Roncopathy and daytime somnolence in autotransport workers

Angel Ramirez Matus1*, Carlos Eduardo Marina Hernandez2, Lesly Joanna García Gómez2

INTRODUCTION
Currently, Nuevo León is a national leader in road accidents, according to official data, during 2016, there were 75,931 traffic accidents. There were also more than 600 deaths per year resulting from crashes. Snoring is a common social problem. Daytime sleepiness that interferes with an attention and functioning is a social health problem.

Methods: This was an analytical, cross-sectional and prospective study. Primary mode, epidemiological type, pilot test. Two instruments were used for data collection; the Epworth test, to measure excessive daytime sleepiness and the Berlin questionnaire for snoring. For the descriptive statistics we obtained the mean, standard deviation, as well as the frequencies as percentages. In the inferential statistics, the ordinal variables were correlated with the Spearman's Rho coefficient with a less than 0.05 and Chi square was used for the nominal variables.

Results: 30 participants were surveyed. 23.3% were identified with normal sleep, 6.7% with medium somnolence and 70% with abnormal somnolence. As for the snoring, 30% were without risk, 17% with low risk and 53% with high risk of suffering it. The snoring and diurnal sleepiness were correlated, finding a moderate positive relationship (0.517) and statistically significant (ρ=0.003).

Conclusions: Snoring and breathing disorders during sleep are associated with daytime sleepiness in truck workers.

Keywords: Snoring, Drowsiness, Workers
which can lead to vehicular accidents, decreased school or work performance, and decreased quality of life.\textsuperscript{5-8} Obstructive sleep apnea and chronic rhoncopathy are also related as pathologies and are among the most multidisciplinary diseases in medicine today.\textsuperscript{9,10} Although snoring and daytime sleepiness are very common, it is not known how many trucking workers in the citrus region of Nuevo Leon suffer from these conditions, and because trucking workers work night shifts, it may be that sleep-disordered breathing may be exacerbated in them.

This pathology is easily detected, so that accidents or associated diseases could be prevented by carrying out timely detection campaigns in high-risk workers, so the objective was to answer the research question: is there an association between rhoncopathy and daytime somnolence in the citrus region of Nuevo León, Mexico, and what is the percentage of suffering from each?

METHODS

This was an analytical, cross-sectional, prospective study. Primary modality, epidemiological type, pilot test.

The population was taken as the population of the citrus transportation workers (trailers and trucks) of the Nuevo Leon citrus region active in 2019, aged 18 and under 65 years old, with a valid driver's license, gender indistinct. 28 were men and 2 were women (Figure 1).

![Figure 1: Sex distribution.](image)

Thirty participants were surveyed at an average age of 39.1±10.36 DE; with a minimum age of 24 years and a maximum age of 63 years. Participation in the study was free and voluntary, the signing of an informed consent document was requested from the transport workers, their data was kept anonymous, the research was submitted to the ethics committee of the University of Montemorelos and approved. for its dissemination. Exclusion criteria were subjects diagnosed with narcolepsy or who were undergoing any pharmacological treatment at the time of data collection (antihistamines, benzodiazepines, brimonidine, or psychiatric treatment). No subjects were excluded or eliminated. Two instruments were used for data collection; the Epworth test, which measures excessive daytime sleepiness. It consists of eight specific questions, and each question with 4 options: never (0), low frequency (1), moderate frequency (2) and high frequency (3).

For the total score, a summation of the points obtained is made. A result between 0 and 6 points corresponds to normal, results between 7 and 8 points suggest mild to moderate daytime sleepiness. A sum of more than 9 points is suspicious of severe daytime sleepiness.

The second instrument assessed the risk of rhoncopathy. It was performed by means of the Berlin questionnaire. This focuses on ten questions, which are divided into three categories relevant to the symptomatology of tiredness during the day. If two of these three categories are positive, we are faced with a probable case of rhoncopathy that interferes with proper rest. The final score is classified as: no risk (3 negative categories), low risk (1 positive category) and high risk (2 or more positive categories).

A non-probabilistic quota sampling technique was used, with a sample size of 30, which was used to carry out a pilot test according to the central limit theorem. It was taken as an alternative hypothesis that there is an association between rhoncopathy and daytime sleepiness in autotransport workers in the citrus region of Nuevo León, Mexico during the year 2019.

For descriptive statistics, the mean, standard deviation and frequencies were obtained as percentages. For inferential statistics, ordinal variables were correlated with Spearman’s Rho coefficient with less than 0.05 and Chi-square was used for the correlation of nominal variables. The statistical software used for data analysis was IBM SPSS statistics 20.

Data collection was carried out in the cities of Allende, Montemorelos, Linares and General Terán in the state of Nuevo León. Workers were intercepted at their places of rest, so no permission was requested from any institution. Data collection takes place between February 10 and December 22, 2019. Regarding the size of the sample, a total of 30 transportation workers were included in order to carry out this work, as pilot test.

Informed consent was given verbally since the surveys were answered completely anonymously and the results of the scoring of both surveys were made known to the participants immediately.

RESULTS

Looking for the age’s most susceptible to daytime sleepiness, according to the Epworth stage, it was found that: at an average age of 39 years, 23.3% maintained normal sleep, 6.7% with an average age of 48.5 years suffered from medium sleepiness and 70% at an average age of 38.2 years suffered from pathological sleepiness.
However, when they were staged according to the Berlin questionnaire to evaluate the risk of suffering from rhoncopathy and breathing disorders during sleep, it was observed that 30% with an average age of 42.5 years were at no risk, 16.7% with an average age of 37.4 years were at low risk and 53.4% were at high risk with an average age of 38.2 years. According to the total score of the Epworth test, most of the respondents had a pathological or abnormal sleepiness, with a minority of those who maintained an average sleepiness (Figure 2).

![Figure 2: Stages of daytime sleepiness.](image)

The prevalence of snoring was obtained on the basis of an item in the Berlin questionnaire asking about snoring, which showed that 83.3% of those surveyed snore, 13.3% do not snore and 3.3% do not know if they snore. In turn, the total score of the Berlin questionnaire was analyzed to determine the risk of suffering from snoring and/or respiratory disorders during sleep, and it was classified as: no risk, low risk and high risk. The results are shown in Figure 3.

![Figure 3: Stages of risk of rhonchopathy.](image)

Using Spearman's Rho coefficient, a correlation was sought between daytime sleepiness and rhoncopathy, taking the total score of the Berlin questionnaire to measure rhoncopathy and the Epworth test for daytime sleepiness, finding a statistically significant correlation ($\rho=0.003$), with a correlation coefficient of 0.517. This indicates that there is a strong moderate positive relationship.

Other important correlations identified in Epworth's survey items were that motor carrier workers who were drowsy or fell asleep during the day in the following situations: traveling as a passenger for 1 hour ($\sigma=0.607$), sitting in a quiet environment after lunch (without alcohol) ($\sigma=0.608$) and in a car while stopped in traffic for a few minutes ($\sigma=0.759$) is strongly related to having high risk of snoring or breathing disorders during sleep with a significance of $\rho=0.000$. When correlating daytime sleepiness (Epworth test) with items of the Berlin questionnaire (snoring), it was analyzed that there is a correlation between weight gain in workers with greater daytime sleepiness ($x^2=10.46, \rho=0.033$) and the presence of snoring ($x=11.08, \rho=0.026$), the presence of snoring ($x^2=11.08, \rho=0.026$), greater frequency of snoring ($\rho=0.046, \sigma=0.403$), stopping breathing during sleep ($\rho=0.000, \sigma=0.670$), fatigue or tiredness during the day ($\rho=0.000, \sigma=0.680$) were also related to greater daytime sleepiness.

DISCUSSION

Although this is not a cause-effect or association study in a large sample, risk factors were found to be present in this pilot test sample. It is more difficult to find relationships, associations or predictive factors in small samples such as this one, however, in this study important relationships between snoring and sleepiness were found. Snoring is mostly associated with three nosological entities of progressive severity: simple snoring, increased upper airway resistance syndrome and sleep apnea-hypopnea syndrome.2,3

Excessive daytime sleepiness is a public health problem that has been increasing according to the change in

---


3. Excessive daytime sleepiness is a public health problem that has been increasing according to the change in
lifestyle in recent decades.\textsuperscript{11} An association between daytime sleepiness and rhoncopathy has been observed not only in the reported literature, but also in autotransport workers in the citrus region of Nuevo Leon, with a strong moderate positive relationship.\textsuperscript{10,12} This may indicate that workers at risk for rhoncopathy and sleep-disordered breathing suffer from abnormal daytime sleepiness. It is also worth mentioning that 80\% of workers with abnormal or pathological sleepiness snore. INEGI data show that between 30 and 60\% of men in Mexico over 45 years of age snore, the percentages being higher in subjects with a higher body mass index. Between 60 and 70\% of patients with snoring are obese. It is also agreed that both snoring and excessive daytime sleepiness increase as weight and body mass index are higher.\textsuperscript{5,10,13,15} Data from the 2016 national health and nutrition survey say that while, in the general Mexican population, 54.8\% of people who snore, only 17.5\% present excessive daytime sleepiness.\textsuperscript{16}

During the analysis of the data in this study, it was observed that the results were, in almost all cases, higher than the results obtained in the previous study. It reported in the medical literature for the Mexican population, finding that 83.3\% snore, compared with the national percentage of 54.8\%. Similarly, when observing the difference in daytime sleepiness (76.7\%), it was found to be above the national percentage of 17.5\% reported in the ENSANUT.\textsuperscript{17}

It is believed that such reported data may be due to the occupation of the participants, since, by altering the circadian cycle due to their work, sleepiness may be more evident. Another relevant data was that all the workers were male and it has been observed that the overall prevalence of rhoncopathy is much higher in males than in females, although postmenopausal and obese women are also at higher risk.\textsuperscript{10,18} For several years, snoring has been recognized as a serious problem due to the mortality caused by drowsiness in traffic accidents, the increased risk of cardiovascular disease and work incapacity; therefore it is also important to mention that 92\% of those interviewed have presented drowsiness or even fallen asleep at the wheel of moving cargo units on the road. It can be observed then that, based on the data found, it is associated with a high risk of occurrence of automobile traffic accidents.\textsuperscript{17}

According to INEGI statistics, Nuevo Leon has been, for two consecutive years, first place nationally in road accidents.\textsuperscript{5} All the drivers who confessed to having fallen asleep at the wheel were in the high-risk category for snoring and sleep-disordered breathing, which could recommend the future application of the Epworth test and the Berlin questionnaire in trucking workers, since these instruments help to stage the risk of the disease in order to subsequently look for associated comorbidities and thus employ specific treatment.\textsuperscript{5}

Worldwide, many nations clearly establish that transportation workers and drivers must be carefully studied for obstructive sleep apnea before granting or renewing a driver's license, as a way to prevent accidents. If this measure could be implemented in the state of Nuevo Leon, it could be a protective factor to avoid and/or reduce automobile accidents.\textsuperscript{19}

Although it is true that the search for a correlation between rhoncopathy and excessive daytime sleepiness with road accidents does not correspond to the aims sought during this investigation, but it is intended to set a precedent for future investigations that plan to do so. Since the association between these two entities (rhoncopathy and daytime sleepiness) puts not only the patient's life at risk, but also the lives of other people, it is important to attend and detect these situations in time.

Limitations

Regarding the limitations of the study, we can argue that although the data obtained was anonymous and confidential, some transport workers may not answer the questions completely honestly, due to the implications that this could have on their jobs and with the authorities, for example, which the problem could be even more serious than what is presented in this study.

CONCLUSION

Snoring and breathing disorders during sleep are associated with daytime sleepiness in truck workers in the citrus region of Nuevo Leon. The high prevalence of both snoring and daytime sleepiness could be a risk factor for road accidents. Due to the high prevalence of risk, it is proposed to study a larger population of truck drivers in Nuevo León in order to implement prevention programs in the future.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES


