

EXAMINING THE RELATIONSHIP BETWEEN PHYSIOLOGICAL JOB STRESS AND SLEEP BRUXISM AMONG WORKING AND NON-WORKING WOMEN IN NORTH CHENNAI, TAMILNADU**Prabu D¹, Sindhu R², Dinesh Dhamodhar³, Shreelakshmi S², Raj Mohan M³, Bharathwaj V V², Sunayana Manipal⁴, Savitha S⁵***¹Master of Dental Surgery, Professor and Head, Department of Public Health Dentistry, SRM Dental College, Ramapuram, Chennai, India.**²Master of Dental Surgery, Senior lecturer, Department of Public Health Dentistry, SRM Dental College, Ramapuram, Chennai, India**³Master of Dental Surgery, Reader, Department of Public Health Dentistry, SRM Dental College, Ramapuram, Chennai, India**⁴Master of Dental Surgery, Associate Professor, Jawaharlal Nehru Institute of Medical Sciences, Porompat, Imphal - East Manipur, India**⁵Post Graduate (Master Of Dental Surgery), Department of Public Health Dentistry, SRM Dental College, Ramapuram, Chennai, India***Received: 05-05-2022 / Revised: 08-06-2022 / Accepted: 6-07-2022****Corresponding author: Dr. Prabu D****Conflict of interest: Nil****Abstract**

Background: Sleep bruxism is a periodical, stereotype movement disorder characterized by an involuntary, parafunctional, excessive teeth grinding during sleep. This disorder is common among the general population and represents the third most parasomnia.

Aim: This epidemiological study aimed to examine the relationship between psychological job stress, general health, and sleep bruxism among working and non-working women residing in North Madras.

Methods: The study was undertaken to assess the sleep bruxism among working and non-working women in North Madras. Subjects were assessed by the demographic data, general health, general job information in a questionnaire and examined for the tooth wear index.

Results: A total of 200 females participated, of which 100 were working and 100 were non-working women. The overall implication of the study shows that bruxism increases with an increase in stress. Furthermore, the non-working women who were under higher stress showed an increased bruxism rate.

Conclusion: We conclude that sleep bruxism was highly associated with a few aspects of stress in working women but not in non-working women residing in North Madras.

Keywords: Epidemiology, general job information, general health, tooth wear index, sleep bruxism.

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Introduction

Bruxism is a destructive habit defined as the nonproductive diurnal or nocturnal clenching or grinding of the teeth. It is a periodical, stereotype movement disorder characterized by an involuntary, parafunctional, excessive teeth grinding during sleep.

The American Academy of Orofacial Pain (1996) defined bruxism as diurnal or nocturnal parafunctional activity, including clenching, bracing, gnashing, and grinding of teeth. Although its pathophysiology is still unclear, two major factors, occlusal interferences and emotional disturbances, have classically been regarded as the main causes.[2]

Psychological job stress has been associated with sleep disturbances, commonly bruxism. In healthy people, masticatory muscle activities can be divided into two categories: functional (e.g. chewing, swallowing, and speaking) and parafunctional (e.g. tooth clenching and grinding, and various oral habits). Tooth grinding and clenching have generally been characterized as bruxism in the literature.

Bruxism has often been associated with temporomandibular disorder (TMD), which affects millions of people worldwide.[1] This disorder is common among the general population and represents the third most parasomnia.

On the other hand, stress has been increasingly considered an initiating, predisposing and perpetuating factor for bruxism; however, their implicit relationship has remained unclear. Stress experiences reportedly arise from multifactorial work and life issues.[1] Millions of people are affected by bruxism (grinding or clenching teeth during sleep or awake) worldwide. It has been noted that bruxism may be genetic in origin,

affected psychosocially or pathophysiological, and caused or perpetuated by occlusal discrepancies.

However, bruxism tends to be considered centrally regulated, with peripheral factors playing only a minor role in its aetiology. Sleep bruxism may happen in all sleep stages but is most often detected in non-REM sleep one and two and towards arousal.[3]

The consequences of this sleep bruxism include excessive tooth wear, fractures of the teeth, TMJ discomfort, muscle pain, inflammation and recession of the gums, increased risk of periodontal problems and overloads of dental implants. Bruxism has been regarded as an underlying factor for TMD, but these associations are not fully accepted.

Temporomandibular disorders (TMD) are signs and symptoms of temporomandibular joints or masticatory muscles, or both. Among these, the most commonly presented symptom among populations is facial muscle pain. In addition, these symptoms are associated with headaches, facial pain, tightening and stiffness of the shoulder, oral infection, and frequent arousal with altered daytime functioning and obstructive sleep apnea.

Several studies have been demonstrated that demographic and lifestyle factors such as young age, higher educational status, smoking, caffeine intake and heavy alcohol drinking are associated cofactors of sleep bruxism. In addition, psychological stress has also been discussed as a predisposing, precipitating and perpetuating factor for sleep bruxism. For example, an epidemiological study conducted in three European countries, including 13057 subjects, revealed that people with a highly stressful life and anxiety had a

1.3 times higher prevalence of S.B. than either low stress or non-anxiety counterparts.

The Etiological Factors of Bruxism are the Following:

Besides peripheral (i.e. morphological) factors, central (i.e. pathophysiological and psychosocial) factors can be differentiated. In the past, morphological factors like occlusal deviations and discrepancies in the anatomy of the bony structures of the orofacial region have been considered the prime causative factors for bruxism. Presently, these factors are thought to play only a small role, if at all. The pathophysiological factors are more in focus recently. For example, bruxism is suggested to be part of a sleep arousal response, the oral motor event preceding or following the arousal. In addition, bruxism appears to be regulated by various neurotransmitters in the central nervous system. More specifically, disturbances in the central dopaminergic system have been described in relation to bruxism. Further, factors like medication, (illicit) drugs, genetics, trauma, neurological and psychiatric diseases may be involved in the aetiology of bruxism. Psychosocial factors like stress and personality are frequently mentioned about bruxism as well. However, research on these factors comes to equivocal results and needs further attention.[9]

The Risk Factors that are Associated with Bruxism:

The subjects with obstructive sleep apnea syndrome, loud snoring, moderate daytime sleepiness, heavy alcohol consumption, caffeine consumption, tobacco consumption, highly stressful life with anxiety were at higher risk of reporting sleep bruxism.

In summary, sleep bruxism is common in the general population and represents the third most frequently occurring parasomnia. It has numerous outcomes, which are not restricted

to dental or muscular problems. Among the associated risk factors, patients with sleep-disordered breathing and anxiety have a greater risk factor for sleep bruxism, which must raise concerns about the future of these individuals.[3]

This epidemiological study examined the relationship between psychological job stress, general health, sleep bruxism among working and non-working women in North Madras.

Materials and Methods

It was a cross-sectional, descriptive study, and the data was collected by self-rated questionnaire and the study period was from February to June 2011. In the present study, there were 200 samples of women who participated, of which 26 of them were working, and 32 were not working under the age group of 18-30 years. The working and non-working women under the age group of 30-40 years were 47 and 41 respectively; 27 working and 27 non-working women were categorized above 40 years of age. Subjects were divided into two groups: 1. the non-working women 2: The full time or the part-time workers. The samples selected is a simple random sampling method. The samples that did not show interest to fill the questionnaire were excluded. The National Institute for Occupational Safety and Health (or NIOSH) is the United States federal agency that is the reason for conducting research and making recommendations to prevent work-related injury and illness. NIOSH is part of the Centers for Disease Control and Prevention (CDC) within the U.S. Department of Health and Human Services, the Occupational Safety and Health Act.[11]

The NIOSH questionnaire was distributed to 100 working women in various departments and 100 non-working women. The questionnaire was elicited on demographic data, their general health, and general job

information. This questionnaire includes ten questions based on the general job information, 17 questions based on general health. This questionnaire was modified from the NIOSH generic job stress questionnaire given by the behavioural and biomedical sciences division. The questionnaire also contains the tooth wear index, authored by Bardsley PF, Taylor S, and Milosevic A and published by PUBMED CENTRAL, THE

CLINICAL ORAL INVESTIGATIONS. This index was assigned as 0,1,2,3. It also had the scores x, m, f. The teeth examined were maxillary and mandibular anteriors and all the first molars. The ethical clearance was obtained from the ethical committee of the department of public health dentistry. Informed consent was obtained from the subjects before the questionnaires were obtained.

Table 1:

Tooth Wear Index Scores	Significance
0	No wear into the dentin
1	Dentin just visible (including cupping) or dentine exposed for less than 1/3 of surface
2	Dentin exposure greater than 1/3 of surface
3	Exposure of pulp or secondary dentin
X	No wear
M	Missing
F	Fracture

Statistical Analysis:

Data collected were entered into the spreadsheets; the statistical package for social sciences (SPSS) version used 15.0 for data analysis.

Results

The present study included 200 samples of women, out of which 26 were working, and

32 were not working under the age group of 18-30 years. The working and non-working women under the age group of 30-40 years were 47 and 41, respectively. Therefore, 27 working and 27 non-working women were categorized above 40 years of age.

Table 2: Distribution of Responses Among Working and Non Working

Questions	Group Working	Never	Occasionally	Sometimes	Fairly Often	Very Often	Total
Your face became hot when not being in a hot room or exercising	Workers	69	13	11	5	2	100
	Non-Workers	59	12	17	8	4	100
You perspired excessively when not being in a hot room or exercising	Workers	40	35	17	4	4	100
	Non-Workers	39	38	13	8	2	100
Your mouth became dry	Workers	17	17	49	14	3	100
	Non-Workers	15	23	42	15	5	100
Your muscles felt tight and tense	Workers	24	34	21	20	1	100
	Non-Workers	22	31	27	16	4	100

You were bothered by a headache	Workers	7	10	43	26	14	100
	Non-Workers	12	19	25	23	21	100
You felt as if the blood was rushing to your head	Workers	39	26	16	9	10	100
	Non-Workers	35	28	19	16	2	100
You felt a lump in your throat or had a choked-up feeling	Workers	35	20	33	8	4	100
	Non-Workers	37	25	26	8	4	100
Your hands trembled enough to bother you	Workers	18	26	28	25	3	100
	Non-Workers	24	25	26	22	3	100

Questions	Working Group	Never	Occasionally	Sometimes	Fairly Often	Very Often	Total
You were bothered by shortness of breath when you were not working hard or exercising.	Workers	33	17	26	19	5	100
	Non-Workers	42	26	19	8	5	100
Your hands sweated so that you felt damp and clammy	Workers	54	25	16	3	2	100
	Non-Workers	53	22	14	6	5	100
You had spells of dizziness	Workers	10	28	44	13	5	100
	Non-Workers	20	28	36	15	1	100
You were bothered by having an upset stomach or stomach ache	Workers	14	25	34	18	9	100
	Non-Workers	19	27	38	11	5	100
You were bothered by your heart beating	Workers	43	25	16	15	1	100
	Non-Workers	46	25	18	9	2	100
You were in ill health, which affected your work	Workers	26	33	30	4	7	100
	Non-Workers	34	17	30	10	9	100
You had a loss of appetite	Workers	19	17	31	27	6	100
	Non-Workers	26	23	26	19	6	100
You had trouble sleeping at night	Workers	18	16	40	19	7	100
	Non-Workers	23	13	39	18	7	100

Tooth Wear Index



Figure 1: Tooth Wear Index for Non Working Women

Examined the teeth mentioned above. The amount of score-0 showed by non-working women were 311, score-1 were 20, and score-2 were 2.

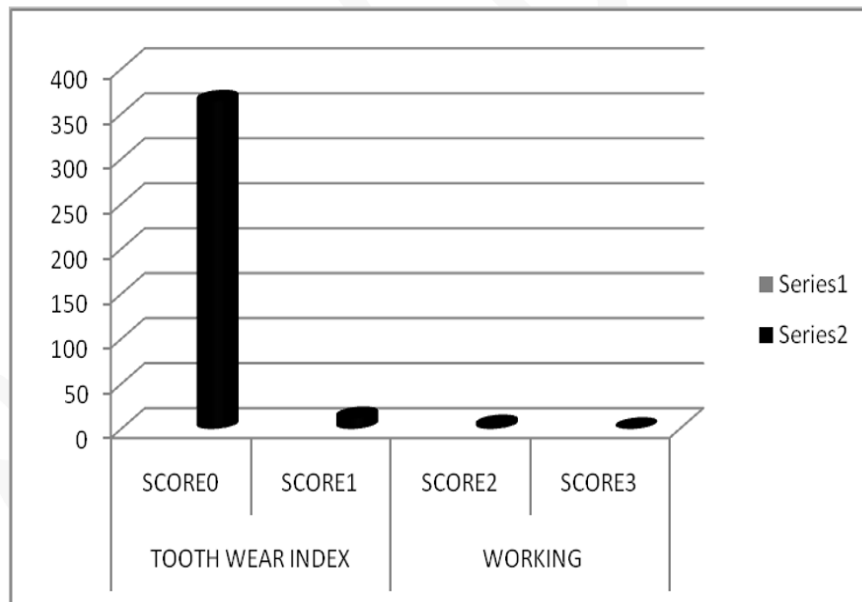


Figure 2: Tooth Wear Index For Working Women

The amount of score-0 showed by working women were 364, score-1 were 12, and score-2 were 2.

Discussion

Everybody knows that stress is harmful and can cause severe health problems. But what we don't know is that stress-related health

problems also include oral health concerns. The present study aimed to examine the bruxism between the working and non-working women residing in North Madras.

The subjects were dichotomized into two equal-sized groups as working and non-working women and compared the prevalence of sleep bruxism.

It is an open truth that working women have to face problems just by their being women. As working women are more exposed to high-stress levels than non-working women, they are highly exposed to stress-related disorders not only in the oral cavity but also systemically. They are more prone because they have to face the tough tasks both at their job or office and in their home as the homemakers do (i.e.); They should play a dual role like a working male and a homemaker.

Bruxism can occur during the day or night. Generally, patients clench their teeth throughout the day and gnash and clench them during sleep. However, nocturnal bruxism is more frequent. It varies with the individual and has been related to emotional or physical stress. Bruxism usually causes tooth wear as evidenced by wear facets ranging from mild to severe and can be localized or found throughout the dentition.[10]

Stress-related disorders in the oral cavity can be:

Bruxism, Canker Sores, Dry Mouth, Burning Mouth Syndrome, Lichen Planus, TMJ/TMD, Gum Disease.

Not only the stress which affects the oral activity but also some hormonal changes will affect. Hence, working and non-working are prone to these hormonal changes, but working women are more affected as they are exposed to stress. The hormonal changes that cause changes in the oral cavity are puberty, pregnancy, menopause, and oral contraceptives.

The results revealed that working women are more prone to the exposure of stress and high

levels of tooth wear, mainly in the mandibular incisors were as we could detect only a lesser amount of stress and tooth wear in the non-working women.

The results suggest that sleep bruxism is highly associated with job stress in working women, which is not seen in non-working women.

The strength of our study is that we evaluated the job information and general health with a well established and validated questionnaire (i.e.) NIOSH questionnaire.

The previous study, which was done by Ahlberg J, shows that the experience of severe stress was the most significant factor associated with frequent bruxism among the multi-professional media personnel.[1] Hence it was significant for our study.

A similar type of study done by Omar Franklin Molina¹ showed that scores in hysteria increased with the severity of bruxism; thus, those temporomandibular disorder patients with higher scores in hysteria are more likely to be found in those presenting with severe bruxism⁽⁴⁾.

The associations between work stressors and the frequency of sleep disturbances were more complex than expected. Only work overload was associated with all three types of poor sleep quality. Poor sleep quality may definitely lead to sleep bruxism. This was the study done by Dr Hannah Knudsen.[5]

Pierce CJ, Christman K, Bennett ME said that in research which was on 1339 employees of a Finnish broadcasting company, frequent bruxism was significantly associated with severely stressful situations at work. Furthermore, frequent bruxism was significantly positively associated with the number of occupational health care and dental visits. It was concluded that bruxism might reveal ongoing stress in normal work life.[6]

Manfredini D, Landi N, Romagnoli M, Bosc M had done the study published in 2004 revealed that the prevalence of bruxism was 40 per cent, with a strong difference between females (57.8 per cent) and males (25.5 per cent). The prevalence of bruxism is seen with the altered psychic and occlusal factors.[8]

The study made by Johansson A showed that the Three TMD-related symptoms and reported bruxism were used as dependent variables. Impaired general health was the strongest risk factor for reported TMD symptoms. Along with female gender and dissatisfaction with dental care, impaired general health was significantly associated with all three TMD symptoms. A few more factors were associated with pain from the TMJ only. In comparison, reported bruxism showed more significant associations with the independent variables.[7]

In the study named neurological mechanisms involved in sleep bruxism, G.J. Lavigne said that sleep bruxism(S.B.) is reported by 8% of the adult population and is mainly linked with rhythmic masticatory muscle activity (RMMA) characterized by repetitive jaw muscle contractions. The pathophysiology of S.B. is becoming clearer. There is an abundance of evidence outlining the neurophysiology and neurochemistry of rhythmic jaw movements (RJM) in relation to chewing, swallowing, and breathing. Several brainstem structures (*e.g.*, reticular pontis oralis, pontis caudalis, and parvocellular) and neurochemicals (*e.g.*, serotonin, dopamine, gamma-aminobutyric acid [GABA], and noradrenaline) are involved in both the genesis of RJM and the modulation of muscle tone during sleep. It remains unknown why a high percentage of normal subjects present RMMA during sleep and why this activity is three times more frequent and higher in amplitude in S.B. patients.[12]

Multiple regression analyses made by Ota A showed that psychological job stress factors of poor appropriateness of work and high qualitative workload were associated with insomnia. The psychological stress response of depression and physical stress responses were also related to insomnia. Depression was also related to the appropriateness of work. The present results showed that insomnia was closely related to the psychological job stress factor of the appropriateness of work and the psychological response of depression. There are mutual relationships between insomnia and poor mental health.[13]

Insomnia affects 5–45% of non-shift workers, making it a serious public health concern. High perceived stress was associated with all types of insomnia with odds ratios (95% confidence interval) of 2.27 (1.58–3.26), 2.15 (1.57–2.95), and 2.96 (2.19–3.99) for DIS, DMS, and PQS, respectively. This was the study made by Chiyo Murata.[14]

Conclusion

The result of the study shows that sleep bruxism was highly associated with some aspects of stress in working women but not in non-working women residing in North Madras. The oral health of working women showed many abnormalities like attrition etc., especially in the mandibular incisors than the non-working women.

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