

**IMPACT OF JOB  
CHARACTERISTICS  
ON THE DRIVER'S  
HEALTH AND SAFETY:  
INTEGRATIVE  
LITERATURE REVIEW**

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## INTRODUCTION

The concept of Occupational Health, according to the General Directorate of Health (2018) corresponds to a set of interventions carried out by professionals specialized in various areas whose common objective is the prevention of occupational risks, the protection and promotion of the health of workers, ensuring safety, their well-being, comfort and integrity and the encouragement of healthy work environments.

Today, in the world of work, health and safety has become a constant concern. The World Health Organization (2013) strongly recommends improving workers' health and reducing work-related injuries. In general, all countries have enacted policies consistent with global regulations to improve workers' safety and health.

Health promotion in the workplace involves not only programs and projects to meet the health and safety needs of its workers and encourage the adoption of healthy behaviors, but also to reduce risk factors that may have negative repercussions on health (Borges, 2018).

There are different European legislative normative documents on occupational safety and health problems and stipulate the need for the assessment of occupational risks in any workplace (examples, Council Directive 89/654/EEC, ISO 45001 and ISO 39001 standards) indicate thus, the basic principles to prevent risks during a work process. ISO 45001 provides the requirements for controlling risks in companies for the reduction of occupational illnesses and injuries. This standard integrates management responsibility requirements in relation to the management of occupational health and safety, which serves to ensure that maximum responsibility is not solely delegated to those responsible for the occupational health team.

Within the scope of occupational

integration, management of workers' health and safety there is scientific evidence, such as safety education, stress management and health promotion programmes. However, with regard to professional drivers of light vehicles, it was found that they are still vulnerable to work-related injuries and health problems such as those related to compromised sleep and stress. However, there are requirements for the duration of transport, breaks and rest time.

In this sense, most organizations restrict themselves to the assessment of risks related to the technical conditions of a vehicle, the driver's behavior and psychophysical condition, as well as road conditions. Occupational hazards are often overlooked due to their long-term effect and the difficulty of controlling them. These are evaluated according to the specification algorithm and this procedure includes: risk identification, assessment of the development of occupational risk, and implementation of measures to reduce occupational risks, analysis of the effectiveness of proposed solutions, and their improvement (Golinko et al., 2020).

It is important for an employer to apply reliable and well-founded methods of determining the level of occupational risk in any workplace, which helps to reduce the likelihood of occurrence of occupational hazards within the organization. In addition, it allows controlling risks aimed at reducing financial losses.

## OBJECTIVE

Analyze the influence of working conditions on the safety and health of vehicle drivers.

## METHODOLOGY

Integrative literature review, following the steps: theme selection; establishment of inclusion and exclusion criteria for articles

(sample selection); definition of information to be extracted from selected articles, analysis of results, discussion and presentation of results.

The question that guided this research was formulated: “What is the influence of working conditions on the safety and health of vehicle drivers?”, after selecting the theme.

The research took place during the month of May 2022, using the following databases: Google Scholar; EBSCO Host; Medline; Web of Science; CDR and Repository of the University of Porto and Scielo, and the descriptors: “Influence of working conditions”; “Driver” and “Health and safety” and the Boolean operators: Influence[All Fields] AND (“work”[MeSH Terms] OR “work”[All Fields] OR “working”[All Fields]) AND conditions[All Fields] ] AND Driver[All Fields] AND (“health”[All Fields] AND “and”[All Fields] AND “safety”[All Fields]) OR “health and safety”[All Fields]).

Free access articles, in full (with abstracts and full texts), written in Portuguese or English, referring to the period from January 2017 to April 2022, were defined as selection criteria.

Exclusion criteria were articles aimed at other professional groups; articles that only present a description of the working conditions of truck drivers and articles that, after reading the text, do not refer to theoretical conceptions about the influence of the working conditions of light truck drivers on their safety and health. The following were also excluded during the search: all duplicate production, editorials, letters to the editor, as well as epidemiological bulletins.

Figure 1 represents the flowchart of the research carried out, adapted by Prisma de Moher et al. (2015).

## RESULTS AND DISCUSSION

Table 1 presents a summary of the analysis

of the selected articles, namely author, year, publication; type of study, general objective, sample and participants and main results.

Transport by light vehicle plays an important role in meeting the needs of travel in a work context. Its efficiency, in turn, directly depends on the reliability of the drivers’ professional skills and their working conditions. The work of drivers in the performance of their duties can be considered a very sensitive and stressful “labor”, and its effect results in the occupational commitment of this professional group, which is characterized by a considerable number of factors such as: adverse weather conditions, intensity and speed of traffic flows, possible traffic jams, ignorance of transport schedules, non-standard working days, complex routes, among others (Golinko et al., 2020).

The various researchers emphasize the need to understand which occupational risks must be evaluated and the causes that lead to deterioration in health, so that organizations can adopt interventional measures that guarantee the reduction of the probability of occurrence of occupational risks and the improvement of quality of workers’ lives. The basic problems that are focused are two and as follows: the assessment of the risks of occupational diseases of workers taking into account the seriousness of the consequences for their health and the assessment of the economic efficiency of preventive measures to encourage organizations regarding their investment in job protection.

Most of the analyzed articles expose the solution of the first problem, that is, they study the influence of a dangerous factor in the human organism: the development of cardiovascular diseases, problems of the musculoskeletal system and nervous disorders. It is possible that there is stress in situations in the exercise of driver functions due to the daily load, lack of time to rest, need for sleep and lack of adequate nutrition. Much

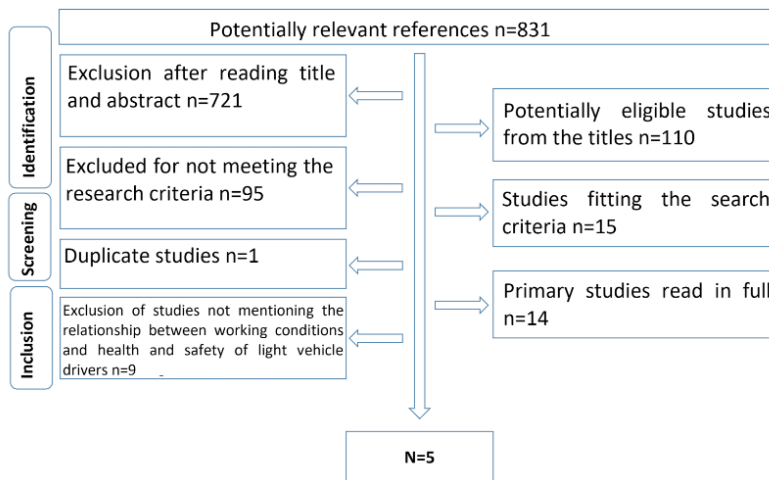


Figure 1. Study selection flowchart.

Author(s) Year	Kind of study	Title of Publication	Main goal	Main Results
Baba M, Miyama G, Sugiyama D, & Hitosugi M. (2019)	Study transversal	Influence of workplace environment, working conditions and health status of taxi drivers on vehicle collisions or near-miss events	Identify risk factors related to the health of taxi drivers that influence vehicle collisions and inform preventive measures interventions.  Sample: 1,739 Drivers	The results of the present study suggest that supporting drivers to maintain balanced control of their health, establishing a work environment in which drivers can take sufficient vacation and immediately stop driving when they feel the onset of physical health problems can lead to prevention of health-related events.  Interventions can also be valuable for promoting driver safety, in order to prevent vehicle collisions and compromise the health of taxi drivers. Thus, all the support given to drivers to maintain balanced disease control and improve working environments can prevent health-related events while driving.
Chen, C. & Hsu, Y. (2020)	Qualitative Study	Taking a Closer Look at Bus Driver Emotional Exhaustion and Well Being: Evidence from Taiwanese Urban Bus Drivers	To investigate the impacts of job characteristics on emotional exhaustion and the effects of emotional exhaustion on job outcomes (including job satisfaction, life satisfaction, organizational commitment, and turnover intention) in the context of bus drivers.  Sample: 320 Bus drivers.	This study concludes that job satisfaction can reduce the likelihood of turnover intention due to commitment. The results provide insights into the moderating effects of personality on the relationship between work demands and emotional exhaustion.  Future research must identify factors to reflect on drivers' job characteristics, e.g., passenger incivility such as workplace disputes and potential moderators, such as drivers' emotional intelligence, and examine the effects of various behaviors used by drivers, e.g. : exercises, to help companies develop better human resources policies.

Golinko, V., Cheberyachko, S., Deryugin, O., Tretyak, O., & Dusmatova, O. (2020)	Experimental Study	Assessment of the Risks of Occupational Diseases of the Passenger Bus Drivers	Describe the occupational health risks of passenger drivers that lead to the deterioration of their health.  Sample: 200 Bus drivers from three different companies.	Risk assessment was carried out for three brands of common passenger buses in Ukraine, where the driver is exposed to the dangers of fever, vibration, noise, harmful impurities in the bus cabin and emotional load. Risk reduction is foreseen through the strengthening of medical control over the health of drivers, regular examinations during the performance of professional activities in the control indicators: blood pressure, pulse, nervous excitement, and monitoring of the traffic schedule and obligatory rest. The health of passenger drivers is most affected by hygiene risks: fever, vibration and emotional stress. The overall risk level is calculated by the modified method and Risk Score.
Peters, S., Grogan, H., Henferson, G., Gomez, M., Maldonado, M., Sanhueza, I., & Dennerlein, J. (2021)	Study Qualitative	Working Conditions Influencing Drivers' Safety and Well-Being in the Transportation Industry: "On Board" Program	Identify working conditions and health outcomes in drivers through conducting focus groups and key informant interviews to inform a Total Worker Health® organizational intervention.  Participants: 450 Bus drivers	This study's participatory approach found that while the health outcomes that impact drivers may not be unique to an organization, the working conditions that facilitate health and wellness outcomes can be. Therefore, determining which working conditions are causing safety, health and well-being problems can be difficult to ascertain. Collecting data through focus groups with drivers and interviews with other key stakeholders can allow for candid discussions about these working conditions and how they manifest themselves uniquely within an organization, which can then be addressed. Organizations and future research can use this TWH approach to determine which conditions must be modified to improve the safety, health and well-being of drivers.
Ahn, Y., Lee, S., Kim S.; Lim M, Park S, Kwon S, & Kim H. (2021)	Cross-sectional and correlational study	Factors associated with different levels of daytime sleepiness among Korean construction drivers: a cross-sectional study	Examine individual and occupational factors related to daytime sleepiness levels and Identify its association with the risk of commercial driver driving.  Sample: 492 commercial drivers	A significant number of commercial drivers experience excessive daytime sleepiness; therefore, it is important to reduce the negative impact of driving fatigue and other factors on daytime sleepiness. The results of this study suggest that occupational health care professionals must pay attention to the development and implementation of health management interventions to reduce driving fatigue that incorporate physical, mental and occupational factors. Professional organizations need to establish internal regulations and public policies to promote the health and safety of occupational drivers.

Table 1. Analysis of selected articles

attention is also given to problems dealing with the reduction of accumulated fatigue during a day and its control. This problem can be solved both by working hours and by implementing certain instruments to monitor a driver's physical conditions. Ergonomics is also a frequently considered issue, as the driver's job is characterized by a monotonous working posture and repetitive manual operations. (Golinko et al., 2020). These authors also confirm that, in order to solve the second problem, great attention is given to the solution of certain social problems (implementation of new norms, development of means of control/monitoring of behavior and health) that aim at improving driver safety measures.

In this premise, according to Ahn et al. (2021) a significant number of drivers have excessive daytime sleepiness, which is associated with health problems and occupational risk. They also consider that it is important to reduce the negative impact of driving fatigue and other factors of daytime sleepiness. The working conditions of drivers that are among the most demanding are stressful and unhealthy with higher rates of mortality and morbidity, as well as absenteeism and turnover in the workplace. These workers encounter considerable occupational stressors, including traffic congestion, routine and conditioned schedules, as well as poor vehicle cabin ergonomics. (Chen & Hsu, 2020).

The work environment and work characteristics of professional drivers make them more vulnerable to specific health problems, leading many to take early retirement due to disabilities (Ahn et al., 2021). The study shows the effectiveness of relaxation techniques during breaks to improve the occupational performance of drivers' functions. The same authors also reinforce the importance of occupational

health professionals promoting interventions with drivers using specific strategies or evidence-based interventions. They also reiterate that constant monitoring and surveillance of drivers must also be carried out to reduce the physical and psychological burden (Ahn et al., 2021).

Unlike professional truck drivers, light truck drivers have very particular work characteristics, as they not only need to drive safely, but also simultaneously provide satisfactory service to their organization (Golinko et al., 2020). In this premise, the most frequent occupational diseases found in drivers are the following: diseases related to the development of cardiovascular disease; neuropsychic diseases; gastrointestinal disorders; diseases related to problems such as mobility of the musculoskeletal system; certain disorders with sedentary lifestyle and metabolic changes, as well as allergic and oncological diseases. (Golinko et al., 2020).

The same investigators add that drivers are also affected by factors such as: noise, vibration, increased temperature in the passenger compartment of the vehicle and nervous tension. Thus, the analysis of scientific studies allows us to specify three potential consequences of this effect, negative emotions, deterioration of the physical and psychological state of human health. As a result, there may be different cardiovascular pathologies, neuropsychic disorders, problems with the sense of hearing, a feeling of constant fatigue, carbon intoxication and the development of allergic reactions and oncological diseases (Golinko et al., 2020).

Therefore, these expectations and requirements related to driving light vehicles increase the workload and stress of drivers, subsequently leading this worker to burnout, with a negative impact on their well-being (Chen & Hsu, 2020). The consequences of exchanges between an organization and its

workers can be both positive (e.g. motivation, empowerment, commitment, job satisfaction) and negative, related to job resources and job complaints (e.g. burnout, intentions of turnover).

Often, claims at work relate to different aspects: physical, social or organizational work, which require these workers to employ physical and psychological efforts, thus causing a “burden” for them. Often, due to long hours and shift work, drivers are considered remote/lone workers, left hauling loads in a remote work environment and at other times with limited interaction with co-workers and supervisors. Nevertheless, job characteristics also make it difficult for drivers to satisfy the needs of their family role, thus creating conflict between work and family (Chen & Hsu, 2020).

However, these researchers reiterate that work resources belong to the physical, social or organizational aspects of work that support drivers to achieve work goals, motivate the team towards personal growth and development and, consequently, eliminate the physiological influences and negative psychological reactions caused by the demands of work. For example, a high level of support from co-workers, supervisors and the organization itself can alleviate the impact of complaints at work and help workers deal with difficult issues.

Determining the causes and consequences of risks to safety, health and well-being can be facilitated by working with all stakeholders in the organization to gain a more complete understanding of the factors that may contribute to safety, health and well-being using participatory methods (Peters et al., 2021).

However, the role of job resources in mitigating driver burnout (or emotional exhaustion) has been overlooked. In the Asian study, only the two types of job

resources, namely supervisor support and organizational support, were focused on, and it would be interesting to explore their effects on burnout to provide a comprehensive understanding of drivers’ job strain and associated outcomes. Researchers Chen & Hsu (2020) provide evidence that burnout is related to negative perceptions of well-being, including negative health outcomes and organizational outcomes. In the negative health of drivers, results attributed to burnout include physical and mental deficiencies such as anxiety, depression, gastrointestinal diseases, muscle tension, cardiovascular diseases, obesity, hypertension, chronic diseases fatigue and poor performance at work. On the other hand, associated with burnout are organizational outcomes that include decreased job satisfaction, lack of organizational commitment, absenteeism, high turnover intention, and eventually decreased life satisfaction.

Furthermore, the same stressor that a driver encounters can have different impacts on stress due to individual differences such as personality. If the role of personality is evident, it can provide insightful information for companies to manage their human resources in terms of hiring and training drivers with more effective guidelines associated with personality (Chen & Hsu, 2020).

Other researchers corroborate that drivers have physical and emotional health problems, such as driving with fatigue, mood disorders (including depression), stress, sleep deprivation and body pain (Ahn et al., 2021). However, most studies are very focused on the individual characteristics of the worker and not on occupational and institutional factors, and current policies must emphasize that safety and health promotion at work must consider not only individual characteristics, but also the organizational support; so it would be interesting for different risk factors

to be evaluated.

The results obtained are related to the conclusions of different investigators, with regard to body pain. That is, studies show that in terms of vibration, drivers begin to feel certain physical discomfort, which are the manifestations of work-related musculoskeletal injuries. Other similar conclusions are obtained in the studies by Baba et al., (2018), where the authors define the relationship between diseases of the musculoskeletal system and the effect of vibration characterized by back pain.

In this line of thought, other researchers corroborate that having chronic diseases, taking insufficient vacations and difficulty in reporting poor health conditions were significant risks of increased probability of a road accident (Baba et al., 2018). Among chronic diseases, the so-called lifestyle-related diseases (hypertension, hyperlipemia and diabetes) were the most common. These diseases are also known to have the highest known risk for cardiovascular and cerebrovascular diseases, maintaining balanced control for these lifestyle diseases is a very important issue in SO. Therefore, Ahn et al. (2021) reinforce,

On the other hand, according to Peters et al. (2021) in the working conditions that influence the safety, health and well-being of drivers, the relationship that a worker has with his superior has been closely associated with his well-being, in their study they also found that the lack of trust and poor communication could have significant implications for driver safety. These support the importance of the physical environment as a major cause of musculoskeletal injury and accidents; however, these can also be influenced by external factors, such as the physical conditions of the space for interim breaks, as well as road conditions or the weather.

With regard to sleep habits, in organizations, the occupational health team must educate drivers about adequate sleep habits and guide them towards medication prescriptions, if necessary. These investigators considered differences in driving characteristics between groups with daytime sleepiness (Ahn et al., 2021). In this study, the investigators performed a medical check-up of excessive daytime sleepiness, which they consider to be related to other comorbidities, such as obesity or obstructive sleep apnea. They also reported that dangerous driving activities were significantly different according to the level of sleepiness.

Working conditions are manifested differently, even within the same organization, focusing on priority areas for both leadership and workers, which contributes to the successful implementation of interventions to improve working conditions (Peters et al., 2021). The same authors corroborate that each organization is unique and work where conditions, such as the physical work environment and chemical risks, are important exposures to be considered, the psychosocial and organizational exposures of work are inherently complex and may require a more in-depth exploration.

The results of our research suggest that occupational health services must promote the development and implementation of health management and interventions to reduce driving fatigue.

## CONCLUSIONS

There are few studies that investigate the influence of working conditions on the safety, health and well-being of light vehicle drivers. However, there is evidence that the work contexts of this working class leave them exposed to certain dangers (temperature, vibration, noise and emotional load), reflecting the appearance of problems in



physical and emotional health, such as: fatigue, mood (including depression and emotional exhaustion), stress, sleep deprivation, and pain from musculoskeletal injury.

The results suggest that the occupational health team needs to pay attention to the development and implementation of health promotion interventions to reduce drivers' fatigue while driving light vehicles and that incorporate physical, mental and

occupational factors. It is essential that organizations establish internal regulations and public policies to promote the health and safety of driver workers. Therefore, most health professionals do not understand which measures are most useful for drivers, so we propose additional studies, as well as refuting the study in dispersed locations and in different countries.

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