ORIGINAL ARTICLE

INFLUENCE OF SOCIO-CULTURAL VARIABLES ON PERIODONTAL CONDITIONS IN PREGNANT WOMEN

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ABSTRACT

Pregnancy is associated with several physiological and hormonal changes in a female's body. One of these hormonal changes is periodontal disease which has an established relationship with pregnancy. The aim of the current study was to evaluate the frequency of gingivitis, gingival recession and pregnancy tumor in pregnant women seen at Dow International Medical College OPD & Hospital and their relationship with socio-demographic and different clinical variables. A cross–sectional survey was carried out on 60 pregnant females using a close-ended questionnaire, followed by a clinical examination with convenience sampling. Information about the socio-demographic characteristics, trimester of pregnancy, number of pregnancy, oral hygiene practices and dietary habits was recorded using a closed ended specifically designed questionnaire. Oral examination was carried out by two calibrated dentists with Michigan O probe with William's markings and Gingival Index, Plaque index, Periodontal Pocket Depths, Gingival recession was recorded from each participant. Statistical analysis was performed using SPSS version 20. Results show that the frequency of gingivitis among pregnant females was 66.66%. The frequency in 1st, 2nd and 3rd trimester was 6.66%, 13.33% and 46.66% respectively. The frequency of pregnancy tumors in 1st and 3rd trimester was 1.66% whereas no cases were seen in 2nd trimester. The frequency of recession reported was 11.6% with no recession seen in 1st trimester whereas 5% cases of recession were seen in 2nd trimester and 6.66% in 3rd trimester. The relationship of education, occupation, number of pregnancy, socio-demographic status, dietary habits, oral hygiene habits and different trimesters of pregnancy to the gingival health parameters showed a negative association (p-value>0.05). Thus, no significant effect of the socio-demographic status on the gingival health of the pregnant females was observed in this study.

Key Words: *Gingivitis, Pregnancy, Socio-demographic status, Trimesters of pregnancy.*

INTRODUCTION

Pregnancy is associated with several physiological and hormonal changes in a female's body. These changes results in various complications during pregnancy, one of which is periodontal disease, which has an established relationship with pregnancy. The prevalence of gingivitis during pregnancy ranges from 35%-100% suggested by various studies.[1-4] Gingivitis is a result of an inflammatory response within the soft tissue surrounding the teeth whereas periodontitis is associated with the destruction of supporting structures of the teeth, including periodontal ligaments, bone, cementum and soft tissues.[5-7]

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It has been suggested that pregnancy gingivitis is an accentuated inflammatory disease in response to dental plaque, which is due to the increased level of female sex hormone.[8] The increase in the level of estrogen, especially progesterone, results in an increased permeability causing gingival swelling and increase in the level of gingival crevicular fluid. It has also been said that the ovarian hormones progesterone and 17-B estradiol alters the oral micro flora which also contribute to the disease process. These changes in hormones begin from the 2nd month of gestation and peaks at 8th month.[5,9-13] Pregnancy gingivitis is also associated with pregnancy epulis or pregnancy granuloma which is a localized gingival swelling which regresses itself after pregnancy or may require a surgical course.[5]

Periodontal disease results from a complex set of conditions which affect the protective and supportive tissue of the teeth. The disease is associated with several stages and different onset and progression patterns but bacterial plaque and host susceptibility are the main reason for different clinical pictures. The main loss caused by this condition is the resorption of alveolar bone and loss of periodontal fibers which connect the bone

to the tooth and results in clinical attachment loss and periodontal pockets formation and provide a niche for the pathogenic micro-organism.[5-7] In previous studies, evidences have been reported that the periodontal diseases in pregnancy may result in various complications such as Pre-term low birth weight (PTLBW), growth retardation and pre- eclampsia.[3,5,9,11]

The periodontal disease in pregnancy is influenced by various factors such as poor oral hygiene, lack of dental care, low education level, poor employment status, increased age, poor dietary habits, parity (number of children born) and physical activities.[3,5,10,14] Pregnant women tend to have poor oral hygiene because of the lack of routine dental care.[15] Proper guidance regarding the maintenance of the oral hygiene is not well provided by the dentists and the physicians also not paying much attention on having a dental care by their patients during their pregnancy.[9,16] Another reason for poor oral hygiene is increased frequency of nausea, vomiting and acid reflux during pregnancy.[3,8]

The identification of these risk factors can help in minimizing the incidence of gingivitis and periodontitis during pregnancy by providing early treatment and awareness regarding dental health especially during pregnancy among the society.[1,10,14,17,18] The aim of the current study was to evaluate the prevalence of gingivitis, gingival recession and pregnancy tumor in pregnancy. This study also investigates the relationship of periodontal disease with socio-demographic and different clinical variables. The research was based on the hypothesis that women with low socio demographic backgrounds, good dietary and oral hygiene habits will have poor gingival health.

METHODOLOGY

A cross-sectional survey was carried out using a close-ended questionnaire, followed by a clinical examination with convenience sampling.[1,19] The study was conducted in a public health care centre in Karachi, Pakistan. Pregnant females attending the OPD and those admitted to the Dow International Medical College Hospital was included in the sample between 24th august 2015 to 15th September 2015.Women taking antibiotics before periodontal examination and those with a systemic disease like chronic diabetes, bleeding disorders, heart disease, bronchial asthma, immune disorders and hypertension prior to pregnancy was excluded from the study. The exclusion criteria will be obtained through clinical histories and medical reports.

The sample size is calculated on the basis of a study carried by DQ Taani, Table 2.[12] Using G-power 3.1[20], goodness of fit test with 99%power of the test and 99% confidence interval and effect size of 0.74 (effect size calculated from Table 2[12] supplement population with 5% margin of error in each category), the minimum sample size calculated is 54.

DATA COLLECTION

Sixty patients were included in the study. An informed consent was taken from all the participants. Information about the socio-demographic characteristics, trimester of pregnancy, and number of pregnancies, oral hygiene practices and dietary habits was recorded using a closed ended questionnaire designed for the study. The questionnaire was tested for validity and reliability. The validity was checked by doing a pilot study of 30 patients. The reliability was measured by the assessment of the questions in the questionnaire to ensure that the questionnaire reflects the complete and comprehensive concept of study. Oral examination was carried out in a well-lit room by two calibrated dentists with participants seated in a chair using a torch, mouth mirror and Michigan O probe with William's markings.

Parameters to be measured clinically were:

1 Plaque Index: According to the criteria of Loe and Sillness (1964).[21-23]

2 Gingival Index: According to the criteria of Loe and Sillness (1963).[2,21-23]

3 Periodontal Probing Depths: Measured in millimeters by Michigan O probe from gingival margins to the most apical extent of the pockets.[2]

For statistical Analysis:

Score 0: When the PPD is less than 4 mm.

Score 1: When the PPD is greater than 4 mm.

Gingival Recession: Measured in millimeters by periodontal probe from the cement-enamel junction (CEJ) to gingival margin according to the classification of Miller's (1985).[2,12]

For statistical analysis:

Score 0: absence of Recession.

Score 1: presence of Recession.

Presence of Pregnancy Tumors: The percentage differences of pregnancy tumor as detected clinically by oral examination.

All the clinical variables were measured by one examiner who was trained and calibrated by a senior examiner in a pilot study of 12 subjects examined during a 1-week period. The method of examination and scoring was standardized in our Periodontology department, until inter- and intra-examiner reliability of 93.8% was achieved using Spearman's correlation coefficient.

Statistical analysis was performed. Frequencies were calculated and Spearman Chi square test for associations was performed using SPSS version 20. Reliability was checked using Spearman's correlation coefficient.

RESULTS

Details of the results can be seen in Table 1-4.

TABLE 1: RELATIONSHIP OF GINGIVAL INDEX WITH SOCIO-DEMOGRAPHIC AND OTHER VARIABLES SHOWING INSIGNIFICANT ASSOCIATION BETWEEN THE VARIABLES (CUT OF P-VALUE>0.05)

Characteristics	Gingival Index				Total	P-value
	No inflammation	Mild Inflammation	Moderate Inflammation	Severe Inflammation		
Education						
Uneducated to Matric	5 (31.2%)	3 (18.8%)	6 (37.5%)	2 (12.5%)	16 (100%)	0.66
Matric to Graduation onwards	15 (34.1%)	14 (31.8%)	14 (27.3%)	3 (6.8%)	44 (100%)	
Total	20 (33.3%)	17 (28.3%)	18 (30.0%)	5 (8.3%)	60 (100%)	
Occupation						
House Wife	18 (32.7%)	16 (29.1%)	16 (29.1%)	5 (9.1%)	55 (100%)	0.66
Job	2 (40%)	1 (20%)	2 (40%)	0 (0%)	5 (100%)	
Total	20 (33.3%)	17 (28.3%)	18 (30%)	5 (8.3%)	60 (100%)	
Number of Pregnancies						
First	8 (38.1%)	6 (28.6%)	5 (23.8%)	2 (9.5%)	21 (100%)	
Second	8 (44.4%)	3 (16.7%)	6 (33.3%)	1 (5.6%)	18 (100%)	
Multi-gravid	4 (19%)	8 (38.1%)	7 (33.3%)	2 (9.5%)	21 (100%)	
Total	20 (33.3%)	17 (28.3%)	18 (30.0%)	5 (8.3%)	60 (100%)	
Socio-demographic Status						
Poor	4 (40%)	4 (40%)	1 (10%)	1 (10%)	10 (100%)	0.468
Fair/Good	16(32%)	13 (26%)	17 (34%)	4 (8%)	50 (100%)	
Total	20 (33.3%)	17 (28.3%)	18 (30%)	5 (8.3%)	60 (100%)	
Dietary Habits						
Poor/Fair	11 (37.9%)	7 (24.1%)	8 (27.6%)	3 (10.3%)	29 (100%)	0.78
Good	9 (29.0%)	10 (32.3%)	10 (32.3%)	2 (6.5%)	31 (100%)	
Total	20 (33.3%)	17 (28.3%)	18 (30.0%)	5 (8.3%)	60 (100%)	
Oral Hygiene Habits						
Poor	2 (66.7%)	0 (0.0%)	1 (33.3%)	0 (0.0%)	3 (100%)	
Fair	15 (38.5%)	12 (30.8%)	8 (20.5%)	4 (10.3%)	39 (100%)	0.245
Good	3 (16.7%)	5 (27.8%)	9 (50.0%)	1 (5.6%)	18 (100%)	
Total	20 (33.3%)	17 (28.3%)	18 (30.0%)	5 (8.3%)	60 (100%)	
Pregnancy Trimesters						
First	0 (0.0%)	1 (25.0%)	2 (50.0%)	1 (25.0%)	4 (100%)	
Second	8 (50%)	3 (18.8%)	5 (31.2%)	0 (0.0%)	16(100%)	0.32
Third	12 (30.0%)	13 (32.5%)	11 (27.5%)	4 (10.0%)	40(100%)	
Total	20 (33.3%)	17 (28.3%)	18 (30.0%)	5 (8.3%)	60(100%)	

TABLE 2: RELATIONSHIP OF PLAQUE INDEX WITH SOCIO-DEMOGRAPHIC AND OTHER VARIABLES SHOWING INSIGNIFICANT ASSOCIATION BETWEEN THE VARIABLES (CUT OF P-VALUE>0.05)

Characteristics	Plaque Index				Total	P-value
	No Plaque	Plaque seen on probing	Plaque seen by Eye	Abundance of Plaque Seen on the margins		
Education						
Uneducated to Matric	7 (43.8%)	5 (31.2%)	4 (25%)	0 (0.0%)	16 (100%)	0.245
Matric to Graduation onwards	22 (50%)	18 (40.9%)	3 (6.8%)	1 (2.3%)	44 (100%)	
Total	29 (48.3%)	23 (38.3%)	7 (11.7%)	1 (1.7%)	60 (100%)	
Occupation						
House Wife	27 (49.1%)	21 (38.2%)	6 (10.9%)	1 (1.8%)	55 (100%)	0.919
Job	2 (40%)	2 (40%)	1 (10%)	0 (0.0%)	5 (100%)	
Total	29 (48.3%)	23 (38.3%)	7 (11.7%)	1 (1.7%)	60 (100%)	
Number of Pregnancies						
First	12 (57.1%)	6 (28.6%)	3 (14.3%)	0 (0.0%)	21 (100%)	0.55
Second	9 (50%)	7 (38.9%)	1 (5.6%)	1 (5.6%)	18 (100%)	
Multi-gravid	8 (38.1%)	10 (47.6%)	3 (14.3%)	0 (0.0%)	21 (100%)	
Total	29 (48.3%)	23 (38.3%)	7 (11.7%)	1 (1.7%)	60 (100%)	
Socio-demographic Status						
Poor	4 (40%)	4 (40%)	2 (20%)	0 (0.0%)	10 (100%)	0.498
Fair/Good	25 (50%)	19 (38%)	5 (10%)	1 (20%)	50 (100%)	
Total	29 (48.3%)	23 (38.3%)	7 (11.7%)	1 (1.7%)	60 (100%)	
Dietary Habits						
Poor/Fair	14 (49.3%)	12 (41.4%)	2 (6.9%)	1 (3.4%)	29 (100%)	0.513
Good	15 (49.4%)	13 (35.5%)	5 (16.1%)	0 (0.0%)	31 (100%)	
Total	29 (48.3%)	23 (38.3%)	7 (11.7%)	1 (1.7%)	60 (100%)	
Oral Hygiene Habits						
Poor	2 (66.7%)	1 (33.3%)	0 (0.0%)	0 (0.0%)	3 (100%)	0.9
Fair	20 (51.3%)	14 (35.9%)	4 (10.3%)	1 (2.6)	39 (100%)	
Good	7 (38.9%)	8 (44.4%)	3 (16.7)	0 (0.0%)	18 (100%)	
Total	29 (48.3%)	23 (38.3%)	7 (11.7%)	1 (1.7%)	60 (100%)	
Pregnancy Trimesters						
First	1 (25%)	2 (50%)	1 (25%)	0 (0.0%)	4 (100%)	0.793
Second	10 (62.5%)	5 (31.2%)	1 (6.2%)	0 (0.0%)	16 (100%)	
Third	18 (45%)	16 (40%)	5 (12.5%)	1 (2.5%)	40 (100%)	
Total	29 (48.3%)	23 (38.3%)	7 (11.7%)	1 (1.7%)	60 (100%)	

TABLE 3: RELATIONSHIP OF PERIODONTAL POCKETS DEPTH WITH SOCIO-DEMOGRAPHIC AND OTHER VARIABLES SHOWING INSIGNIFICANT ASSOCIATION BETWEEN THE VARIABLES (CUT OF P-VALUE>0.05)

Characteristics	Periodontal Pockets Depth		Total	P-value
	Pockets Present >4mm	Pockets Absent <4mm		
Education				
Uneducated to Matric	3 (18.8%)	13 (81.2%)	16 (100%)	0.37
Matric to Graduation onwards	4 (9.1%)	40 (90.9%)	44 (100%)	
Total	7 (11.7%)	53 (88.3%)	60 (100%)	
Occupation				
House Wife	7 (12.7%)	48 (87.3%)	55 (100%)	
Job	0 (0.0%)	5 (100%)	5 (100)%	1
Total	7 (11.7%)	53 (88.7%)	60 (100 %)	
Number of Pregnancies				
First	3 (14.3%)	18 (85.7%)	21 (100%)	
Second	2 (11.1%)	16 (88.9%)	18 (100)%	0.887
Multi-gravid	2 (9.5%)	19 (90.5%)	21 (100)%	
Total	7 (11.7%)	53 (88.3%)	60 (100 %)	
Socio-demographic Status				
Poor	2 (20%)	8 (80%)	10 (100%)	0.369
Fair/Good	5 (10%)	45 (90%)	50 (100%)	
Total	7 (11.7%)	53 (88.3%)	60 (100%)	
Dietary Habits				
Poor/Fair	2 (6.9%)	27 (93.1%)	29 (100%)	0.426
Good	5 (16.1%)	26 (83.9%)	31 (100%)	
Total	7 (11.7%)	53 (88.3%)	60 (100%)	
Oral Hygiene Habits				
Poor	0 (0.0%)	3 (100%)	3 (100%)	
Fair	5 (12.8%)	34 (87.2%)	39 (100%)	0.798
Good	2 (11.1%)	16 (88.9%)	18 (100%)	
Total	7 (11.7%)	53 (88.3%)	60 (100%)	
Pregnancy Trimesters				
First	0 (0.0%)	4 (100%)	4 (100%)	
Second	2 (12.5%)	14 (87.5%)	16 (100%)	0.754
Third	5 (12.5%)	35 (87.5%)	40 (100%)	
Total	7 (11.7%)	53 (88.3%)	60 (100%)	

TABLE 4: RELATIONSHIP OF GINGIVAL RECESSION WITH SOCIO-DEMOGRAPHIC AND OTHER VARIABLES SHOWING INSIGNIFICANT ASSOCIATION BETWEEN THE VARIABLES (CUT OF P-VALUE>0.05)

Characteristics	Gingival Recession		Total	P-value
	Recession Present	Recession Absent		
Education				
Uneducated to Matric	3 (18.8%)	13 (81.2%)	16 (100%)	0.37
Matric to Graduation onwards	4 (9.1%)	40 (90.9%)	44 (100%)	
Total	7 (11.7%)	53 (88.3%)	60 (100%)	
Occupation				
House Wife	7 (12.7%)	48 (87.3%)	55 (100%)	1
Job	0 (0.0%)	5 (100%)	5 (100%)	
Total	7 (11.7%)	53 (88.7%)	60 (100%)	
Number of Pregnancies				
First	2 (9.5%)	19 (90.5%)	21 (100%)	
Second	2 (11.1%)	16 (88.9%)	18 (100%)	0.887
Multi-gravid	3 (14.3%)	18 (85.7%)	21 (100%)	
Total	7 (11.7%)	53 (88.3%)	60 (100%)	
Socio-demographic Status				
Poor	1 (10%)	9 (90%)	10 (100%)	1
Fair/Good	6 (12%)	44 (88%)	50 (100%)	
Total	7 (11.7%)	53 (88.3%)	60 (100%)	
Dietary Habits				
Poor/Fair	2 (6.9%)	27 (93.1%)	29 (100%)	0.426
Good	5 (16.1%)	26 (83.9%)	31 (100%)	
Total	7 (11.7%)	53 (88.3%)	60 (100%)	
Oral Hygiene Habits				
Poor	0 (0.0%)	3 (100%)	3 (100%)	
Fair	4 (10.3%)	35 (89.7%)	39 (100%)	0.635
Good	3 (16.7%)	15 (83.3%)	18 (100%)	
Total	7 (11.7%)	53 (88.3%)	60 (100%)	
Pregnancy Trimesters				
First	0 (0.0%)	4 (100%)	4 (100%)	
Second	3 (18.8%)	13 (81.2%)	16 (100%)	0.493
Third	4 (10%)	36 (90%)	40 (100%)	
Total	7 (11.7%)	53 (88.3%)	60 (100%)	

DISCUSSION

The present study aimed to find an association between the socio-demographic variables and other factors. Investigating the patients about their oral health and their periodontal status may help those who are concerned with their oral status in finding a dental care. This study demonstrates that there was no relationship between socio-demographic status with the periodontal health in pregnant women. The participants are also asked about their past dental visits and regular dental care which signifies the lack of awareness about the regular dental visits.

The results of the study revealed that the frequency of pregnancy gingivitis is higher (66.6%) which confirms the findings of Hugoson, Taani and Silness.[8,12,21] As described in earlier studies, these findings were due to the hormonal changes that occur during pregnancy resulting in increased vascularity and increased vascular flow, due to which susceptibility of the gingival tissues towards periodontal disease was increased.[11,24,25] The patients with pregnancy tumor were also reported in the present study as in the previous and were found in 2nd and 3rd trimester instead of 1st and 3rd trimester. According to Hugh Silk et al pregnancy granuloma is the result of increased progesterone in addition to local irritants and bacteria acting on the gingival tissues.[5] The previous finding related to the prevalence of gingival recession was 16% whereas the present study showed 11.6%.[25]

The association of gingival index to the level of education in Table 1 shows no significant relationship (p-value 0.66 cut of p-value 0.05) suggesting that the level of education has no effect on gingival health and do not support the earlier findings.[1,3,12,19] The difference in the findings may be because the sample of the present study consisted of majority of educated participants. The relationship of education with plaque index in Table 2 signifies no positive association between them (p-value 0.25). This could be because of a sample of highly educated people. Similar results were seen when relationship between education and periodontal pockets and gingival recession (Table 3 and 4) was assessed. The inconsistency with other findings may be because of the same reason as for gingival and plaque index.

The relationship between occupation and gingival index showed that there was no association between the two variables (p-value 0.66). Although 30% of the sample (i.e. 18 out of 60) participants presented with moderately inflamed gingiva but due to small sample, the results were not consistent with the previous study.[12] Another reason for the difference in the findings may be that the sample consisted of majority of the housewives (i.e. 55 out of 60). The plaque index and occupation also have a negative relationship with a p-value of 0.91, not confirming the findings of a previous study of Taani.[12] Negative association was seen between occupation and periodontal pocket depths and gingival recession. The reason may be because the sample consisted of housewives.

Insignificant association seen between multiple pregnancies and gingival health parameters, different from the findings of the study which says that gingival index and periodontal pocket depths are increased in multi-gravidae females.[12] The reason could be because the gingival changes are similar in all the women and multi-gravidae females had experienced this condition before and are well aware of managing it.[21,23] The effect of socio-demographic status on the gingival health parameter was insignificant, denying the facts from the previous studies.[3,12,19,27-29] The differences may be because the sample was taken from one hospital where people with similar demographic status visits and only 10 out of 60 females were in the category of low socio-demographic status.

No significant association of gingival health parameters was seen with good or poor dietary habits. Females with good dietary habits were those who consumed milk, fruits and multi-vitamins in their diet regularly. But the result signifies that having a good dietary habit does not have any effect on good oral health, hence confirming the finding of a previous study.[12]

There were several limitations to this study, one of which was a small sample size, due to which the participants were not evenly distributed among the groups. Second was that the sample was drawn from one hospital due to which variance in the data is not evident. As the sample included a specific population of one area in Karachi, the results cannot be generalized to larger populations.

CONCLUSION

It was concluded that there was not much effect of the socio-demographic factors on the gingival health in pregnancy, but the hormonal effect that occur during pregnancy plays the role.

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1 Mehwish Ghazal:	Manuscript drafting; data collection & analysis, title selection.
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3 Sania Riaz:	Critical revision & discussion.
4 Waqas Ahmed Farooqi:	Statistical analysis & sample size calculation.