Prevalence of coronary risk factors in load transport drivers
Prevalência de fatores de risco coronariano em motoristas de transporte de carga

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ABSTRACT | Introduction: Non-communicable diseases are the main cause of mortality worldwide, with risk factors that contribute to their development, including those associated with work activity. Objectives: To evaluate the prevalence of risk factors related to the development of non-communicable diseases and their relationship with work activity in professional load transport drivers. Methods: Eighty male truck drivers were assessed (39.73±10.91 years) with 15.22±12.09 years of professional experience. In addition to collection of anthropometric data and measurement of blood data, drivers answered three questionnaires: Physical Activity Readiness Questionnaire, Coronary Risk, and Finnish Diabetes Risk Score. Descriptive and inferential analyses were performed using Pearson correlation and Student’s t test, considering a significance level of p < 0.05. Results: The results showed a prevalence of arterial hypertension of 31.30% and a medium coronary risk (46.30%), a factor that was directly associated with time of professional performance (r = 0.519; p < 0.05). Of the 80 truck drivers, 48.80% were physically inactive, 73.80% were overweight, and 7.50% had a high risk for the development of diabetes. Conclusions: The professional category studied presents an excess risk for health problems in the context of non-communicable diseases due to the peculiar characteristics of their profession.

Keywords | cardiovascular diseases; health promotion; primary prevention.

RESUMO | Introdução: As doenças crônicas não transmissíveis são a principal causa de morte no mundo, existindo fatores de risco que contribuem para sua formação, inclusive associados à atividade laboral. Objetivos: Avaliar a prevalência de fatores de risco relacionados ao desenvolvimento de doenças crônicas não transmissíveis e sua relação com a atividade laboral em motoristas profissionais de transporte de carga. Métodos: Foram avaliados 80 caminhoneiros do sexo masculino (39,73±10,91 anos) com 15,22±12,09 anos de experiência profissional. Além dos dados antropométricos e mensuração da pressão arterial, os motoristas responderam a três questionários: Physical Activity Readiness Questionnaire, Risco Coronariano e Finnish Diabetes Risk Score. Realizou-se análise descritiva e inferencial por meio da correlação de Pearson e teste t de Student, adotando nível de significância de p < 0,05. Resultados: Os resultados demonstraram prevalência de hipertensão arterial de 31,30%, com o risco de desenvolvimento coronariano médio (46,30%), estando este fator associado diretamente ao tempo de profissão (r = 0,519; p < 0,05). Dos 80 caminhoneiros, 48,80% eram fisicamente inativos, 73,80% com excesso de peso e 7,50% com alto risco para o desenvolvimento de diabetes. Conclusões: A categoria laboral estudada apresenta excesso de risco para agravos à saúde no âmbito das doenças crônicas não transmissíveis devido às características peculiares de sua profissão.

Palavras-chave | doenças cardiovasculares; promoção da saúde; prevenção primária.

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INTRODUCTION

Non-communicable diseases (NCD) are the main cause of population’s morbidity and mortality, being recognized as an important public health problem with potential risk of increase over time, thus leading to a rise in public health costs.

Prior diagnosis of NCD minimizes relevant health problems and favors early adoption of preventive measures. Some specific, validated, and internationally accepted questionnaires, such as the Physical Activity Readiness Questionnaire (PAR-q), the coronary risk table proposed by the Michigan Heart Association (MHA), and the Finnish Diabetes Risk Score (FINDRISC), are interesting alternatives that contribute in this diagnosis. These instruments have already been used in previous studies and are appropriate for use in epidemiological studies, due to their simplicity and low cost, allowing for the assessment of large population samples.

Among the factors related to the development of NCD, it is possible to mention systemic arterial hypertension as one of the most important causes of cardiovascular mortality in adults, with a high prevalence and incidence in this population. The body mass index (BMI), which assesses nutritional status, is also associated with risk factors for the development of these diseases. The combination of these two variables represents a high risk for the population and is one of the most relevant causes of cardiovascular morbidity and mortality in adults.

The development of coronary disease, in addition to being associated with genetic, behavioral and environmental factors, may also be directly influenced by work activities. Some of these activities, due to their peculiarities, interfere with workers’ life habits, leading to a high prevalence of health risks. In this sense, there is an evident need to conduct studies with at-risk populations in order to provide support for the adoption of effective strategies to control this situation.

The work environment of professional truck drivers is characterized by long sedentary hours, due to the time they spent in the sitting position, and erratic schedules and time pressure, with few opportunities to access healthy food options or environments conducive to physical activity. As a result, truck drivers are consistently identified as being at increased risk of developing NCD, due to poor nutritional quality and physical activity-related conditions, such as obesity, cardiovascular diseases, and diabetes. Furthermore, exhausting work routine, due to working outdoors, subject to weather, traffic and road conditions, may lead to implications for workers’ psychophysiological status, thus enhancing the risk of developing NCD.

Most of the Brazilian economy is linked to road transport, enabling several other economic sectors. According to updated data from the National Department of Traffic, there are 2,858,377 trucks in Brazil, accounting for 2.68% of the total number of vehicles in the country, of which 1,264,521 are in the Southeast region, and 348,874 in the state of Minas Gerais. Since drivers of these vehicles transport essential products and raw material to manufacture several other consumer goods, they carry a great economic and social responsibility and are considered to play an important role in our society.

Considering the relevance of these professionals to society and the risks to which they are exposed due to their work activity, specific studies are necessary to support government authorities in taking public health measures for this workers’ group.

Therefore, the present study assessed the prevalence of risk factors related to the development of NCD and its relationship with work activity in professional load transport drivers.

METHODS

SAMPLE POPULATION

This non-probabilistic, convenience sample consisted of 80 professional load transport drivers from two municipalities in the state of Minas Gerais, Brazil. This descriptive, cross-sectional study was conducted after approval of the Human Research Ethics Committee of Universidade Federal de Viçosa (opinion no. 875.283 and Certification of Presentation for Ethical Assessment [Certificado de Apresentação de Apreciação Ética, CAAE]: 37759114.7.0000.5153), in compliance with Resolution 466/2012 of the Brazilian National Health Council.
As inclusion criteria, participants should be male, be in full work activity, and have a fixed residence in one of the municipalities studied. Truck drivers were invited to voluntarily participate in the study by initially contacting the companies at which they worked. Once approval was obtained from the companies, drivers were personally and individually invited to participate, in the patio of these facilities during their office hours. Those professionals who agreed to participate in the study were conducted to a reserved room, where data collection was performed, after explanation and signing of the Informed Consent Form.

As an instrument for data collection, we used a questionnaire adapted from a physical evaluation and exercise prescription software named AVAESPORTE, with questions to evaluate sociodemographic and occupational characteristics, in addition to life habits, such as smoking and alcohol consumption, and self-reported anthropometric variables (weight and height) to categorize BMI. Furthermore, specific, validated and internationally accepted questionnaires were used, which contributed to the previous diagnosis of NCD, namely the PAR-q, the coronary risk table proposed by the MHA, and the FINDRISC.

Data were collected in a reserved room in the participants’ workplace, in the respective furniture factories and/or cooperatives of the municipalities. Data collection was conducted by a single evaluator.

In addition to applying the questionnaires, blood pressure was measured using a Premium aneroid sphygmomanometer. Pressure was measured on the left arm after the participant remained at rest for 5 minutes. Drivers were classified as hypertensive if they had a systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg or those who reported having the disease and making use of medications.

**STATISTICAL ANALYSIS**

Initially, the Kolmogorov-Smirnov test for normality assumption was performed. Pearson’s correlation was calculated to assess the relationship between time of professional performance and coronary risk. Significance level was set at α = 0.05, and analyses were performed using the Statistical Package for Social Sciences (SPSS) software, version 20.

**RESULTS**

The main characteristics of the sample are presented in Table 1, and most participants consider their work

**Table 1. Occupational and health profile of professional load transport drivers (n = 80)**

| Variable | Total |
|----------|-------|
| Age (years) | 39.73±10.91 |
| Time of professional performance (years) | 15.22±12.09 |
| Systolic blood pressure (mmHg) | 123.13±11.31 |
| Diastolic blood pressure (mmHg) | 78.00±8.33 |
| Sleeping hours | 6.28±1.65 |
| Work activity (%) | |
| Mild | 21.30 |
| Moderate | 42.80 |
| Intense | 35.00 |
| Smoking (%) | 27.50 |
| Alcohol consumption (%) | 61.30 |
| Use of illicit drugs (%) | 750 |
| Physical inactivity (%) | 68.80 |
| Consider their diet (%) | |
| Appropriate | 36.30 |
| Inappropriate | 11.30 |
| Could be better | 52.40 |
| Difficulty sleeping (%) | |
| Yes | 30.00 |
| No | 70.00 |
| Sleep quality (%) | |
| Poor | 15.00 |
| Fair | 16.30 |
| Good | 60.00 |
| Excellent | 8.70 |
| Risk for type 2 diabetes mellitus (%) | |
| Low | 36.30 |
| Slightly moderate | 31.20 |
| Moderate | 25.00 |
| High | 7.50 |
| Body mass index (%) | |
| Normal | 26.20 |
| Overweight | 38.80 |
| Obesity class 1 | 20.00 |
| Obesity class 2 | 3.80 |
| Obesity class 3 | 11.20 |
| Physical Activity Readiness Questionnaire (PAR-q) (%) | |
| Fit | 51.20 |
| Unfit | 48.80 |
| Self-reported arterial hypertension (%) | |
| Yes | 31.30 |
| No | 68.70 |
activity as moderate (42.80%) or intense (35.00%). Overall, 30.00% of drivers reported difficulty sleeping, a high percentage (61.30%) reported using alcohol, and 7.50% reported using illicit drugs. Most of the sample (68.80%) was considered physically inactive and was overweight (73.80%). Moreover, 31.30% of participants had a self-reported diagnosis of arterial hypertension.

In the evaluation of coronary risk, 51.20% of participants showed risk above the medium level (Table 2).

A positive correlation was observed between coronary risk and time of professional performance \((r = 0.519; p < 0.05)\), with this risk increasing as time of professional performance increases.

**DISCUSSION**

The present study aimed to evaluate the prevalence of risk factors related to the development of NCD and their relationship to time of professional performance in professional load transport drivers from two municipalities in the state of Minas Gerais, Brazil.

Mean age of load transport drivers in our study \((39.73\pm10.91)\) is similar to that observed in other studies with this population.18,19 In their study, Sendall et al.12 found transport drivers in full work activity who were 70 years or older. This age profile may suggest that certain coronary characteristics typical for this age group are evident in this population, related to aging.

**Table 2. Prevalence of the different coronary risk scores as proposed by the Michigan Heart Association (MHA) in professional load transport drivers (n = 80)**

| Coronary risk      | Total (%) |
|-------------------|-----------|
| Below-average     | 2.50      |
| Medium            | 46.30     |
| Moderate          | 41.30     |
| High              | 8.70      |
| Very high         | 1.20      |

Time of professional performance is another factor that needs to be explored with caution, since there is evidence that professional drivers with more 10 years of experience are more exposed to the risk of acute myocardial infarction (AMI) compared to those with less time of experience.20 Considering that average time of professional performance was 15.20 ± 12.09 years in the present study, it is possible to estimate that its population is at risk for AMI, thus requiring a preventive action.

Among the occupational characteristics identified in the study, we observed that most respondents assessed their work activity as moderate or intense, corroborating previous results.21,22 Professional load transport drivers are exposed to an exhausting work routine, which may lead to implications for their psychophysiological status.14,15

Sleep is known to exert influence on individuals’ physical, psychological and social conditions and to play an important role in their lives.23 In the present study, drivers’ average sleeping hours was low, which also occurred in other studies21,23 and may be one of the reasons that led to psychological changes in these professionals. Not sleeping the appropriate number of hours may cause risks in the short term, such as tiredness and sleepiness during the day, irritability, mood changes, loss of recent memory, impaired creativity, reduced ability to plan and execute, slow reasoning, lack of attention, and difficulty concentrating,21,23 which characterizes a serious problem, since these professionals are required to be constantly alert to perform their activity, which usually consists of more than 9 hours of work per day.12 Thus, when planning health actions targeted to this professional category, it is extremely important to address the sleep factor.

Other factors associated with increased risk of developing NCD were smoking, alcohol consumption, and drug use. The participants in this study are more likely to smoke compared to others studies conducted with the same professional category.16,24 Smoking is one of main causes of preventable death and is associated with several health problems, especially the cancer and cardiovascular and pulmonary diseases.25 Therefore, it is essential to promote awareness
campaigns on the harms of smoking in the population concerned, in order to reduce its prevalence.

Alcohol consumption was highly reported by participants (61.30%), especially compared with other studies with the same population group. The rates of alcohol use observed among drivers are worrying, since this population is involved in a high number of traffic accidents. In view of these findings, it bears emphasizing the importance of a more rigorous inspection of compliance with the already existing specific legislation (Lei Seca [Dry Law] 12,760/12) in order to inhibit alcohol consumption and preserve the safety of this population.

With regard to the use of other drugs, it is difficult to make inferences, due to the complexity in evaluating this variable. Few Brazilian studies used toxicological analysis or self-reports to investigate drug consumption. In a study conducted by Takitane et al., participants’ urine was assessed for the presence of amphetamine, and 10.80% of the samples tested positive for this substance. Of these individuals, less than a half (42.90%) reported having used the drug, showing the difficulty in conducting an actual survey by means of self-reported use of illicit substances. A total of 7.50% of respondents spontaneously reported using illicit substances, a worryingly high rate, due to the severity of consumption of this type of substance by professional drivers. The consumption of any amount of psychoactive substances may lead to cognitive changes not consistent with safe driving, due to the acute, residual and withdrawal effects of these substances.

As for eating habits, findings were consistent with expectations. Most drivers interviewed (63.70%) expressed dissatisfaction with their diet. When investigating this group of workers and their relationship with eating habits, some authors observed that most of these professionals rely on food establishments that usually provide high-calorie and low-nutritional food. Furthermore, due to the specific characteristics of the profession, meal times are considered inadequate as well.

Assessment of BMI showed that 35.00% of participants in the present study were considered obese. These findings were similar to those of studies with the same professional category, evidencing a negative characteristic for this parameter in this profession.

Obesity is associated with a series of diseases, including cardiovascular and cerebrovascular diseases, metabolic disorders, some types of cancer, hypertension, and diabetes, and is a public health challenge. Therefore, campaigns aiming at combating the high prevalence of obesity are necessary to increase quality of life and health of these professionals, who are so important for the country’s economy.

In this sense, regular physical activity becomes desirable and necessary, considering the variety of associated benefits.

Still analyzing the behavioral aspects in the group studied, there was a high prevalence of physical inactivity (68.80%), also observed in other studies with a population of load transport drivers. The sedentary behavior characteristic of this type of profession may worsen even more the health condition of this professional group, since they remain in the setting position for several hours a day. The adoption of a more physically active lifestyle should be encouraged in order to minimize the effects of sedentary behavior.

A more detailed pre-exercise examination is necessary in this population before the development of a physical activity plan, since 48.80% of the group evaluated were not considered able to start a specific exercise program, as shown by the PAR-q (Table 1). With regard to the results derived from this evaluation, it was observed that, among the affirmative answers for the incapacity to perform regular physical activity, the most prevalent was the one related to osteoarticular complications (35.00%). This finding may be explained by the sitting posture adopted by these professionals during their working hours. This analysis reinforces the importance of studies assessing ergonomics in the work performed by drivers, aiming to improve their quality of life and consequently their health. Moreover, stretching activities should be part of the work routine of these professionals, which could reduce the incidence of orthopedic problems, such as low back pain.
Arterial hypertension among participants showed values similar to those observed by other studies with the same professional category. The prevalence found in our study is lower than that described for the Brazilian male population (35.80%), which is a positive comparative factor, but should not be neglected by those involved, since arterial hypertension is one of the main coronary risk factors.

With regard to the risk of developing type 2 diabetes mellitus through the FINDRISC, scores were similar or higher than that found in others populations assessed by the same instrument. The prevalence of moderate-to-high risk (32.50%) observed in the present study, as assessed by FINDRISC scores, evidences the need for educational health actions targeted to this professional class.

High scores were observed when assessing coronary risk according to the table proposed by the MHA. Most drivers studied (51.20%) were classified into moderate to very high risk scores. In a certain way, these results are surprising, due to the health profile of the professionals studied. Coronary risk is estimated from the relationship between some risk factors, namely age, heredity, weight, smoking, physical activity, sex, cholesterol percentage, and systolic blood pressure. The results obtained in the present study and in other studies with the same population revealed that these individuals are exposed to health complications, when considering the aforementioned variables. Therefore, health interventions are recommended to reverse this reality.

In the present study, increased coronary risk was related to longer time of professional performance (p < 0.05), which evidences the need for these professionals to develop and maintain a healthier routine, especially those with longer experience in the profession.

It is worth noting that the present study has limitations, such as the fact that it was conducted in only two municipalities in the state of Minas Gerais, and data cannot be extrapolated to the entire professional category. Another limitation was related to blood pressure, which could be measured only once, due to the characteristics of participants’ activity; thus, the prevalence of arterial hypertension found here should be seen with caution.

The present study shows the need to pay greater attention to professional load transport drivers. The classifications and scores related to risk factors for the development of NCD presented worrying values and should be controlled with immediate actions aimed at recovery, prevention and promotion of health. The economic impact promoted by truck drivers is essential to the Brazilian economy, but the health of these professionals is the main parameter to be observed and monitored during drivers’ time of professional performance.

CONCLUSIONS

The professional category studied presents a high risk for health problems in the context of NCD, due to the peculiar characteristics of their profession, which exerts a negative influence on their life habits.

Coronary risk, assessed according to MHA proposal, was considered high, which suggests the need to implement lifestyle changes in this professional group. The adoption of a healthier lifestyle by engaging in regular physical activity and eating a balanced diet should become a habit. Actions such as controlling body weight, reducing alcohol intake, and not smoking should also be a priority. The sum of these behaviors will improve the quality of life of these workers and, thus, will lead to changes in risk behaviors to which they are exposed.

**Author contributions**

BBB was responsible for study conceptualization, data curation, formal analysis, investigation, methodology, software, and writing – original draft. FGF was responsible for data curation, formal analysis, methodology, supervision, presentation, and writing – review & editing. HHTR was responsible for supervision, validation, presentation, and writing – review & editing, and JCBM was responsible for study conceptualization, methodology, project management, resources/materials, software, supervision, validation, writing – original draft and writing – review & editing. All authors approved the final version submitted and take public responsibility for all aspects of the work.
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