Periodontal health and salivary Interleukin -6 among preterm postpartum women

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ABSTRACT

Background: Hormonal changes during pregnancy have been suggested to predispose women to gingivitis. Furthermore, advance periodontal infection in pregnant women may pose a threat to the placenta and uterus and may increase the like hood of preterm delivery. The aim of this study was to investigate the effect of salivary interleukin -6 (IL-6) level and periodontal health among preterm postpartum women.

Materials and Methods: Salivary samples were taken from 33 preterm postpartum women (study group) and 33 full term postpartum women (control group). The supernatant salivary samples were assayed using atomic absorption spectrophotometer. Plaque, calculus and gingival indices were used for recording the oral hygiene and gingivitis also probing pocket depth was recorded.

Results: The mean values of plaque index, calculus index probing pocket depth were higher among study group than control group with no statistically significant difference, but a highly significant difference was observed in the mean value of GI between the two groups. The full term women had a higher mean value of salivary IL-6 than study group with no statistically significant difference, weak positive correlation was found between salivary IL-6 and probing pocket depth in control group. On the other hand, weak negative correlations were noticed between salivary IL-6 among study group with Plaque index, Gingival index, Calculus index and probing pocket depth, also between salivary IL-6 with PII, GI and CaII among control group. However, statistically all correlations were not significant.

Conclusion: It is concluded that pregnant women during pregnancy required preventive programs directed for improvement of oral health and especially periodontal disease to prevent any pregnancy outcomes such as preterm delivery.

Keywords: Periodontal health, salivary IL-6, preterm postpartum women. (J Bagh Coll Dentistry 2013; 25(2):140-142).

INTRODUCTION

Pregnancy and child bearing are normal occurrence in women life, it involves physicals and physiological changes that profoundly affect even healthy women [(1)]. During pregnancy, women may be particularly amenable to disease prevention and health promotion interventions that could enhance her own oral health or that of her infants. Studies documented that effects of hormones on the oral health of pregnant women, suggested that 25-100 percent of these women experienced gingivitis and that 10 percent may develop pyogenic granuloma [(2,3)]. Researchers have focused on potential associations between periodontal disease and pregnancy outcomes [(4,5)]. The way in which oral health outcomes may contribute to general health outcomes, therefore periodontal infection, which can be a reservoir inflammatory mediators, may pose a potential threat to the placenta and fetus there by increasing the like hood of preterm delivery [(4,6-9)]. In Iraq, many studies were conducted regarding the oral health status of pregnant women [(10-14)]. Yet, no previous studies were conducted to investigate the relation between periodontal disease during pregnancy and preterm delivery, so for this reason this study was designed.

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MATERIALS AND METHODS

The salivary IL-6 of 66 postpartum women with an age range 20 -25 year old was analyzed. The sample was distributed into two groups: 33 preterm postpartum women (study group) and 33 full term postpartum women (control group). Saliva was collected in plastic tubes after stimulation by chewing Arabic gums. Saliva samples were centrifuged at 4000 rpm for 30 minutes, the clear supernatant was separated by micropipette, stored at (-20°C) in a deep freeze till being assessed by using Biosource IL-6 which is a solid phase Enzyme Amplified Sensitivity Immouno Assay (EASID). Plaque [(15)], calculus [(16)] and gingival [(17)] indices were used for recording the oral hygiene also probing pocket depth was recorded. The expected day of delivery (EDD) was calculated by counting back 3 months and adding 7 days to the first day of last menstrual period (naegeles rules) [(18)]. Mean and standard deviations were calculated. Spearman's correlation coefficient and Student's t-test were used for statistical analysis, at level of significance 0.05.

RESULTS

Table 1 illustrates the mean values and standard deviations of PII and CaII among preterm and full term groups. Although statistically no significant difference were found in PI and CaII between study and control groups (P> 0.05), but

still the study group had a higher mean values. Mean values and standard deviation of GI and PPD among preterm and full term groups were shown in Table 2. The study group had a higher PPD mean values. While a highly significant difference was observed in the mean value of GI between the two groups ($P< 0.05$). Table 3 demonstrates salivary IL-6 (mean and standard deviation) among preterm and full term groups. Statistically, no significant difference was recorded between the two groups ($P> 0.05$).

The correlation coefficients among the variables are illustrated in Table 4. Weak positive correlation was found between salivary IL-6 and PPD in control group, while negative correlations were recorded among the other variables. All the relations were weak and statistically not significant ($P>0.05$).

DISCUSSION

The current investigations revealed that plaque and calculus accumulation were almost similar in both groups. The differences were statistically not significant between the two groups. This could be attributed to the negligence of oral health in the total sample and no one had received motivation in plaque control or under oral health program. In spite of, no statistically significant difference were found regarding PlI and CalI between the two groups, but the study group had a high means value than that among control groups, therefore adding for hormonal changes during pregnancy. In general, this could explain that GI was higher among first group and the difference was statistically highly significant. High significant difference was found between preterm and full term women in GI mean value. This result agree with Radnai et al study [19], in which hormonal changes due to increased levels of estrogen and progesterone during pregnancy have a special effect on the periodontium [17, 20, 21], as a vascular permeability increase in the gingival tissue and as consequence, bacteria and/ or their products can diffuse through tissue more readily than normally [22]. Thus, this finding could be explained by the fact that gingivitis had the strongest association with preterm birth.

The mechanisms by which periodontal disease could cause preterm birth have still not been cleared, but there is evidence that this relation has biological feasible bases. It has been suggested that the effect of periodontal infection on preterm birth could result from stimulation of fetal membrane on prostaglandin synthesis by cytokines produced by inflamed gingival tissue, or through the effect of endotoxin derived from periodontal infection [6]. Endotoxin can stimulate prostaglandin production by macrophages in human amnion [23].

In this study, preterm postpartum women showed a higher PPD than that among control group with no statistically significant difference between them because of low percentage of periodontal is in the entire study. This study failed to support a proposed link between a preterm birth and periodontitis compared to other studies [4-6,8,9, 24-26]. It is important to note that a majority of the women in these studies were 30 years of age or older. This may, in part, explain the strong relationship between periodontitis and preterm birth in that the occurrence of periodontitis increased with age. In young age women, periodontitis is rather uncommon, add to, this result could be due to population difference related to, poorer living condition, including poorer to comprehensive care, different life style. This result agrees with Offenbacher et al and Moreu et al studies [7, 27].

Periodontal bacteria and their virulence factors found in the periodontal pocket, induce a local periodontal host immune response that includes mainly the production of inflammatory cytokines like (Interleukin- 6) and antibodies against the bacteria [28]. So the difference between the two groups was statistically not significant in salivary IL-6 mean value, due to low occurrence of periodontitis in both groups of this study. This result agrees with the study done by Noak et al [29] .Weak negative correlation were recorded between salivary IL-6 and (GI,CalI) among the two groups. Therefore, it is responsibility of the dentist and the profession to inform patients about the biologic plausibility that untreated periodontal disease may increase the risk, not only of unfavorable pregnancy out comes, but also the developing conditions that may affect the wellbeing of the offspring.

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Table 1: Pl and Cal indices among preterm and full term groups.

Groups	PlI	Sig.	CalI	Sig.
	Mean ± SD		Mean ± SD	
Preterm	1.39 0.27	N.S.	0.17 0.23	N.S.
Full term	1.38 0.36		0.13 0.29	

Table 2: GI and PPD among preterm and full term groups.

Groups	GI	Sig.	PPD	Sig.
	Mean ± SD		Mean ± SD	
Preterm	1.31 0.27	*t = 3.92	1.52 0.24	N.S.
Full term	1.08 0.18		1.42 0.11	

***P < 0.01, d.f = 64**

Table 3: Salivary Interleukin-6 among preterm and full term groups

Groups	Salivary IL - 6	Sig.
	Mean ± SD	
Preterm	125.72 21.37	N.S.
Full term	126.49 37.02	

Table 4: The correlation coefficient between salivary interleukin-6 with PlI, Cal, GI and PPD among preterm and full term groups.

Groups		Salivary IL - 6
Preterm	PlI	r = - 0.10 p = 0.56
	GI	r = - 0.13 p = 0.46
	CalI	r = - 0.11 p = 0.51
	PPD	r = - 0.13 p = 0.46
Full term	PlI	r = - 0.08 p = 0.62
	GI	r = - 0.05 p = 0.78
	CalI	r = - 0.15 p = 0.40
	PPD	r = + 0.23 p = 0.19