Fatigue and alcohol consumption in heavy truck drivers

Relación de fatiga y consumo de alcohol en conductores de carga pesada

Fadiga e consumo de álcool em condutores de camiões pesados

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Abstract

Introduction: Fatigue, a feeling integrated by physical, mental and neurosensorial symptoms of exhaustion, tiredness and lack of energy, can be a conditioning factor that increases the vulnerability of the working population to acquire harmful behaviors such as alcohol consumption, especially in heavy truck drivers. Objective: To identify the relationship between fatigue and alcohol consumption in heavy truck drivers in Nuevo Laredo, northern border of Mexico. Methodology: Cross-sectional study, with descriptive-correlational design, in a sample of 224 drivers selected by non-probabilistic sampling. Participants who were active at work and who drove fifth-wheel trucks were included, and those who did not complete the questionnaires were excluded. A Sociodemographic Data Questionnaire, the Subjective Symptoms of Fatigue Test and the AUDIT Test were applied. The confidentiality and anonymity of the participants was guaranteed. The data were processed using the SPSS statistical package version 24.0, by means of nonparametric inferential analysis. Results: Drivers with low fatigue 87.1% prevailed, and those with risky consumption, that is, 58.0%, which were followed by dependent consumption, that is, 23.2%. A statistically significant positive relationship was identified between driver fatigue and alcohol consumption with $r = .230$, $p = .001$. Conclusions: The findings indicate that the greater the fatigue, the greater the alcohol consumption in heavy truck drivers, which highlights the need for the design and implementation of effective and timely nursing interventions that contribute to reduce health risk behaviors.

Key words: Fatigue; Alcohol abuse; Transportation; Motor vehicles (DeCS).

Resumen

Introducción: La fatiga, sensación integrada por síntomas físicos, mentales y neurosensoriales de agotamiento, cansancio y falta de energía, puede ser un condicionante que incremente la vulnerabilidad en la población laboralmente activa para adquirir conductas nocivas como el consumo de alcohol, especialmente en conductores de carga pesada. Objetivo: Identificar la relación de la fatiga y el consumo de alcohol en conductores de carga pesada de Nuevo Laredo, frontera norte de México. Metodología: Estudio transversal, con diseño descriptivo-correlacional, en una muestra de 224 conductores seleccionados mediante muestreo no probabilístico. Se incluyeron participantes laboralmente activos y que condujeran camiones de quinta rueda, y se excluyeron a quienes no cumplieran con el llenado completo de los cuestionarios. Se aplicó una Cédula de Datos Sociodemográficos, la Prueba de Síntomas Subjetivos de Fatiga y la Prueba AUDIT. Se garantizó la confidencialidad y anonimato de los participantes. Los datos fueron procesados a través del paquete estadístico SPSS versión 24.0, mediante análisis inferencial no paramétrico. Resultados: Prevalecieron los conductores con fatiga baja 87.1 %, y quienes tenían un consumo riesgoso 58.0 %, y un consumo dependiente 23.2 %. Se identificó una relación positiva estadísticamente significativa entre fatiga y consumo de alcohol de los conductores con $r = .230$, $p = .001$. Conclusiones: Los hallazgos indican que a mayor fatiga mayor consumo de alcohol en los conductores de carga pesada, lo cual pone en evidencia la necesidad del diseño e implementación de intervenciones eficaces y oportunas de enfermería que contribuyan a disminuir conductas de riesgo para la salud.

Palabras clave: Fatiga; Abuso de alcohol; Transportes; Vehículos a motor (DeCS).

Resumo

Introdução: A fadiga, uma sensação integrada por sintomas físicos, mentais e neurosensoriais de exaustão, cansaço e falta de energia, pode ser um factor condicionante que aumenta a vulnerabilidade da população activa à aquisição de comportamentos nocivos, tais como o consumo de álcool, especialmente em condutores de veículos pesados. Objetivo: Identificar a relação entre o cansaço e o consumo de álcool em condutores pesados em Nuevo Laredo, na fronteira norte do México. Metodologia: Estudo transversal, com um desenho descritivo-correlacional, numa amostra de 224 condutores selecionados por
amostragem não probabilística. Foram incluídos os participantes que estavam activos no trabalho e que conduziam camiões de quinta-roda, e foram excluídos os que não preenchiham os questionários. Foi administrado um Questionário de Dados Sociodemográficos, o Teste dos Sintomas Subjectivos de Fadiga e o Teste de AUDIT. A confidencialidade e o anonimato dos participantes foram garantida. Os dados foram processados utilizando o pacote estatístico SPSS versão 24.0, por meio de análise inferencial não paramétrica. **Resultados:** Prevaleceram os condutores com baixa fadiga 87,1%, e os com consumo de risco, ou seja, 58,0%, a que se seguiu o consumo dependente, ou seja, 23,2%. Uma relação positiva estatisticamente significativa entre a fadiga do condutor e o consumo de álcool foi identificada com rs = .230, p = .001. **Conclusões:** Os resultados indicam que quanto maior é a fadiga, maior é o consumo de álcool nos motoristas de pesados, o que realça a necessidade de conceber e implementar intervenções de enfermagem eficazes e atempadas que contribuam para reduzir os comportamentos de risco para a saúde.

**Palavras-chave:** Fadiga; Abuso de álcool; Transportes; Veículos automotores (DeCS).

**Introduction**

Alcohol consumption is a serious public health problem worldwide due to the magnitude of consumption and the multiple consequences, among which cardiovascular problems \(^{(1,2)}\), cancers \(^{(3)}\), mental disorders \(^{(4)}\), as well as social \(^{(5)}\) and occupational \(^{(6)}\) problems in the general population \(^{(7)}\) stand out. However, one of the populations more vulnerable to health risks such as alcohol consumption are workers, especially those engaged in driving, such as heavy truck drivers \(^{(8,9)}\). This is probably due to high work demands, such as long working hours, changing shifts, low wages and time pressures for delivery of goods, which may exceed their capabilities and generate both mental and physical strain \(^{(10)}\).

According to statistics on alcohol consumption among drivers in Colombia, 18.8% report risky and harmful alcohol consumption \(^{(11)}\) and more than a quarter of the drivers (27.0%) mentioned consumed alcohol during their working day, 88.6% reported having consumed alcohol once in their lifetime, 6.3% in the last 12 months and 4.7% in the last 30 days. A total of 33.3% reported drinking alcohol on a weekly basis and 16.7% every two weeks \(^{(12)}\). In Mexico, a study \(^{(13)}\) identified that 14% of cargo drivers reported being under the influence of alcohol during their workday and 8.9% of deaths were attributed to drug use.

In accordance with the foregoing, there is a high prevalence of alcohol consumption in drivers, which may be due to various circumstances where fatigue stands out as a form of escape from the various symptoms of burnout \(^{(12,14)}\). It should be noted that fatigue is a feeling comprised of physical, mental and neurosensory
symptoms of exhaustion, tiredness, and lack of energy (15), which becomes a complex phenomenon when driving, since it reduces alertness and awareness levels, increasing the occurrence of road accidents (16). In this regard, a study conducted on public transport drivers in Colombia reported a significant association ($X^2 = 2.1$, $p = .041$) showing that those who sleep only 1 to 5 hours a day have a higher prevalence of alcohol consumption (57.6 %), compared to those who sleep between 6 to 10 hours (42.5 %) (12).

In Mexico, studies on drivers have been characterized mostly by those who drive passenger transportation, which investigate descriptive aspects of prevalence and health-related ailments (17-19). However, heavy freight transport has different characteristics. For example, an important point to highlight about heavy truck vehicles is their dimensions and the size of the load they carry, which makes them even more dangerous (20).

It should be noted that Nuevo Laredo, on Mexico’s northern border, is one of the cities most used by heavy freight drivers because it is the main land transit port for trade and commerce and generates significant economic growth due to the high volume of transportation of various products to the United States (21). However, there is currently a lack of research related to the topic of interest, because there is a gap in the relevant knowledge to be explored.

Thus, it is considered necessary to know the risk conditions, such as fatigue, associated with alcohol consumption in drivers, so that the nursing professional, among other disciplines in the health area, can adequately meet the needs of this population, as well as increase preventive actions towards risk behaviors in drivers of heavy trucks, which is a population that has been little studied. Therefore, the research question was prepared, that is, what is the relationship between fatigue and alcohol consumption in heavy truck drivers in Nuevo Laredo, city located in the northern border of Mexico? Moreover, it was considered pertinent to enunciate the objectives: a) Describe the level of fatigue in heavy truck drivers; b) determine the prevalence (lifetime, last year, last month, and last seven days) of alcohol consumption; and c) describe the patterns of alcohol consumption (risk, dependent, and harmful) in heavy truck drivers in Nuevo Laredo, city located in the northern border of Mexico.
**Methodology**

Cross-sectional study with a descriptive, correlational design (22). In a sample of 224 heavy truck drivers from two transportation companies located in Nuevo Laredo, Tamaulipas, city located in the northern border of Mexico, sample calculated in the statistical package nQuery Advisor version 7.0, power of 95%, significance of .05, correlation of .30 and non-response rate of 10%. Sampling was non-probabilistic, and included active cargo drivers of working age (18 to 65 years), both sexes, who used fifth-wheel trucks for the transport of dry boxes (48 or 53 feet, double trailers), refrigerated, fixed platforms, extendable platforms, and dollies (vehicle carriers), and who were available to fill out a battery of self-applicable instruments detailed below. Participants who used trucks or vehicles for moving, parcels, machinery and auto tanks or pipes, and who did not complete the filling of the instrument, were excluded.

The battery of instruments consisted of a sociodemographic data and alcohol consumption prevalence questionnaire created specifically for this purpose, which collected general information such as age, marital status, schooling, prevalence of consumption classified as once in a lifetime, in the last year, last month, and last seven days. The Subjective Fatigue Symptoms Test (23), adapted to the Mexican context, measures the magnitudes of fatigue presented by workers and has reported an acceptable Cronbach's alpha reliability of 0.89 (24). It consists of 30 items, with a dichotomous response option (yes and no). It has three subscales: a) drowsiness and heaviness, difficulty in concentrating and projection of physical discomfort. The total scale ranges from 0 to 30 points, where a higher score suggests greater fatigue. An acceptable total reliability of .88 was obtained, in the first subscale .794, second .726, and third .756.

The Alcohol Use Disorders Identification Test (AUDIT), an instrument designed by the WHO, consists of 10 multiple-choice items and allows the identification of alcohol use and abuse. It identifies types of consumption, that is, risky, dependent and harmful. The total scale ranges from 0 to 40 points, where a higher score suggests a higher level of risk for alcohol consumption. Scores lower than 8 are considered
cases of risky consumption, while scores greater than or equal to 8 comprise cases of harmful consumption. An acceptable reliability of .77 \(^{(25)}\) was obtained.

For the collection, the FAEN-D-1626 registration was obtained from the Research and Research Ethics Committees of the Nursing School of the University and the authorization of the directors of the participating companies. The drivers were invited to participate voluntarily and anonymously, and were informed of the objectives and the instructions for filling out the questionnaire, and those who accepted signed the informed consent form. At any time, the protection of the participants' rights, as well as their confidentiality and freedom of participation, was ensured, pursuant to the Regulations of the General Health Law on Health Research, in accordance with Chapter I, Title Two of the Ethical Aspects of Research on Human Beings \(^{(26)}\).

The statistical process was carried out using the Statistical Package for the Social Sciences (SPSS) version 24.0 for Windows 10. Descriptive statistics (frequencies, proportions, measures of central tendency, and dispersion) and nonparametric inferential statistics (Spearman's correlation coefficient) were used because the variables did not report normality in the distribution of the data, which was identified using the Kolmogórov-Smirnov test with Lilliefors correction.

**Results**

All the participants were male, with an average age of 41.2 years (SD=±10.5), with a prevalence of those who reported having a partner (86.6%) and high school education (57.6%). Likewise, 77.7% were national highway drivers, 46% worked night shifts, drove an average of 16.0 hours per trip with an average of 15.7 years (SD=±10.76) of work experience (Table 1).
It was seen that most of the participants showed a low level of fatigue (87.1%) (Table 2).

It was seen that most of the participants showed a low level of fatigue (87.1%) (Table 2).

Regarding the prevalence of alcohol consumption, 86.6% of the heavy truck drivers had drank alcohol at some time in their lives (Table 3).

Moreover, it was seen that the average age of onset of consumption was 17.9 years, drinking an average of 4.9 alcoholic beverages in a typical day where beer was the most consumed beverage (72.8%), followed by liquor (27.2%).
Table 3. Prevalence of alcohol consumption by heavy truck drivers, 2021, n= 224

<table>
<thead>
<tr>
<th>Prevalence of alcohol consumption</th>
<th>Yes</th>
<th>No</th>
<th>IC 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>Sometime in their life</td>
<td>194</td>
<td>86.6</td>
<td>30</td>
</tr>
<tr>
<td>In the last year</td>
<td>155</td>
<td>69.2</td>
<td>69</td>
</tr>
<tr>
<td>In the last month</td>
<td>111</td>
<td>49.6</td>
<td>113</td>
</tr>
<tr>
<td>In the last seven days</td>
<td>59</td>
<td>26.3</td>
<td>165</td>
</tr>
</tbody>
</table>

Source: Own development. f = Frequency, % = Percentage, IC = Confidence Interval of 95%, LI = Lower limit, LS = Higher limit

In describing the alcohol consumption patterns of the heavy truck drivers, it was shown that in 81.3% their alcohol consumption was risky and the consumption of 18.7% was harmful, (Table 4).

Table 4. Patterns of alcohol consumption in heavy truck drivers, 2021, n= 224

<table>
<thead>
<tr>
<th>Variable</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risky consumption</td>
<td>182</td>
<td>81.3</td>
</tr>
<tr>
<td>Harmful consumption</td>
<td>42</td>
<td>18.7</td>
</tr>
</tbody>
</table>

Source: Own development. f = Frequency, % = Percentage

Regarding the relationship between fatigue and alcohol consumption in heavy truck drivers in Nuevo Laredo, a statistically significant positive relationship of low intensity was found (rs= .230, p= .001, (Figure 1). This indicates that the greater the feeling of fatigue, the greater the involvement with alcohol consumption in heavy truck drivers. Likewise, statistically significant positive relationships were found between the subscales of fatigue, drowsiness and heaviness (rs= .185, p= .005), difficulty concentrating (rs= .210, p= .002) and projection of physical discomfort (rs= .268, p = .001).
Figure 1. Scatter plot between alcohol consumption and fatigue among heavy truck drivers. 2021, n=224

Source: Own development.

Discussion

Based on the objective of identifying the relationship between fatigue and alcohol consumption in heavy truck drivers in Nuevo Laredo, city located in the northern border of Mexico, it was found that the entire population was male, with a predominant age of 41.2 years, married participants with a high school education. These data are in agreement with several authors (13, 27, 28) who pointed out that driving is an activity mainly for men, which demands physical and mental effort that requires the driver to develop skills and abilities for its performance. Additionally, this activity is considered a common trade, so it does not require professional academic preparation, only basic education and various driver training courses, depending on the type of vehicle, the product being transported, and the logistical operations (29).

Low fatigue followed by moderate fatigue prevailed. These results are in agreement with a study carried out in Peruvian drivers (30), where it was noted that almost half of the participants showed mild fatigue followed by moderate fatigue. Another study performed in Colombian drivers (31), showed similarities in the presence of physical fatigue, including symptoms such as having the desire to lie down, feeling thirsty, tired body and eyesight, and experiencing back pain during the driving activity.
Although in the present study, the fatigue assessment highlighted the presence of mild fatigue, which does not affect the worker’s health, less than a quarter of the drivers presented moderate fatigue. This level can cause damage to the worker’s health, as well as jeopardize the transport operation \(^{(30,31)}\). It is worth noting that most of the participants drove an average of 16.0 hours per trip, which could increase the symptoms of drowsiness, heaviness and difficulty concentrating, thus increasing the rate of accidents and risky behaviors \(^{32}\).

Likewise, alcohol consumption at some time in life prevailed, while consumption in the last year was second. These results match a study of transport drivers in Peru \(^{(33)}\), which showed that almost all the participants had drank alcoholic drinks at some time in their lives, followed by consumption in the last year in the second place. The results of alcohol consumption reported exceeded the national average \(^{(34)}\) and could be due to the long working hours, the reduced number of hours to sleep, or being away from the family, as a way of coping with such situations. Furthermore, although alcohol is a Central Nervous System (CNS) depressant drug, it initially produces euphoric and stimulation effects, which could be mistaken for a stimulant drug, so drivers consider it necessary to cope with their long working hours \(^{(34,35)}\).

Risky consumption prevailed among drivers, followed by harmful alcohol consumption. These findings coincide with those reported in a study conducted among drivers of a transportation company in Colombia \(^{(36)}\), where half of the participants showed risky consumption and a smaller number reported harmful consumption. These findings allow us to identify an alarming public health problem in this group of workers, making it necessary to strengthen nursing prevention and intervention actions to reduce harmful health behaviors, such as alcohol consumption.

Finally, it was found that the higher the overall fatigue score, as well as the subscales of drowsiness and heaviness, difficulty concentrating, and projection of physical discomfort, the higher the alcohol consumption in heavy-duty drivers. It should be noted that all correlation coefficients identified were of low intensity, but statistically significant \(^{(37)}\). In this regard, a study conducted on drivers in Thailand \(^{(38)}\) showed
that more than half of the drivers always consumed beverages to control fatigue while on duty. As mentioned above, alcohol is a CNS depressant, which, along with fatigue, reduces the capacity for coordination, adequate decision making and reaction to a dangerous driving situation, which increases the probability of road accidents, generating invaluable human, economic and environmental losses (39). The low intensity of the coefficients may be due to various factors, but emphasis is placed on the accuracy of the self-report provided by the participants. This is due to the fact that the instruments used depend on the participant’s memory and perception. According to the authors of this study, it was identified that participants may underestimate their perception of fatigue, mainly because they are used to; a similar situation could occur in the self-report of addictive substances (40).

However, the following limitations should be noted. The present study was cross-sectional, so the results should be interpreted with caution, without making inferences of causality. Also, because heavy truck drivers are a population with limited free time to respond to surveys, their responses could imply a certain bias. In the same vein, other research adds that the lack of regular working hours could have implications for the appreciation of fatigue (16). Finally, one option to improve the understanding of the phenomenon of fatigue and alcohol consumption could be to resort to qualitative approaches, or by means of a triangulation framework (41) where possible sources of bias (e.g., work shift) are controlled through the study design and statistical covariates.

Conclusions

According to the results obtained, it was concluded that there was a statistically significant positive association between the study variables, indicating that the greater the fatigue, the greater the alcohol consumption among heavy truck drivers in Nuevo Laredo, a city located in the northern border of Mexico. Likewise, most of the sample showed a low to moderate level of fatigue. Regarding alcohol consumption, drivers who had drank alcohol at least once in their life and in the last year, and those who showed a risky consumption, prevailed.
The above justifies the need to investigate fatigue levels in heavy truck drivers, in whom high prevalence of alcohol has been reported. Likewise, the findings invite collaboration in networks to investigate risks such as fatigue and alcohol consumption, so that knowledge is produced to guide future nursing interventions to reduce risk behaviors among heavy truck drivers, taking into account that this population is of utmost importance for the economic growth of our country and that they have a strong impact on public health.

**Conflict of interest**

The authors stated that they have no conflicts of interest.

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