Original Article
Anxiety levels among Turkish public transportation drivers: a relation to restless legs syndrome?

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Abstract: The aim of this study was to estimate the prevalence of individuals who are at high risk for state and trait anxiety as well as to investigate the relationship of anxiety levels of urban transportation drivers from Istanbul, Turkey with restless legs syndrome (RLS). The data was gathered between April 2013 and June 2013 by the use of a questionnaire prepared for the purpose of this study, completed anonymously. Restless leg syndrome and anxiety level were evaluated in the group; data obtained was analyzed using the SPSS version 16. Chi-square, correlation and student-t tests were used. Restless leg syndrome symptoms were determined by a self-assessment questionnaire, including the International Restless Legs Syndrome Study Group (IRLSSG) diagnostic criteria, to determine RLS symptoms and Spielberger State-Trait Anxiety Inventory (STAI) to determine anxiety levels of the participants. In the present study, the four RLS criteria were reported in 31.2%. STAI-state and STAI-trait scores were 40.82 ± 9.55 and 42.99 ± 8.54 respectively. The state and trait anxiety mean scores were different among participants with RLS in this study (p < 0.05). It was found a significant difference between tobacco usage and state anxiety (p < 0.05). There were a significant difference between RLS and age, number of cigarettes daily consumed and employment time (p < 0.05). The state and trait anxiety scores were found high among bus drivers with RLS in this study.

Keywords: Drivers, urban transportation, anxiety, restless legs syndrome, STAI-state, STAI-trait

Introduction

Restless legs syndrome (RLS) is a very common neurological disorder that results in considerable discomfort and distress. The diagnosis is based on clinical criteria: an urge to move the legs usually associated with unpleasant sensations; symptoms occurring during periods of rest, such as sitting or lying down; symptoms relieved by movement; and symptoms worse in the evening or night [1]. Standardized criteria were proposed by the International Restless Legs Study Group (IRLSSG) in 1995 [2] and these were slightly modified in 2003 [1] when a four-question set recommended for epidemiological surveys also was presented. (**Table 1**).

Prevalence of RLS differs country by country. According to recent estimates, it affects 5-20% of adults and often has a substantial impact on sleep, daily activities, and quality of life [3, 4]. Its prevalence has been found as 3.2% in a study [5] and 5.52% in another study made in Turkey [6].

Restless legs syndrome (RLS) is a sensorimotor disturbance that may cause profound sleep disorders [2]. The association between psychopathology and poor sleep has long been recognized. Consequently, in the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) and International Classification of Diseases (ICD-10), disturbed sleep is a key symptom of many psychiatric disorders [7]. Moreover, Harvey et al. suggested that there is a causal relationship between sleep disturbance and psychiatric disorders [8]. The most commonly encountered sleep disorder in patients with psychiatric disorders is insomnia, a condition that is defined by difficulties initiating/ maintaining sleep or non-restorative sleep accompanied by at least one form of related daytime impairment [9]. Other prevalent sleep disorders include sleep-related breathing disorders [10] and the restless legs syndrome (RLS) [11].

Based on pathophysiological mechanisms, RLS is classified in idiopathic and symptomatic

forms [12]. Patients with idiopathic RLS represent up to 70% to 80% of all cases [13]. RLS can be defined as idiopathic when no apparent cause other than perhaps a genetic predisposition is observed [14]. Patients affected by idiopathic RLS also have a high prevalence of anxiety and depressive disorders [15, 16].

There is strong evidence of environmental causes of RLS, but the etiology remains unknown. Dopaminergic hypofunction in the CNS is believed to have a crucial role in RLS pathophysiology [17, 18]. Obese persons have decreased dopamine D2 receptor availability in brain [19] and could thus be at increased risk of RLS. Some epidemiologic studies have reported that body mass index (BMI) was associated with a higher likelihood of having RLS [20-22].

Anxiety was assessed using the State-Trait Anxiety Inventory (STAI). This internationally validated questionnaire consists of 40 items: 20 designed to assess state anxiety (S-anxiety scale) and the other 20 aimed at evaluating trait anxiety (T-anxiety scale). The STAI has been used extensively in research and clinical practice. Internal consistency of its sub-scales is high. Cronbach's alpha coefficients are 0.90 and 0.93 for scores on the trait and state scales, respectively.

The S-anxiety scale assesses how respondents feel "right now, at this moment". The T-anxiety scale evaluates how people "generally feel". The STAI questionnaire has only rated on a four-point intensity scale ranging from "not at all" to "very much". The range of scores is 20-80; the higher score indicates more trait or state anxiety and low scores mean less anxiety [23, 24].

The purpose of this cross-sectional study is to perform a survey of a Turkish public transportation drivers using the STAI scale and a questionnaire interrogating diagnosis criteria of IRLSSG for Restless Leg Syndrome and estimate the prevalence of individuals who are at high risk for state and trait anxiety as well as to investigate the relationship of anxiety levels of urban transportation drivers with RLS.

Material and methods

Subjects

This study was conducted on a sample of 618 public transportation drivers chosen randomly among 5468 drivers employed by largest public transportation corporation in Turkey who were evaluated between April 2013 and June 2013. All of the drivers in the sample were male. The participants were informed about the study procedures prior to signing informed consent forms. Of the 618 bus drivers, all of them were working in shift. The work schedule of bus drivers mainly consisted of three shifts: a) early-morning (05:30-06:30) to mid-afternoon (13:30-14:30), b) morning (06:30-08:00) to evening (21:00-22:30) with about 4 hours of rest time around noon, and c) early-afternoon (13:30-14:30) to late-evening (21:30-22:30). The drivers starting to drive in the early-morning were working in this shift for one week period and then in the afternoon in the next week consequtively. The rest of the drivers working in morning to evening with about 4 hours of rest time around noon were always driving in same schedule.

The bus drivers were invited to complete anthropometric assessments (weight, height, waist, hip, and neck measurements) to determine their BMI, obesity, and risk for cardiovascular disease. BMI calculations were determined using the criteria established by the World Health Organization [25]. After responding to the general questionnaire (to assess demographics, lifestyle, daily routine, traffic accident history) the State-Trait Anxiety Inventory (STAI) and a questionnaire interrogating diagnosis criteria of IRLSSG for Restless Leg Syndrome were applied to participants by face-to-face interviewing.

The STAI consists of two questionnaires to measure momentary (state) (STAI-1) and chronic (trait) anxiety symptoms (STAI-2) in adult subjects, each with 20 statements. The state anxiety is a measure of anxiety experienced at time of the test, while trait anxiety assesses the general tendency for anxiety. Each of the statements has a score 1-4, so the total score can range from 20 to 80. The test scores of ≤ 30 may indicate the low level of anxiety or no anxiety, scores 31-49 may indicate average level of anxiety or borderline results of anxiety test, and scores higher than 50 indicate high level of anxiety or positive results of anxiety test. The test is designed for a self-reported assessment of the intensity of feelings [26]. Validation tests of STAI have been done in a Turkish population [27].

Table 1. Diagnostic criteria for Restless Legs Syndrome (RLS)

IRLSSG minimal criteria (1995)
(1) Desire to move the limbs usually associated with paresthesias/dysthesias;
(2) Motor restlessness;
(3) Symptoms are worse or exclusively present at rest (i.e. lying, sitting) with at least partial and temporary relief by activity;
(4) Symptoms are worse in evening/night.
IRLSSG essential criteria (2003)
(1) An urge to move the legs, usually accompanied or caused by uncomfortable and unpleasant sensations in the legs (Sometimes the urge to move is present without the uncomfortable sensations and sometimes the arms or other body parts are involved in addition to the legs);
(2) The urge to move or unpleasant sensations begin or worsen during periods of rest or inactivity such as lying or sitting;
(3) The urge to move or unpleasant sensations are partially or totally relieved by movement, such as walking or stretching, at least as long as the activity continues;
(4) The urge to move or unpleasant sensations are worse in the evening or night than during the day or only occur in the evening or night. (When symptoms are very severe, the worsening at night may not be noticeable but must have been previously present.)

Table 2. Findings of sub-parameters of IRLS

IRLS item	% (n)
Paresthesias/dysesthesias	51.8 (320)
Motor restlesness	55.2 (341)
Relief by activity	41.4 (256)
Worsening in the evening or during night	37.2 (230)
RLS	31.2 (193)

The Turkish version of four minimal criteria suggested by the IRLSSG (International Restless Legs Syndrome Study Group) was used in the assessment for RLS: (1) the desire to move the limbs associated with paresthesias/dysesthesias, (2) motor restlessness, (3) symptoms worse or present exclusively at rest (i.e., lying or sitting) with at least partial or temporary relief by activity and (4) symptoms worse in the evening or at night. In addition to the four minimal criteria, the following were asked: co-morbidities (diabetes mellitus, kidney disease, vitamin B12 deficiency, Parkinson's disease, rheumatoid arthritis, anemia, polyneuropathy and pregnancy) and if family members, spouses and close relatives had RLS symptoms. The second part of the questionnaire consisted of the 10-item IRLSSG Rating Scale (IRLS) which was used to assess the severity of RLS [28]. The Turkish versions of both the four minimal criteria and IRLS were formerly found to be reliable [29].

Statistical analyses

Data obtained was analyzed using the SPSS version 16. Continuous variables with normal distribution (age, BMI, number of cigarettes daily consumed, worktime, STAI and four minimal criteria scores for RLS) are expressed as means and standard deviation and compared using the student t-test and correlation tests. Group differences in discrete variables (e.g., BMI category, STAI risk category, RLS category (presented as frequencies) are compared with the Chi-square test. *P* values < .05 were accepted as statistically significant.

Results

The study group was entirely male. In the overall sample of bus drivers, the average age was 43.08 ± 5.41 years. The mean BMI was found as 29.01 ± 3.92 kg/m². With regard to obesity, 84.1% of all bus drivers taken into the study had above average weight (BMI > 25 kg/m²); 279 of 618 bus drivers (45.1%) were overweight and 241 (39.0%) were obese. There were 68 (11.0%) drivers with abdominal adiposity and 100 (16.2%) with hypertension. Median duration of working as a bus driver in the corporation was 12.24 ± 4.83 years. Two-hundred and fourteen (34.6%) of the participants were never smoked, 240 (38.8%) were currently smoking and 164 (26.6%) were quitted smoking. More than half of the respondents (51.0%) were high school graduated.

One hundred ninetythree subjects were diagnosed with RLS, thus the prevalence of RLS was found to be 31.2%. The prevalence was higher in subjects aged 40-9 than in subjects aged 20-9 (23.9% vs 7.3%, X^2 = 9.5, p = 0.002). The mean age of the 193 individuals with RLS (43.9 ± 4.9 years) was different from that of the study population without RLS (42.6 ± 5.5 years, X^2 = 2.92, p = 0.004), suggesting that the

Table 3. Comparison of participants with RLS in terms of some features

		X ± SD	t	p
BMI (kg/m^2)	RLS (+)	29.40 ± 4.24	1.60	0.111
	RLS (-)	28.83 ± 3.76		
Age (years)	RLS (+)	43.97 ± 4.93	2.92	0.004
	RLS (-)	42.67 ± 5.57		
Number of cigarettes daily consumed	RLS (+)	18.04 ± 7.18	2.55	0.011
	RLS (-)	15.40 ± 8.48		
Employment (years)	RLS (+)	12.82 ± 4.98	1.99	0.046
	RLS (-)	11.98 ± 4.75		

Data presented as the mean and SD (±), comparison made using student T-test.

Table 4. Mean scores of STAI-state subscales among the IRLS items

		X ± SD	t	p
Paresthesias/dysesthesias	RLS (+)	38.18 ± 9.05	2.68	0.008
	RLS (-)	36.27 ± 8.70		
Motor restlessness	RLS (+)	38.39 ± 8.89	3.53	0.000
	RLS (-)	35.87 ± 8.79		
Relief by activity	RLS (+)	38.59 ± 8.91	3.13	0.002
	RLS (-)	36.32 ± 8.84		
Worsening in the evening	RLS (+)	38.84 ± 9.09	3.37	0.001
	RLS (-)	36.33 ± 8.71		
RLS	RLS (+)	38.72 ± 9.21	2.69	0.008
	RLS (-)	36.60 ± 8.73		

Data presented as the mean and SD (±), comparison made using student T-test.

Table 5. Mean scores of STAI-trait subscales among the IRLS items

		X ± SD	t	p
Paresthesias/dysesthesias	RLS (+)	44.81 ± 7.34	3.93	0.000
	RLS (-)	42.43 ± 7.65		
Motor restlessness	RLS (+)	44.85 ± 7.16	4.34	0.000
	RLS (-)	42.20 ± 7.84		
Relief by activity	RLS (+)	44.74 ± 7.25	3.03	0.003
	RLS (-)	42.90 ± 7.73		
Worsening in the evening	RLS (+)	45.45 ± 7.51	4.57	0.000
	RLS (-)	42.60 ± 7.43		
RLS	RLS (+)	45.01 ± 7.19	2.69	0.008
	RLS (-)	43.05 ± 7.69		

Data presented as the mean and SD (±), comparison made using student T-test.

into those with infrequent symptoms (occurring less than twice a week) and those with frequent symptoms (occurring at least twice a week).

Commonly occurring medical illnesses among the study population were diabetes mellitus and hypertension. Fifty six (9.1%) participants were diabetic and 100 (16.2%) were hypertensive. No respondent had been diagnosed or treated for iron deficiency. While there were 100 (16.1%) hypertensive people among general study population, 49 of them (25.4%) were the participants with RLS and hypertension was found only as 12.4% (n: 24) among participants without RLS.

Among respondents, 320 (51.8%) replied that they desire to move the limbs associated with paresthesias/dysesthesias; 341 (55.2%) told that they have motor restlesness; 256 (41.4%) expressed that their symptoms worse or present exclusively at rest and 230 (37.2%) stated that symptoms worse in the evening or at night. Totally it has been found that 193 (31.2%) had RLS. (**Table 2**).

occurrence of RLS was related to age in this population. The average score of IRLSSGRS was 22.27 (SD 5.53, range 9-34). The RLS prevalence decreases significantly when the symptom frequency is taken into consideration. When the clinically significant patients (i.e., symptoms occur at least two or more times a week) were analyzed, the RLS prevalence was 16.2%. These subjects were further divided

Comparison of participants with RLS in terms of some features are shown in **Table 3**. RLS was found positive in 32.9% (176) of participants who had road traffic accident (RTA) while this ratio was 20.5% (17) among participants who had not RTA and this difference was found to be statistically significant (p < 0.05).

Mean scores of STAI-state and STAI-trait subscales among the IRLS items were calculated

and shown in **Tables 4** and **5**, respectively. The range of STAI-state scores obtained from whole of the population were 20 to 74 and mean score was 37.26 ± 8.93. Twenty to 75 was the range of STAI-trait scores in the population and mean score was 43.66 ± 7.58. It was found that trait anxiety levels were increasing with employment duration of bus drivers (X^2 = 456.70, p= 0.000).

Discussion

The aim of this study was to estimate the prevalence of individuals who are at high risk for state and trait anxiety as well as to investigate the relationship of anxiety levels of urban transportation drivers with RLS.

The mean scores of STAI-state and STAI-trait showed a statistically significant difference regarding to having RLS (p < 0.01). Both STAI-state and STAI-trait scores showed a statistically significant difference between all of the four questions of IRLSS scale (p < 0.001). Furthermore, the results of this study indicated that risk of RLS was showing a statistically significant difference between older age, increase in number of cigarettes daily consumed and extension of employment time (p < 0.05). The result we reached about the elevation in the risk of RLS by improving age in our study is consistent with a study in the literature [30]. The relation with the increase in number of cigarettes daily consumed may be attributed to the hypoxemia (as in iron deficiency, anemia) and microvascular problems caused by tobacco smoking. In a study in the literature, it was found that those dissatisfied with their RLS treatment revealed the highest psychological distress. Compared with untreated patients compulsivity, depression, anxiety, hostility, phobic anxiety and paranoid ideation, were elevated in these patients. The highest scores were seen in the somatisation, compulsivity, depression, and anxiety [31]. We think that extension of employment period causes an increase in anxiety and depression levels of bus drivers because of daily experienced stress in traffic jam, strict working hours, hurry to obey the timetable, working in shifts and stressor factors caused by passengers' behaviors such as committing aggression and violence towards the drivers.

Restless legs syndrome (RLS) is a disorder related to sensation and movement. People with restless legs syndrome have an unpleasant feeling or sensation in parts of their bodies when they lie down to sleep. Most people also have a very strong urge to move, and moving sometimes makes them feel better, but all this movement makes it hard or impossible to get enough sleep. Restless legs syndrome usually affects the legs, but it can cause unpleasant feelings in the arms or even a phantom limb. Not getting enough sleep may raise having problems in getting things done during the day because of tiredness. It may also cause sleepiness or having trouble in concentrating. It was found that 24% of the patients surveyed reported all 4 basic diagnostic symptoms of RLS. Of the patients surveyed 15.3% had symptoms at least weekly and 20.6% had symptoms at least monthly in a study in the literature [32].

In our study, prevalence of RLS was found as 31.2% so, we think that this higher result arises from bus drivers' working environment which is full of psychological stress originating from traffic jam, timetable as a necessity and aggression of passengers; working in shifts; doing a job requring complete attention; driving for minimum 8 hours intracity and high levels of anxiety. Of the study participants 55% stated motor restlessness already.

Anxiety is a mental condition manifested by worry about everyday life events, fears about something terrible happening without any valid reason, sometimes even panic attacks with physical tension [33]. The sources of anxiety may be internal unconscious conflicts or some situations in life such as traumatic experiences, stress, or loss (4). Anxiety disorders are one of the most common psychiatric disorders with a lifetime prevalence of approximately 20-30% [34, 35].

In the study, we found that one in four bus drivers (154) and 5% (31) participants showed low level or no anxiety regarding STAI-state and STAI-trait scores, respectively. Since therefore the bus drivers were under intense stress, state anxiety was detected in a total of 75.1% (464) bus drivers and in addition, of them, 8.9% (55) were showed high level of state anxiety. Regarding trait anxiety scores, it was detected in 95% (587) of bus drivers and of them, 22.3% (138) indicated positive results of anxiety test. Our results were higher than the results found in a study made among drivers in the literature

[36]. We think that our results might indicate that bus drivers were in a work environment requiring immense concentration and under extreme stress when compared to the rest of the community.

It was detected a statistically significant difference between number of cigarettes daily consumed and state anxiety scores in the study (r: 14; p: 0.032). This result is consistent with a study in the literature [37]. In our study, therefore, it is determined that tobacco usage has an impact on both anxiety and RLS.

The state and trait anxiety mean scores were statistically significantly different among participants with RLS in this study (p < 0.005). We think that, since RLS is a kind of sleep disorder, it might cause people feel tired during work hours and block doing daily routines effectively, especially in bus drivers who have to be fully careful in traffic and concludes in anxiety. To our knowledge, there is no research in the literature investigating the relationship of anxiety levels of urban transportation drivers with RLS. Determination of this relation is the one of the pros of this study.

We have found that trait anxiety levels were increasing with employment duration of bus drivers (p < 0.05). Our comment about why anxiety gets higher while term of employment gets more and more is facing every work day by same stressor factors such as traffic jam, agression of passengers, hurry to obey to the timetable causes an increase in anxiety with advancing work years. It was not detected a relation with BMI and anxiety in the study. Although this relation was found in a study made among a population outside drivers [38], we think bus drivers in our study were faced anxiety independent from BMI because these drivers were doing a job interbedded excessive stress and requiring a lot of attention.

In conclusion, the state and trait anxiety scores were found high among bus drivers with RLS in the largest city transportation company in Turkey. Our results further suggest that age, increase in number of cigarettes daily consumed and in employment time elevates the risk of developing RLS. Therefore, it seems reasonable to manage anxiety symptoms in bus drivers to increase their quality of life and to increase their productivity. We confirm the necessity for treatment of smoking cessation. Our findings suggest that professional psychological support must be provided to bus drivers with high levels of anxiety.

Disclosure of conflict of interest

None.

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