

## The association between periodontal disease and job stress in Baghdad city

### الترباط بين مرض النساع و أجهد العمل في مدينة بغداد

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#### // الخلاصة //

الدراسات الوبائية أظهرت ان مرض النساع لا يؤثر في الأشخاص بطريقة متماثلة , بعض الأشخاص لديهم عوامل تهديد التي تجعل الأشخاص اكثر قابلية لنشوء مرض النساع. الغاية من هذه الدراسة هي تقييم الترباط بين مرض النساع و أجهد العمل في مدينة بغداد. تم أعداد دراسة أستعراضية في العيادة الخاصة . العينة المدروسة تتكون من 64 شخص من كلا الجنسين تتراوح أعمارهم بين 23 الى 65 سنة. تم الطلب من الأشخاص المشاركين للأجابة على أستفتاء شخصي و الخضوع لتقييم سريري لمرض النساع و المتكون من مؤشرات الصحيفة الجرثومية , التهاب اللثة , قياس عمق الجيوب , النزف عند التسمير و قياس مستوى الأنسجة الرابطة. نتائج هذا البحث أظهرت وجود فرق أحصائي معنوي بين مجموع أجهد العمل و المجموعة الضابطة في مؤشر قياس عمق الجيوب , المؤشرات الأخرى أظهرت كذلك زيادة في مجموعة أجهد العمل مقارنة بالمجموعة الضابطة و لكن الفرق لم يصل الى مستوى أحصائي معنوي.

#### Abstract

**Introduction:** Epidemiological studies have shown that periodontitis does not affect all subjects in the population in a similar way, some individuals present risk condition that make them more susceptible to develop periodontal disease. The association between stress factors and periodontal disease have been examined in several studies.

**Aim of the study:** to evaluate the association between periodontal clinical parameters and job stress in Baghdad city.

**Material and Method:** A cross sectional study was conducted at my private clinic, the study population was consisted of 64 patients of both genders with ages ranging from 23 to 65 years. The patients were asked to answer self-administered questionnaire and to undergo periodontal examination. To estimate job stress, a questionnaire based on the life events scale was used, The parameters used in the periodontal assessment were plaque index, gingival index , probing pocket depth, bleeding on probing and clinical attachment level.

**Result:** A statistically significant difference was found between stress and control group in probing pocket depth. Plaque index , gingival index , bleeding on probing and clinical attachment level was also higher in stress group but it is not statistically significant.

**Conclusion:** , the prevalence of periodontal disease in subjects who felt job stress was higher than that in subjects without such stress.

#### Introduction :-

Periodontal disease is a chronic inflammatory condition characterized by loss of connective tissue attachment and alveolar bone, and the formation of pathological pockets around the teeth. (Creda et al 1994)

Epidemiological studies have shown that periodontitis does not affect all subjects in the population in a similar way, some individuals present risk condition that make them more susceptible to develop periodontal disease. (Page 1998)

Several factors are related to the development of periodontal disease, such as virulence of the microorganism , host, and environment condition (Monteiro da silva et al 1996). Smoking, alcohol consumption, tooth brushing frequency, dental visits, and life events are also related to periodontal health. (Aleksejaniene et al 2002)

Stress can be defined as a response state of the organism to forces acting simultaneously on the body which if extensive lead to disease (Jaclyn Chin et al 2005). Stress in itself does not pose a risk to health, providing that the individual has adequate coping resources and the capacity to control his environment (Aleksejaniene et al 2002)

The association between stress factors and periodontal disease have been examined in several studies ( Solis et al 2004, Hugoson et al 2002, Linden et al 1996). Biological plausibility for such an association is supported by studies that have demonstrated that psychological states such as depression and exposition to stress agents could modify the immune response make the individual more susceptible to develop an unhealthy condition and may also have an impact on periodontal health. (Solis et al 2004)

Inadequate coping when faced with psychological stress results in activation of central nervous system , the central nervous system then modulates the immune response that was elicited by mounting a coordinated complex series of adaptive responses , which including activating the sensory nervous system , the sympathetic-adreno-medullary system , and the hypothalamic-pituitary-adrenal (HPA)axis to release immuno-regulatory neurotransmitter , neuropeptides and hormones such as cortisol , IL-1 $\beta$  and IL-6. (Jaclyn Chin et al 2005)

Cortisol , the most important glucocorticoid, is a marker of stress and produced in the adrenal cortex. Amongst its other roles, it has major immunosuppressive and antiphlogistic effects, by inhabiting the production of lymphocyte and antibodies and the proliferation of fibroblasts in the inflammatory granulation tissue , on the other hand , the role of IL-1 $\beta$  is extremely diverse including induction of collagenases and calcium resorption in the bone. (Jaclyn Chin et al 2005)

The randomized controlled split-mouth trial by Deinzer et al.(1999) involved inducing experimental gingivitis and measuring levels of interleukin-1 $\beta$  in a group of students undergoing academic stress as compared to a non-stressed control group. The experimental group was found to have significantly higher levels of the immunological mediator at the sites of experimental gingivitis than the control group and also higher levels at sites of experimental gingivitis as compared to sites of perfect oral hygiene. This not only showed a relationship between psychosocial stress and periodontal conditions, but suggested a synergistic relationship for the increase of interleukin-1 $\beta$  via stress and presence of plaque.

Trombelli et al.(2005) conducted a similar randomized split mouth to that of Deinzer et al.(1999) which induced experimental gingivitis in subjects but measured stress differently. The findings were not able to establish a relationship between stress and the periodontal effects. In this study questionnaires were used to gather information on personality traits, current level of stress, social support and life events over the previous year and these were then correlated to the periodontal conditions over a 21 day period .

In an effort to resolve the discrepancy presented by using different measurements of stress, a study by Mengel et al.(2002) was examined in which levels of immunological mediators and

glucocorticoids were related to subjective measures of stress in a case control study to determine if a relationship existed. Overall it was determined that not only did the stress levels not differ significantly between the cases and controls, but also that the immunological mediator and glucocorticoid levels did not positively correlate with the registered stress values as determined by questionnaire .

Three additional case-control studies used a variety of questionnaires and clinical measures in an attempt to link psychosocial stress and periodontal disease, with inconsistent results. Two of the three studies, by **Croucher *et al.*(1997)** and **Vettore *et al.*(2003)** found that the periodontally diseased cases were more likely to have increased stress as compared to the controls, while the third study by **Locker & Leake (1993)** failed to find a significant relationship. The studies were analyzed by similar methods, using bivariate and multivariate analyses to examine relationships between a variety of factors and periodontal disease, however the study by **Locker & Leake (1993)** was the most thorough and will thus be considered stronger than the other two studies which were not as well controlled. The study by **Croucher *et al.* (1997)**. matched the cases and controls according to both age and sex and was considered to be stronger than the remaining study by **Vettore *et al.*.(2003)**

Although there have been many studies on the relationships of stress factors to periodontal diseases in Western countries, there have been few studies in Asian countries. **Shizukuishi *et al.*(1998)** found a significant association between mental stress and periodontal health status in Japanese workers. However, only one item related to subjective mental stress was examined in that study; individual stress-related factors such as job stress and health-related stress were not examined. Furthermore, the study population consisted of factory employees in one company. **Sonoda and Mori (2003)** examined the relationships between lifestyle factors and subjective health, including periodontal health, in residents of an urban area. Rural areas have rapidly aging communities in which the lifestyles of residents are expected to be more typical and which might provide a more appropriate sample for epidemiological study. **Akhter *et al* (2005)** collected data from 1089 adults in a farming district of Japan, the results suggested that stress related to self health and job might be potential risk indicators for development of periodontal disease.

The aim of the present study was to evaluate the association between periodontal clinical parameters and job stress in Baghdad city.

## **Material and Methods:**

### **Study Population:**

A cross sectional study was conducted at my private clinic, the study population was consisted of 64 patients of both genders with ages ranging from 23 to 65 years.

Exclusion criteria of our study were: current periodontal treatment; diabetes; disorders of the immune system; application of antibiotic, anti-inflammatory or immunosuppressive drugs; pregnancy and subjects who were unemployed at the time of the survey

### **Procedure:**

The patients were asked to answer self –administered questionnaire and to undergo periodontal examination.

To estimate job stress, a questionnaire based on the life events scale was used (Genco et al, 1999; Solis et al, 2004; Akhter et al, 2005). The first page of the questionnaire including questions on demographic factors like age, gender, employment status. The participants were asked to answer by "yes" or "no" to which they agree with a statement that had occurred in the last month.

### **Oral Examination:**

The parameters used in the periodontal assessment were the followings:

#### **1. Plaque Index (PLI)**

The assessment of dental plaque was made according to the plaque index (Silness and Loe 1964). The measurement was made at the mesial, distal, lingual and buccal aspect of each tooth.

#### **2. Gingival Index (GI)**

The gingival condition of four surfaces of each tooth was assessed using the criteria of gingival index. (Löe and Silness 1963).

#### **3. Probing Pocket Depth (PPD)**

The percentage of sites with probing pocket depth  $\geq 4\text{mm}$  was calculated. The distance in millimeters from the gingival margin to the most apical extent of Williams probe inserted into the gingival crevice as close as possible to the long axis of the tooth was recorded.

The sites for measurement were mid-buccal, mid-lingual, mesiobuccal, distobuccal lines, No pressure was used, the probe was allowed to fall by its own weight. The measurement was made to the nearest millimeters.

#### **4. Bleeding On Probing**

Assessment of the bleeding was done immediately after the probing depth measurement. If bleeding occurs within 30 seconds after probing, the site was given a positive score whereas a negative score for non-bleeding site. The proportion of bleeding surfaces out of the total number of surfaces was calculated.

#### **5. Clinical attachment level:**

It represents the vertical distance in millimeter from the cemento-enamel junction to the bottom of the probable gingival pocket. The longest distance for each tooth surface is recorded. (Lindhe et al, 1998)

### **Statistical Analysis:**

Data were stored in database (excel for Windows) and analyzed using software SPSS for Windows version 17.00. The mean value of PI, GI, PPD, CAL, POB were calculated for each subject and compared for each group using student-t-test, comparison was done with a 5% of significant.

### **Results:**

The final sample was comprised of 64 subjects who completed the periodontal clinical examination and answered the self reported questionnaire. Thirty-Five subjects fell into the category of stress group and were considered cases; the other twenty nine were considered healthy (control)

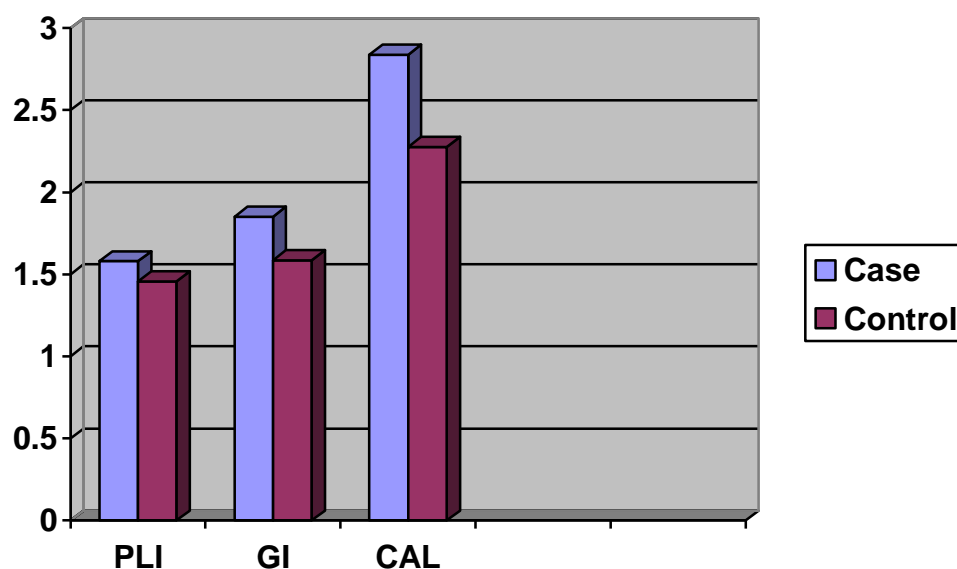
As shown in table (1), the mean plaque index for stress group was 1.58, while it is 1.458 for control group, a difference was found but it is not statistically significant. ( $P > 0.05$ ). Figure (1).

The mean gingival index for stress group was 1.851, while it is 1.586 for control group, a difference was found but it is not statistically significant. ( $P > 0.05$ ). Figure (1).

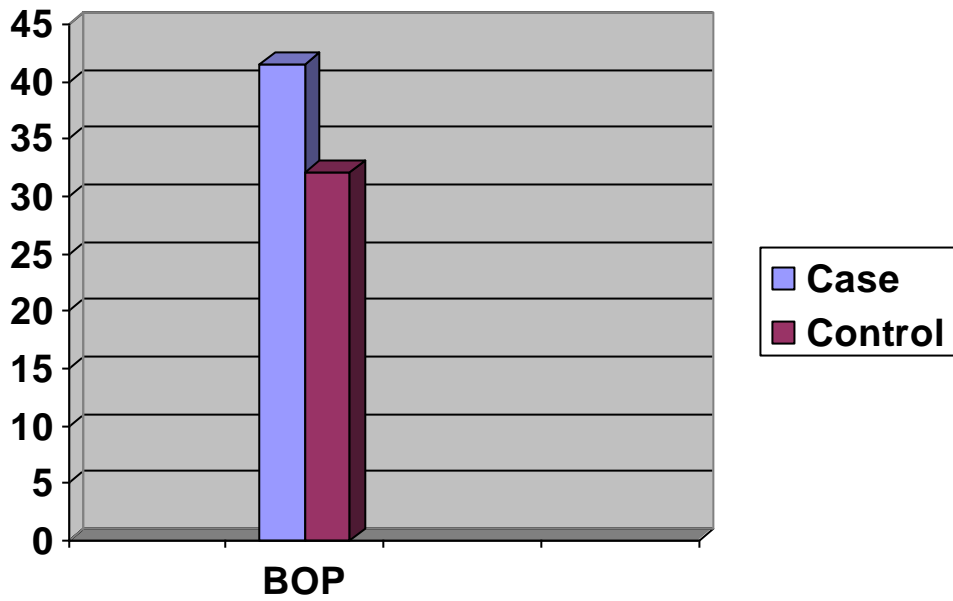
The percentage of sites with probing pocket depth  $\geq 4\text{mm}$  was calculated. As shown in table (1), the total mean percentage of pocket depth  $\geq 4\text{mm}$  in stress group was 6.277%, while it is 4.762% in the control group , A statistically significant difference was found ( $P < 0.05$ ). Figure (3).

Tables (1) describe the distribution of bleeding on probing expressed as percentage in each group. The total mean percentage of sites which bled after probing in stress group is 41.534%, while it is 32.137% in the control group, a difference was found but it is not statistically significant. ( $P > 0.05$ ). Figure (2).

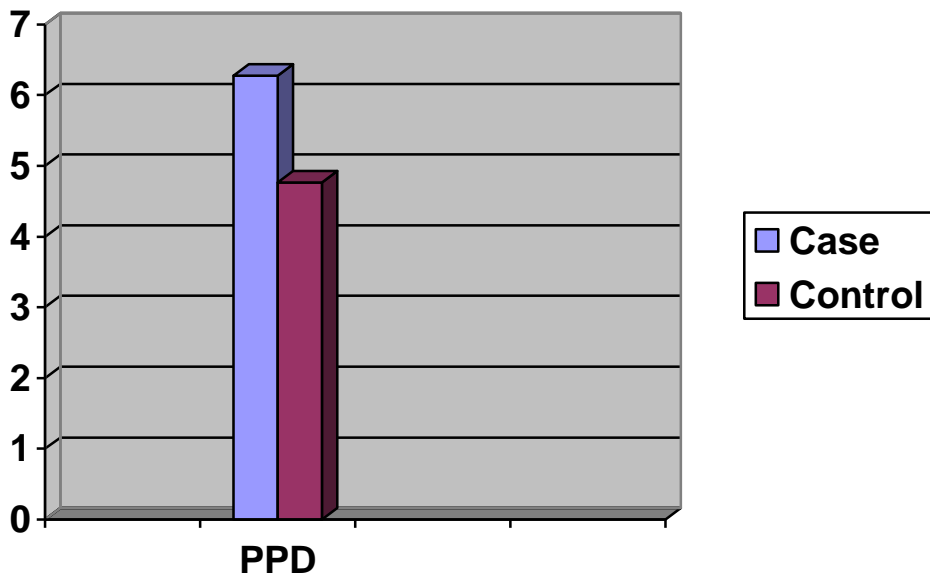
The mean of the clinical attachment level for stress group was 2.837, while it is 2.275 for the control group , a difference was found between these two group but it is not statistically significant. ( $P > 0.05$ ). Figure (1).



**Figure (1) Bar chart showing mean plaque index, gingival index and clinical attachment level of stress and control group.**



**Figure (2) Bar chart showing the mean of the bleeding on probing of stress and control group.**



**Figure (3) Bar chart showing mean of the probing pocket depth of stress and control group.**

**Table (1) Comparison of the clinical parameters between stress and control group**

Group		Stress	Control	Sig.
Plaque Index	M	1.58	1.458	NS
	SD	0.2795	0.3190	
Gingival Index	M	1.851	1.586	NS
	SD	0.2821	0.3044	
Pocket Depth	M	6.277	4.762	S
	SD	4.8263	3.5955	
Bleeding On Probing	M	41.534	32.137	NS
	SD	14.960	16.256	
Clinical attachment level	M	2.837	2.275	NS
	SD	0.8788	0.6254	

**Discussion:**

In this cross-sectional study, the relationship between Job stress and periodontal variables was investigated in a consecutive sample of 64 subjects aged 23–65 years. This study design is often used to investigate the association between risk factors and disease prevalence in situations where less is known about the form or type of association. Studies with similar design were conducted by other authors, using however, different target populations, threshold scores and indices to positively identify the disease (**Davis & Jenkins 1962, Green et al. 1986, Marcenes & Sheiham 1992**). Studies conducted by other authors (**Monteiro da Silva et al. 1996, Moss et al. 1996, Vettore 2000**) also applied different self-report scales as instruments to measure psychological variables (Minnesota Multiphasic Personality Inventory, Modifiers and Perceived Stress Scale, Brief Symptom Inventory) as well as different psychological variables (stress, anxiety, depression). These differences may limit the comparisons between the investigations.

In our study, the prevalence of periodontal disease in subjects who felt job stress was higher than that in subjects without such stress. Job stress may arise from various sources, some of which are intrinsic to the job such as poor working conditions, long working hours, work overload or under load, individual's role in the organization, relationships at work, career development and general work climate. Job stress may depend on how a person handles and copes with the job strain he/she encounters since stress from the job is not the same experience for everyone or it may depend on the degree of social support (**Genco et al. 1999**). **Kawakami and Haratani (1999)** suggested that Japanese workers tend to suppress expression of positive feelings, resulting in apparently higher psychosocial stress level and lower job satisfaction level compared with those for workers in the US. They also showed that job stress from long working hours was associated with a higher risk of development of myocardial infarction, diabetes mellitus and hypertension in Japanese. In another study by **Uehata (1991)**, an association between job stress and cardiovascular

attacks was found. These studies using Japanese subjects showed associations of job stress with various systemic diseases rather than with periodontal disease. In this study, an additional consideration was proved in view of the fact that job stress has a possible influence on the presence of periodontal disease, this finding is agree with **Freeman and Gross (1993)**.

Several limitations of our study should be considered when interpreting our findings. Stress factors might also result from low socioeconomic status and poor health knowledge, which might lead to the occurrence of periodontal disease. However, these factors were not analyzed in this study. Another limitation is the cross-sectional design of the study, which might have indicated temporal relationships between stress factors and periodontal disease. Therefore, it is necessary to conduct further longitudinal studies relating the sequence of risk factors to periodontal disease onset and progression in order to establish causal relations between potential stress factors and periodontal disease. In conclusion, job stress may be predisposing factors for the onset of periodontal disease. Further work needs to be done to determine possible associations between specific stressors and their effects on periodontal disease.

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أستبيان ترابط أجهاد العمل مع فقدان الأسناد العظمي للأسنان (مرض النساع )

أسم المراجع \_\_\_\_\_  
العمر \_\_\_\_\_ الجنس \_\_\_\_\_  
الوظيفة \_\_\_\_\_  
عدد ساعات العمل \_\_\_\_\_  
التحصيل العلمي \_\_\_\_\_

هل تعاني من الأمراض المزمنة التالية

مرض السكري  أمراض القلب  اعتلال النظام المناعي

مرض الصرع  ارتفاع ضغط الدم

هل تتناول أي دواء حاليا  نعم  كلا

هل تناولت أي دواء خلال الشهر الماضي  نعم  كلا

إذا كانت الإجابة نعم الرجاء ذكر أسم الدواء \_\_\_\_\_

هل خضعت سابقا لعلاج مرض النساع  نعم  كلا

هل تخضع حاليا لعلاج مرض النساع  نعم  كلا

هل تعاني من إجهاد نفسي في العمل خلال الشهر الماضي  نعم  كلا

هل تعاني من مشاكل مع مديرك في العمل خلال الشهر الماضي  نعم  كلا

هل تعاني من إجهاد جسدي في العمل خلال الشهر الماضي  نعم  كلا

**Oral examination**

**Plaque Index**

□	□	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□

□	□	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□

**Mean** \_\_\_\_

**Gingival Index**

□	□	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□

□	□	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□

**Mean** \_\_\_\_

**Probing Pocket Depth**

□	□	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□

□	□	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□

**Mean** \_\_\_\_

**Bleeding on Probing**

□	□	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□

□	□	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□

**Mean** \_\_\_\_

**Clinical Attachment Level**

□	□	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□

□	□	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□

**Mean** \_\_\_\_