

ORIGINAL ARTICLE

Reported bruxism and restless legs syndrome in media personnel with or without irregular shift work

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Abstract

A standardized questionnaire was mailed to all employees of the Finnish Broadcasting Company with irregular shift work ($n=750$) and to an equal number of randomly selected controls in the same company with regular 8-h daytime work. The questionnaire covered demographic items, employment details, general health experience, physical status, psychosocial status, stress, work satisfaction and performance, tobacco use, bruxism, and restless legs symptoms (RLS). The aim was to investigate among a multiprofessional media personnel the associations between reported bruxism and RLS, while simultaneously controlling the effects of gender, age, tobacco use, shift work, and dissatisfaction with current workshift schedule. The overall response rate was 58.3% (53.7% men). The response rate in the irregular shift work group was 82.3% (56.6% men) and in the regular daytime work group 34.3% (46.7% men). In the bivariate analyses, RLS was more prevalent in workers at either end of the studied age range ($p<0.05$). Self-reported frequent bruxism was significantly associated with younger age ($p<0.05$). Females reported RLS (11.4%) slightly more often than males (7.7%) (NS). In logistic regression, frequent bruxism ($p<0.05$) and older age ($p<0.05$) were significantly positively associated with RLS. Dissatisfaction with one's current workshift schedule ($p<0.05$) and RLS ($p<0.05$) were significantly positively associated with frequent bruxism, while age ($p<0.05$) was significantly negatively associated. In conclusion, perceived bruxism may be a sign of a stressful situation or dissatisfaction, while RLS as a more stable trait may in itself negatively affect sleep quality and further enhance the problem.

Key Words: *Dissatisfaction, non-patient, shift work, sleep problem, tooth-grinding*

Introduction

According to the American Academy of Orofacial Pain, bruxism is diurnal or nocturnal parafunctional activity that includes clenching, bracing, gnashing, and grinding of teeth [1]. In clinical studies, the reported prevalence of bruxism varies greatly, between 6.5% and 88%, while figures in epidemiologic studies are usually lower, about 6–8% [2–8]. Bruxism is most common between 20 and 50 years and tends to decrease with age. It is also more common among the better educated and among women, especially during their reproductive years.

Many theories to explain the controversial character of bruxism have emerged over the years [4,6,9–12].

Two groups of proposed etiological factors can be distinguished: peripheral (morphological) and central (pathophysiological and psychological). At present, peripheral morphological factors, e.g. occlusal discrepancies, are considered to play a minor role, if any, in the etiology of bruxism, while central factors, such as disorders in the dopaminergic system and stress, are suggested to be more important in its regulation. Smoking may exacerbate bruxism [13].

Restless legs syndrome (RLS) is characterized by discomfort and unpleasant sensations in the legs, which may delay sleep onset or disrupt sleep, and the condition sometimes forces the person to move the legs or walk around to relieve the sensations. Although clinical features of RLS were described centuries ago

[14], and 'rediscovered' in recent decades [15], the general awareness remains relatively low. However, RLS does have diagnostic criteria; it is regarded as a specific disease entity and, moreover, as one of the commonest neurological disorders [16]. In epidemiological studies utilizing established diagnostic criteria the prevalence of RLS has varied between 5% and 15% [5,17,18]. A few studies have found RLS more prevalent among females and the elderly [5,19–21].

A recent investigation of a multiprofessional media personnel with or without irregular shiftwork found that dissatisfaction with one's workshift schedule may aggravate bruxism and stress [13]. On the other hand, there is evidence that bruxism may signify a sleep disturbance which appears concomitantly with the transient arousal response [5,22,23]. Although previous findings do not support an association between bruxism and RLS [5], their relationship is far from clear, which may be due to the limited number of studies. However, both entities share certain physiological and neurochemical characteristics, and link to disturbed sleep.

The aim of the present study was to investigate the associations between reported bruxism and RLS, while simultaneously controlling the effects of gender, age, tobacco use, shift work, and dissatisfaction with one's current workshift schedule in a multiprofessional media personnel.

Material and methods

A standardized questionnaire was mailed to all employees of the Finnish Broadcasting Company with irregular shift work ($n=750$) and to an equal number of randomly selected controls in the same company with regular 8-h daytime work. The work duties of the media personnel included journalism, broadcasting, programme production, technical support, and administration.

The overall response rate was 58.3% (53.7% men): in the irregular shift work group 82.3% (56.6% men) and in the regular daytime work group 34.3% (46.7% men). The mean age of males in shift work was 45.0 (SD 10.6) years and of females 42.6 (SD 10.7) years ($p<0.001$); the figures for daytime workers were 47.4 (SD 9.7) and 45.5 (SD 10.1) years (NS), respectively [24].

The questionnaire covered demographic items, employment details, general health experience, physical status, psychosocial status, stress, work satisfaction and performance, tobacco use, bruxism, and restless legs symptoms. For the present study, the data were categorized as follows: (a) demographic data: gender and age; (b) dissatisfaction with current workshift schedule (irregular shifts versus daytime work); (c) smoker: all tobacco use (cigarettes, cigars, and pipe) was considered as smoking. Former smokers who had stopped tobacco use less than a year previously were included in the smoker

group; (d) bruxism: self-assessed frequency of tooth-grinding or clenching (1=never, 2=seldom, 3=sometimes, 4=often, and 5=continually); (e) restless legs syndrome: presence of the four essential diagnostic criteria according to the NIH diagnosis and epidemiology workshop for RLS [16]:

1. An urge to move the legs, usually accompanied or caused by uncomfortable and unpleasant sensations in the legs.
2. The urge to move or unpleasant sensations begins or worsens during periods of rest or inactivity, such as lying or sitting.
3. The urge to move or unpleasant sensations is 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 is worse in the evening or night than during the day or only occurs in the evening or night.

Statistical methods

Student's *t*-test and the Mann-Whitney U-test were used to compare group means. The χ^2 test was used to study associations between categorical variables. Two logistic regression models were fitted to analyse the independent effects of the background variables on the probability of RLS and self-reported frequent bruxism (present often or continually). Independent variables included in the multivariate models were: gender (male=0, female=1), irregular shift work (no=0, yes=1), perceived dissatisfaction with current workshift schedule (no=0, yes=1), smoking behaviour (categorical: never or less than once a month, less than once a week, 1–2 days per week, 3–5 days per week, daily or almost every day), age (continual: range 23–64 years). Self-reported frequent bruxism was included as an independent variable in the model to study the probability of RLS and vice versa. The forced entry method was used, i.e. all selected independent variables were entered in a single step in the regression model.

Results

Employees in irregular shift work were significantly younger ($p<0.01$) and more often males ($p<0.01$) than those in regular day work. Younger workers were significantly more often dissatisfied with their current workshift schedule than were older workers ($p<0.001$). Self-reported frequent bruxism was significantly associated with perceived dissatisfaction with workshift schedule ($p<0.01$). No statistically significant differences emerged between the studied work groups regarding the occurrence of RLS or smoking (Table I).

In the bivariate analyses, RLS was more prevalent in workers at either end of the studied age range

Table I. Demographic data and percentages for frequent bruxism, restless legs syndrome (RLS), and smoking by workshift schedule and satisfaction. Chi square test

(n=874)	Regular day work	Irregular shift work	Sig. p=	Dissatisfied with workshift schedule	Satisfied with workshift schedule	Sig. p=
Age group						
<45	47.5	62.6	<0.001	70.2	55.2	<0.001
≥45	52.5	37.4		29.8	44.8	
Gender			0.008			0.055
Male	46.7	56.6		47.0	55.2	
Female	53.3	43.4		53.0	44.8	
RLS			0.322			0.123
Yes	10.9	8.8		12.5	8.6	
No	89.1	91.2		87.5	91.4	
Frequent bruxism			0.217			0.004
Yes	8.5	11.4		16.9	9.1	
No	91.5	88.6		83.1	90.9	
Smoking			0.831			0.330
Yes	26.8	27.6		30.4	26.6	
No	73.2	72.4		69.6	73.4	

($p < 0.05$). Self-reported frequent bruxism was significantly associated with younger age ($p < 0.05$). Females reported RLS (11.4%) slightly more often than males (7.7%) (NS). Females were significantly more often current smokers ($p < 0.001$) (Table II).

According to logistic regression, self-reported frequent bruxism ($p < 0.05$) and older age ($p < 0.05$) were significantly positively associated with RLS. Dissatisfaction with the current workshift schedule ($p < 0.05$) and RLS ($p < 0.05$) were significantly positively associated with frequent bruxism, while age ($p < 0.05$) was significantly negatively associated. Increasing smoking frequency was slightly positively associated with both RLS and frequent bruxism (NS) (Table III).

Discussion

This study was designed to investigate associations between self-reported bruxism and RLS in media personnel who could be considered as under sustained pressure at work: radio and TV broadcasting work involves several psychosocial loadings, e.g. deadlines,

team-work, changing technology, demands on productivity, on-going competition, and resource management. Although irregular shift work was a special focus of interest, it did not emerge as a significant factor in itself. The lower response rate in the regular day work group may in part explain that. On the other hand, a previous study with a response rate of 75% in the same company also found that a higher level of self-reported stress was associated with overwork and sick leave, regardless of work duty [25].

The prevalence figures for self-reported frequent bruxism and RLS, and the finding that RLS was more prevalent among women, accord with earlier reports [2–8,17,18]. The main result was a significant association between bruxism and RLS, which is contradictory to previous findings [5]. The slightly positive, although statistically non-significant, effect of smoking behavior on both bruxism and RLS found in the present non-patient population is also noteworthy.

Logistic regression enabled us to study the independent effect of each background variable on the probability of the studied item while simultaneously controlling the effects of other background variables.

Table II. Percentages for frequent bruxism, restless legs syndrome (RLS), and smoking by age group and gender. Chi square test

(n=874)	Age group		Sig. p=	Gender		Sig. p=
	<45	≥45		Male	Female	
RLS			0.072			0.063
Yes	7.9	11.5		7.7	11.4	
No	92.1	88.5		92.3	88.6	
Frequent bruxism			0.015			0.022
Yes	12.7	7.4		4.4	6.1	
No	87.3	92.6		91.7	86.8	
Smoking			0.654			<0.001
Yes	26.8	28.1		22.4	33.1	
No	73.2	71.9		77.6	66.9	

Table III. Regression coefficients (B) of the studied independent variables and the probabilities of frequent bruxism, and restless legs syndrome (RLS). Logistic regression

	B	S.E.	Odds ratio	95% CI	Sig. <i>p</i> =
Probability of frequent bruxism (<i>n</i> =874)					
Gender (female)	0.46	0.24	1.6	1.0–2.5	0.054
Irregular shift work	0.17	0.28	1.2	0.7–2.1	0.554
Dissatisfaction with workshifts	0.61	0.27	1.8	1.1–3.1	0.022
RLS	0.68	0.33	2.0	1.1–3.8	0.036
Smoking behavior*	0.11	0.07	1.1	1.0–1.3	0.083
Age (in years)	−0.03	0.01	n.a.	n.a.	0.023
Constant	−1.88	0.62			
Probability of RLS (<i>n</i> =874)					
Gender (female)	0.50	0.24	1.7	1.1–1.3	0.042
Irregular shift work	−0.30	0.27	0.8	0.5–1.3	0.331
Dissatisfaction with workshifts	0.47	0.29	1.6	0.9–2.9	0.109
Frequent bruxism	0.70	0.32	2.0	1.1–3.8	0.020
Smoking behavior*	0.12	0.10	1.1	1.0–1.3	0.076
Age (in years)	0.03	0.01	n.a.	n.a.	0.013
Constant	−2.70	0.31			

* Never or less than once a month, less than once a week, 1–2 days per week, 3–5 days per week, daily or almost every day.

n.a. = Odds ratios and corresponding 95% confidence intervals were not calculated for one additional year of age.

The use of cumulative smoking as a categorical independent variable in the models resulted in only weak associations. This implies, as suggested earlier [26], that when examining the effects of smoking on both bruxism and RLS, nicotine dose response, duration of habit and degree of dependence need to be more specifically controlled.

In both models used, the significant associations between bruxism and RLS imply some comorbidity between them. However, age had diverse effects in the models and, in addition, dissatisfaction with one's workshift schedule – possibly signifying a stressful situation – was significantly associated with frequent bruxism but not with RLS. Bruxism, in turn, was recently associated with perceived stress in another study involving the same non-patient population as here [24]. Thus, despite the co-occurrence of bruxism and RLS in the present study, and although both were slightly associated with smoking behavior, they are probably distinct entities. Moreover, a possible explanation for their co-occurrence is that both can be addressed as sleep problems.

Using questionnaires to measure bruxism may cause difficulties in defining its actual prevalence: it may be even more common among populations than surveys indicate, but, because of its potential subconscious nature, not registered as a behavior by individuals. Although data on bruxism gathered by questionnaires may be difficult to operationalize, numerous surveys have been performed to evaluate possible interactions between bruxism and psychological factors. Perceived bruxism was previously shown in a similar non-patient population to have a coherent relationship with stress and stress-related disorders [13,27], which, together with the present findings, may imply that to some extent it reflects intrapersonal or interpersonal reactivity, or dissatisfaction.

However, electromyographic or polysomnographic measurements of bruxism may end up detecting a parafunction with a somewhat different origin. Recent reports indicate that many of the parasomnias often co-occur, and that they may share some common genetic background [28,29]. Bruxism in childhood and adulthood is reportedly highly correlated in both genders [7], and recent research has focused on the genetic aspects of primary RLS, too [30]. In addition, an association between secondary RLS and systemic diseases such as renal failure, rheumatoid arthritis, and diabetes mellitus has been suggested [31–33], although these latter findings are controversial [18]. On the other hand, according to the few existing studies, those with RLS have more often suffered from anxiety and depression symptoms [34], both also detrimental to work performance.

Shift work appears to be associated with work-related problems mostly connected with the human circadian rhythm [35,36]. Moreover, irregular shift work has been addressed as a cause of fatigue and decreased work performance, and may expose employees to work hazards [37,38]. Perceived bruxism may be a sign of a stressful situation and a sleep problem, while RLS as perhaps a more stable trait may, if untreated, negatively affect sleep quality and further enhance the problem. From a preventive perspective this indicates a need for increased awareness about these associations to better manage them in non-patient as well as patient populations, both on individual and organizational levels.

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