

PREVALENCE OF GINGIVAL DISEASE IN A POPULATION OF PREGNANT WOMEN

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ABSTRACT

Objective: To evaluate the prevalence of gingival disease and the degree of oral care among pregnant Jordanian women during the different stages of pregnancy.

Methods: A cross sectional study was conducted to choose a non-random convenient sample consisting of 360 pregnant women attending the obstetric clinics at King Hussein Medical Center between December 1999 and June 2000. Subjects were assessed by one periodontist at the periodontal clinic in one single clinic visit. The age of the patients ranged between 20 – 45 years with a mean of 28.7 years. The stage of pregnancy, gingival index, plaque index, pocket depth score and history of oral care were recorded and analyzed.

Results: Out of the 360 patients, 268 women (74%) had moderate to severe grades of gingival condition, 271 (75%) had moderate to heavy grades of supragingival plaque and 226 (63%) had moderate to severe grades of pocket depth scores. We found no statistically significant difference between patients at different stages of pregnancy and the grades of gingival index, plaque index or pocket depth scores. The level of oral care was poor. Only 131 patients (36%) admitted that they brush their teeth two or more times daily but with no regularity.

Conclusion: The prevalence of gingival disease among pregnant women in our study was high and the level of oral care was poor. Establishment of preventive programs for pregnant women and regular check-up of the periodontium since the early stages of pregnancy is recommended.

Key word: Periodontal disease, Prevalence, Pregnancy effect, Oral care.

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Introduction

Changes in the gingival condition during pregnancy have been assessed by a number of researchers. Some researchers^(1,2) have found changes in the gingival appearance during pregnancy such as hyperemia, increased tendency for bleeding and edema. They postulated that increased circulating levels of female sex hormones may play a central role in the etiology of pregnancy gingivitis. Elevated serum levels of progesterone may result in a decrease in gingival keratinization and changes in the microvasculature such as dilatation, increased capillary permeability and proliferation may be significant^(3,4).

Many studies⁽⁴⁻⁶⁾ have reported an increase in the subgingival growth of *Provetella intermedia* during the

second trimester of pregnancy, which may be responsible for increased inflammation. Macphee & Cowley in 1981⁽⁷⁾ reported an increase in gingivitis during the second trimester of pregnancy. However, other studies have reported a gradual increase in severity until the 36th week of gestation^(1,2,8) with the gingival condition recovering spontaneously after delivery. It is important for pregnant women to follow a preventive program against periodontal disease during pregnancy.

On the other hand other researchers have found that increased hormone levels during pregnancy does not result in severe periodontal disease^(9,10) and suggested that a special program of periodontal disease prevention in pregnancy will be unnecessary.

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Carranza in 1990⁽⁸⁾ stated that pregnancy itself does not cause gingivitis but that gingivitis in pregnancy is caused by bacterial plaque, and pregnancy accentuates the gingival response to plaque and so modifies the resultant clinical picture. No notable changes occur in the absence of local irritants.

Oral hygiene is a very important factor in order to establish a healthy gingival condition. During pregnancy there are alterations in the psychology and behaviour with a tendency towards lack of personal care⁽¹¹⁻¹⁴⁾, which may have bearings on the state of the periodontal condition.

The aim of this study was to evaluate the prevalence of gingival disease, among pregnant Jordanian women, during the different stages of pregnancy. In addition, an assessment of oral home care in terms of frequency and regularity of teeth brushing during the different stages of pregnancy was investigated.

Methods

A cross sectional sample of 360 pregnant women attending the obstetric clinics at King Hussein Medical Center for routine antenatal care between December 1999 and June 2000, were referred to the periodontal clinic for a routine examination to fulfil the purposes of the study. None of the referred patients had any systemic disease or any complication of pregnancy. A minimum of 20 teeth excluding the third molars had to be present in the oral cavity for inclusion in the study. The age of the patients ranged between 20 – 45 years with a mean of 28.7 years. Patients found in need for dental treatment were referred accordingly for follow-up treatment, but the recorded findings on the first visit were used for the sake of the analysis.

There was no control group in this study. Non-pregnant patients seen at the periodontal clinic, who invariably come with a dental complaint, cannot be compared to a random population of pregnant women seen at a routine antenatal care visit. Nevertheless, the findings in this study can form a baseline for future studies related to this subject.

Each patient was seen once by a single periodontist for the purposes of the study and the following parameters were recorded; age, stage of pregnancy according to trimester, the gingival condition using the Loe & Silness Gingival Index (GI)⁽¹⁾, the presence of supragingival plaque using the Silness and Loe Plaque Index (PI)⁽¹⁵⁾, and pocket depths at all teeth, excluding the third molars, were measured using a Williams probe and the depth read to the nearest mm at 4 areas (mesiobuccal, distobuccal, mesiolingual and distolingual) for each tooth.

For purposes of analysis the gingival index (GI) scores on a scale from 0 to 3 were divided into three grades; none to mild (0-1.0), moderate (1.1-2.0) and severe (2.1-3.0).

The plaque index (PI) scores on a scale from 0 to 3 were also divided into three grades; none to mild (0-1.0), moderate (1.1-2.0) and heavy (2.1-3.0).

The pocket depth (PD) score⁽¹⁵⁾ was measured by calculating the percentage of pockets showing a depth \geq 4 mm. to the total number of measured pockets. Patients were then classified with regard to pocket depth (PD) scores on a scale from 0-100% into three grades; none to

mild (\leq 10%), moderate (11-20%), severe ($>$ 20%).

A history of oral care was also taken to assess the frequency and regularity of daily brushing of teeth and its relationship to the stage of pregnancy.

Statistical analysis was performed using the Chi-square test. The level of statistical significance was established at $P < 0.05$.

Results

The three hundred and sixty pregnant women were examined at one clinical visit, during any stage of pregnancy, by one examiner, in order to exclude inter-examiner variation. There were 60 patients in the first trimester, 190 patients in the second trimester and 110 patients in the third trimester. The mean number of existing teeth for the whole group was 29.5 per patient.

A full history was taken before examination including the stage of pregnancy and the frequency and regularity of teeth brushing. None of the women in this study were smokers, which is not surprising since women smokers are not common in our society. The Gingival Index, Plaque Index and Pocket Depth scores were calculated and recorded for each woman. The results are summarized in Tables I, II and III.

The prevalence of gingival disease among the pregnant women in our study was high. Out of the 360 patients studied, we found 268 patients (74%) with moderate to severe grades of gingival condition. There were 271 patients (75%) with moderate to heavy grades of supragingival plaque and 226 patients (63%) had moderate to severe grades of pocket depth scores. This may be a reflection of the high prevalence of periodontal disease in our community and not necessarily related to the pregnancy per se.

We found no statistically significant difference between patients in different stages of pregnancy and the grades of gingival index, plaque index or pocket depth scores using the chi square test at 0.05 level of significance. Although only patients in the third trimester of pregnancy were found to have severe grades of gingival or plaque indices, the results were not statistically significant.

The level of oral care regarding the frequency or regularity of teeth brushing was surprisingly very poor as shown in Table IV, where only 131 patients (36%) admitted to brushing their teeth two or more times daily with no regularity. This may explain the high prevalence of gingival disease in this study group.

Discussion

Hormonal changes during pregnancy are believed to influence susceptibility to gingivitis. However, the presence of plaque and gingival inflammation seem to be necessary for the sub-clinical hormonal changes to be manifested as overt gingivitis⁽⁷⁾, as the plasma levels of estrogen and progesterone increase progressively during pregnancy⁽¹⁶⁾.

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were found to have severe grades of gingival or plaque indices, the results were not statistically significant.

The prevalence of gingival disease among the pregnant women in our study was high. The prevalence of periodontal disease in our community is unknown due to lack of research. The high prevalence among pregnant women may be a reflection of the high prevalence of gingival disease in the community as a whole and not necessarily related to the pregnancy per se.

Miyazaki *et al* (1991)⁽¹⁰⁾ reported in their study, that the percentage of pregnant women having 4 or 5 mm pockets was significantly higher during pregnancy and increased with months of pregnancy reaching a maximum of 31% in the 8th month group. An increase in gingivitis during the second trimester of pregnancy has been demonstrated, and an increase in pocket depth during pregnancy is caused by enlargement of gingival tissue, rather than periodontal destruction⁽⁷⁻¹⁶⁾.

Sridama *et al*⁽¹⁷⁾ reported a decreased ratio of helper (CD4) to suppressor (CD8) T-cell ratio as a result of decreased proportions and numbers of helper T cells which was observed during the second and third trimesters of pregnancy. This may reflect the increase in gingival inflammation during the second and third trimesters. Many investigators^(14,19) have suggested that the decreased CD4/CD8 ratio indicates the presence of immunodeficiency during pregnancy as measured *in vitro* by

decreased lymphocyte proliferation. Jonsson *et al* found that salivary cortisol levels were significantly higher in pregnant women than males and menstrual women and showed a statistically significant positive correlation with progression of pregnancy⁽⁹⁾.

Some authors relate the increase in gingival inflammation during pregnancy to alterations in the psychology and behavior of pregnant women with a tendency towards lack of personal care. The lack of oral care among our study group was evident from their brushing habits, but this may be another reflection of brushing habits among the community as a whole. Further studies are required to draw conclusions with regard to the effect of behavior during pregnancy and changes in brushing habits.

Lack of oral care and the development of plaque are the most important factors in the gingival disease. The high prevalence of gingival disease among pregnant women in our community and the poor level of oral care suggest the need for establishment of preventive programs for pregnant women. This would be a simple way to avoid development of severe gingival disease in the latter stage of pregnancy. Referral of all pregnant women in our community in the early stages of pregnancy to a periodontist for a routine assessment is guaranteed in view of the high prevalence of gingival disease.

Table I. Number of patients with each grade of severity of gingival condition using the Loe & Silness Gingival Index (GI) scores related to the stage of pregnancy.

Stage of pregnancy	Normal / Mild (0-1.0)	Moderate (1.1-2.0)	Severe (2.1-3.0)	Total
1 st trimester	19	41	0	60
2 nd trimester	33	157	0	190
3 rd trimester	40	55	15	110
Total	92 (26%)	253 (70%)	15 (4%)	360 (100%)

(Chi square test, p>0.05 N.S).

Table II. Number of patients with each grade of severity of supragingival plaque using the Loe & Silness Plaque Index (PI) scores related to the stage of pregnancy.

Stage of pregnancy	Normal / Mild (0-1.0)	Moderate (1.1-2.0)	Heavy (2.1-3.0)	Total
1 st trimester	8	52	0	60
2 nd trimester	53	137	0	190
3 rd trimester	28	62	20	110
Total	89 (25%)	251 (70%)	20 (5%)	360 (100%)

(Chi square test, p>0.05 NS).

Table III. Number of patients with each grade of severity of Pocket Depth (PD) score according to the percentage of measured pockets showing a depth \geq 4 mm. related to the stage of pregnancy.

Stage of pregnancy	Normal / Mild (\leq 10 %)	Moderate (11-20 %)	Severe (>20 %)	Total
1 st trimester	40	3	17	60
2 nd trimester	59	71	60	190
3 rd trimester	35	20	55	110
Total	134 (37%)	94 (26%)	132 (37%)	360 (100%)

(Chi square test, p>0.05 NS).

Table IV. Number of times of daily brushing according to the stage of pregnancy.

Stage of pregnancy	No. patients who brush irregularly	No. patients who brush once	No. patients who brush twice	No. patients who brush three times	No. patients total
1 st trimester	33	27	0	0	60
2 nd trimester	42	40	65	43	190
3 rd trimester	68	19	11	12	110
Total	143 (40%)	86 (24%)	76 (21%)	55 (15%)	360 (100%)

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