Original article

Sleep quality in long haul truck drivers: A study on Iranian national data

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ABSTRACT

Purpose: Iran has a high rate of road traffic accidents. Poor quality of sleep brings about loss of attention, which is an important cause of road traffic accidents particularly in monotonous roads. The causes of poor quality of sleep in occupational drivers are multifactorial. The objective of the present study was to assess the prevalence of poor sleep quality among occupational drivers with rotating work schedules and analyze its different risk factors.

Methods: 2200 professional long-haul truck drivers who had been referred to the Occupational Health Clinic for routine education course were invited. We obtained data from eight provinces from various parts of Iran during 2012–2013. Data were collected using a questionnaire including questions about demographic and job characteristics. Pittsburg Sleep Quality Index (PSQI) was used to assess drivers' sleep quality.

Results: Mean working (driving) time was (9.3 ± 2.5) hours daily and (55.5 ± 18.29) hours weekly. About 23.5% of the drivers reported history of smoking, 14.5% had low job satisfaction and 60% had irregular work schedule. 16.4% of drivers had an accidents leading to injury during the past five years. The mean PSQI score was 4.2 ± 2.7; 54% had a PSQI>5 (poor quality of sleep). Multivariate logistic regression showed that smoking, job satisfaction, history of accidents, shift work and work hours per day were the most important risk factors for poor sleep quality.

Conclusion: Results obtained from the current study showed a high prevalence of poor quality of sleep among professional drivers. It warrants more attention to this significant problem using some measures to improve working conditions in professional drivers, as well as health promotion interventions.

Introduction

Iran ranks the 18th largest country in the world with 1,648,195 km^2 surface area. This country is bordered with seven country included Azerbaijan, Armenia, Turkmenistan, Iraq, Turkey, Pakistan, and Afghanistan. Also, Iran is located in the geographic center of the Eco member states of the Economic Cooperation Organization. For these reasons, Iran has a lot of advantages in terms of economic and commercial opportunities. The only way for properly and timely use of these opportunities is having an effective, cheap, efficient and secure transportation system that facilitates trade between Asia, Europe and other countries in this region.[1] These situations have provided plenty of job opportunities for drivers in the road transport system in the country and thousands of people are working as a driver in Iran.[2]

In addition to these opportunities, driving can be a serious threat to the personal and social health. Each year, thousands of people lose their lives in Iran due to road accidents. Clearly, reduction of mortality and damages resulting from these accidents allow investment in other sectors.[2] Iran had the highest rate of deaths due to road accidents in the world from many years ago. Also, mortality due to car accidents is the second leading cause of death in Iran.[3]

Sleepiness is one of the most important causes of fatal road accidents.[4] A study was conducted in Norway on 29,600 drivers who had involved in an accident. According to the data from this study, drowsiness was a contributing factor in 3.9% of all accidents. This percent increased to 18.6%, 8.1% and 7.3% in night-time

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accidents, driving more than 150 km in one trip, and personal injury accidents, respectively.[5]

Despite many studies that emphasize the importance of sleep health in professional drivers, many aspects of this subject remain unclear or contradictory. For example, the proportions of car accidents related to sleep problems have been reported very different in the various countries. These rates are 1%–3% in the US, 10% in France and 33% in Australia.[6–8]

In Iran, more than 700,000 persons have selected professional driving as their main job. Meanwhile, the majority of them have to work all hours of the day due to job requirements and economic needs. So, it is highly probable that drivers is forced to drive in their two peaks of sleepiness according to their circadian rhythms including early hours of the morning and the middle of afternoon. Also, the professional truck drivers are at greater risks for suffering from some sleep disorders such as obstructive sleep apnea and poor sleep hygiene compared to general population. All the points mentioned above may lead to poor quality of sleep in this group.[9,10]

A study conducted by Sadeghniiat and Labbafinejad among lorry drivers showed that 7.3% of them have driven with sleepiness sometime. Moreover, 4.9% and 1% of them almost always and always have driven with sleepiness, respectively. Also, they found that excessive daytime sleepiness increases the risk of accidents more than 2 times.[10] Another study conducted by Halvani including 200 truck drivers. Their results showed that 29.5% of drivers suffered from accidents in the last decade. One of the main causes of accidents in their study was drivers' sleepiness and poor sleep quality.[11]

High prevalence of road accidents in Iran and the important role of sleep quality in causing crashes merit a comprehensive research to determine the quality of sleep in professional drivers. Therefore, the present study was designed to evaluate the quality of sleep and its related factors among Iranian professional drivers. Results from this study will provide necessary information for administrative programs and health recommendations to reduce traffic accidents.

Materials and methods

The data for this cross-sectional study were collected during 2012–2013. 2200 professional long-haul truck drivers from eight provinces who had been referred to the Occupational Health Clinic for routine education course and annual periodic examination were invited to participate in the study. We eliminate 700 questionnaires with inappropriate or missing responses, then we ran our analyses on the remaining 1500 drivers (response rate was 68.2%).

The protocol of the study had been approved by Tehran University of Medical Sciences. Informed consent was obtained from all drivers for their participation and use of their records after explanation of study protocol.

Data were collected using a questionnaire including questions about socio-demographic characteristics (age, educational level, marital status and smoking history) and job characteristics (daily driving hours, monthly driving hours, history of road accidents during five past years, job satisfaction and type of shift work schedule). The drivers had four types of shift work schedules including fixed morning shift (6:00 to 14:00), fixed evening shift (14:00 to 22:00), fixed night shift (22:00 to 6:00) and rotating shift work (all the above types).

The Pittsburg Sleep Quality Index (PSQI) was used for collecting data about self-reported sleep quality during the previous month. This questionnaire assesses subject's attitude about sleep quality with a sensitivity of 89.6% and specificity of 86.5%.[12,13] The PSQI consists of 19 items that yields a global score about sleep quality and 7 components scores (each from 0 to 3 points): self-reported sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep medications, and daytime dysfunction. The sum of the total components scores yields one global score with the range of 0 through 21; while higher scores represent poorer sleep quality. A cutoff score of 5 has been recommended for this questionnaire, with scores more than 5 representing poor sleep quality.[13]

The PSQI has been translated and verified for its validity and reliability in several languages. Farrahi and her colleagues have translated this questionnaire into Persian in 2011. They assessed validity and reliability of PSQI in two groups of psychiatric patients and healthy people. Cronbach's alpha coefficient of questionnaire was 0.77 for all subjects, 0.52 for the patient group, and 0.78 for the control group. The sensitivity and specificity of questionnaire for discrimination between insomniac patients and control subjects were 94% and 72% for cutoff value of 5, and 85% and 84% for cutoff value of 6.[14]

The obtained data were analyzed using SPSS software version 11.5. Logistic regression analyses and calculation of odd's ratio were conducted to examine the factors associated with poor sleep quality in the drivers. For this purpose, all variables were examined initially in univariate models. Then, multivariate logistic regression analyses were performed to determine final model. Reported differences were accepted significant at the level of 0.05 or less.

Results

The final participants included 1500 male drivers. The mean age of them was (36.6 ± 9.4) years (ranged 22–72). About education level, 861 drivers (57.4% of the participants) had diploma or higher. Most of them were married (84.9%), while 14% and 1.1% were single and widowed, respectively. Two hundred and forty-seven of drivers (16.4%) had an accidents leading to injury during the past five years. 23.5% of the drivers reported cigarette smoking. The mean number of cigarette smoking per day was 6.8 ± 10.1, and mean years of smoking was 8.8 ± 11.72 with mean pack/year of 9.47 ± 7.21.

Mean driving hours was 9.3 ± 2.5 per day and 55.5 ± 18.29 per week. Only 40.7% of the drivers had sufficient satisfaction from their work and 44.9% of them had relative satisfaction. Also, nearly 14.4% of them were completely unsatisfied from their work. Most of them needed to work morning shift (86.2%). But, 34.5% and 9.6% worked at the evening and night shift, respectively. Then, more than 30% of them worked more than one shift.

The mean PSQI global score was 5.75 ± 2.75. About 934 drivers (62.3%) had poor sleep quality according to the cutoff 5 for PSQI questionnaire. The prevalence of poor sleep quality was 88.03% for drivers with night shifts and 69.13% for drivers who were working more than one shift.

Table 1 represents the risk factors associated with poor sleep quality using univariate logistic regression. The results showed significantly increased odd's ratio among several factors, including education level, smoking history, working in morning (conservative role), evening and night shift, number of shift work, job satisfaction, hours of work per day and week with poor sleep quality.

Table 2 demonstrates the risk factors associated with poor sleep quality using multivariate logistic regression. With this model, the variables associated with poor sleep quality were smoking history, job satisfaction, having a history of accidents in the past five years, working in evening and night shift, and hours of work per day.

Discussion

The current study demonstrated that the mean score of PSQI was 5.57 ± 2.75 among Iranian professional truck drivers, and 62.3% of them had poor quality of sleep. In a study of Emkani et al, the mean score of sleep quality was 6.98 ± 0.34 in 100 inter-city bus

Table 1
Association between sleep quality and its related risk factors using univariate logistic regression.

Personal and job related variables	Number of respondents	Number of drivers with poor sleep quality				
		n	%	Odd's ratio	95% CI	p value
Smoking						
No	926	461	49.8			<0.001
Yes	574	483	84.1	1.58	1.22–2.04	
Marital status						
Single	215	30	14			
Married	1269	902	71.07	0.99	0.73–1.34	0.95
Widowed	16	2	12.5	0.19	0.06–0.63	0.006
Education level						
≤12 years	639	512	80.1			
>12 years	861	422	49.1	1.42	1.14–1.92	0.02
Accidents in the past five years						
Yes	247	201	81.3			
No	1253	733	58.5	3.2	2.6–3.8	<0.001
Morning shift						
No	214	173	80.8			
Yes	1286	761	59.1	0.33	0.23–0.47	<0.001
Evening shift						
No	981	432	44.03			
Yes	519	502	96.7	1.53	1.22–1.92	<0.001
Night shift						
No	1362	812	59.57			
Yes	138	122	88.4	4.99	2.97–8.37	<0.001
Type of shift work						
Fixed	1053	625	59.6			
Rotating	447	309	69.13	1.53	1.21–1.94	<0.001
Job satisfaction						
No	216	154	71.3			
Partly	673	456	67.7	0.79	0.56–1.11	0.183
Satisfied	611	324	53.02	0.49	0.35–0.68	<0.001
Hours of work per day				1.13	1.08–1.18	<0.001
Hours of work per week				1.01	1.009–1.02	<0.001

Table 2
Association between sleep quality and its related risk factors using multivariate logistic regression.

Personal and job related variables	Odd's ratio (95% CI)	p value
Smoking	1.44 (1.10–1.90)	0.008
Job satisfaction		
Partly	0.88 (0.62–1.28)	0.502
Satisfied	0.56 (0.39–0.80)	0.001
Accidents in the past five years	3.1 (2.8–3.4)	<0.001
Evening shift	1.39 (1.10–1.77)	0.006
Night shift	4.8 (2.8–8.1)	<0.001
Hours of work per day	1.09 (1.04–1.15)	
P value = 0.770	X^2 = 249.61	

drivers, and about 61% of them had poor sleep quality.[15] Kakooei et al reported that the average of overall score of sleep quality was 7.2 ± 2.7 in inter-city bus drivers. The prevalence of poor sleep quality was 78.2% in their study.[16] In Brazil, Souza et al evaluated 260 truck drivers in 2005. They found that the mean PSQI was 4.95 ± 2.56 in their participants, and 35.4% of them had a PSQI>5.[17] In another study on 476 Belgian truck drivers conducted by Braeckman, the mean PSQI score was 4.45 ± 2.7, and 27.2% of them had poor quality of sleep.[18] In Japan, Kanazawa et al conducted a self-administered questionnaire survey on 2054 commercial truck drivers. Finally, 1005 questionnaires were examined. The results revealed that there was an association between subjective sleep quality and overtime work, working at night, irregular work schedule, and general health of drivers.[19]

In our study, a significant relationship was found between poor sleep quality and hours of work per day. In study of Kakooei et al there was a significant relation between poor sleep quality and job satisfaction.[16] Also, a significant relationship was shown between sleep quality and job satisfaction in their study. In the other way, professional drivers with job dissatisfaction had lower quality of sleep. The same association was observed in a study of Emkani et al too.[15]

According to the results from the present study, there was a significant correlation between education level, smoking habit, working at evening and night shift, number of shift work, history of accidents, job satisfaction, and hours of work per day with poor sleep quality.

Drivers who were working at night shift had higher risk of poor quality of sleep than drivers who didn't work night shift (OR = 4.99, 95% CI = 2.97–8.37). Also, the drivers who were working more than one shift were more prone to poor sleep quality (OR = 1.53, 95% CI = 1.21–1.94).

In this study 16.4% of truck drivers had history of accidents leading to injury during the past five years that is comparable with other studies. In Sweden and Brazil 36.6% and 13.1% of truck drivers had at least one accident in the past five years. This information indicates that poor sleep quality has a direct relationship with car accidents.[17,20]

In the current study, more than half of the participant had high school education or even higher. They can be trained for health related issues including sleep health. We found that drivers with higher education level had higher sleep quality, too. This finding had not been noticed in earlier studies.

Nevertheless, there are some limitations in our study. PSQI questionnaire is subjective and depends on the response of participants. Moreover, we could not access to drivers in all parts of Iran. Some drivers did not cooperate in the study and some of them had concerns about mishandling of their personal information by the authors or occupational administrative.

To sum up, the present study found that the prevalence of poor sleep quality was 62.3% in professional drivers. Also, based on the findings of this study, educational level, smoking habits, working at shift, history of accidents, lack of job satisfaction, and hours of work per day are significantly associated with sleep quality.

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