at risk of becoming dependent.

It is extremely worrying the number of individuals in this survey that make use of alcoholic beverages on a regular basis. Depending on the consumed amount, it can affect the central nervous system and is able to impair the ability of coordination and increasing the risk of drivers getting involved in traffic accidents and violations. In addition, the act of driving is a task with multiple occupational stressors, such as physical, chemical, biological, psychosocial and/or environmental. And it may be also directly involved in work situations, affecting the security of the taxi driver, passenger, pedestrians and other vehicles.

On the other hand, the driver is also on suffering attacks of drunken passenger, being one of the main factors that lead them to refuse a race.

Dejours et al [7] mentions that the smaller the autonomy of the worker, the greater are the possibilities of mental disorders occur, however most taxi drivers surveyed are autonomous, and the worry with security may be also a stressful factor.

The authors Rozestraten and Dotta [32] say that the task of driving a vehicle would be analysed by experts and that there would be an activity that required more attention, skill, talent, dedication and concentration than the act of driving a vehicle.

According to the Grun-Réhomme [33] the taxi drivers is four times more likely than other workers to become victims of murder and being approached by non-fatal assaults. The Occupational Safety and Health Administration (OSHA) [34] is concerned with violence against taxi drivers. The following risk factors have been identified to help in making this work more

secure: working with the public, with cash, alone or in areas of high crime and during nighttime. It was also proposed the application of security measures such as: the use of GPS systems, alarms or panic button, as designated by the taxi drivers of that article, surveillance cameras inside the vehicle, a radio for communication in case of emergency, cab fares charged with cards and training security for drivers, dispatchers and entrepreneurs as measures of caution. However, he highlighted that such measures only become viable and effective when the employer and employee assume responsibilities and rights and also the local government proposes the development and implementation of security strategies.

So, the taxi drivers are exposed to physical, cognitive and organizational constraints, with consequences for the work performance and well-being.

The habits of life and safety stand out as the main factors that can break the work and health of the binomial taxi from the Curitiba city. The ergonomic intervention can reestablish the link between health, work and safety by transforming design models, correction and or performance situations that require immediate improvement or long-term working conditions of taxi drivers. But it emphasizes the need for government actions to raise awareness of the worker and for the development and implementation of solutions to the profession in a more healthy, safe and effective.

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