Periodontal and Gingival Health of Pregnant Women in Comparison to Non-Pregnant Women

Hira Butt, Nauman Khan, Fizza Tahir*, Maila Habib Piracha*

Sharif Medical and Dental College Lahore, Pakistan, *Combined Military Hospital Lahore Medical College/ National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Objective: To assess pregnant women's periodontal and gingival health compared to non-pregnant women.
Study Design: Cross-sectional comparative study.
Place and Duration of the Study: Department of Gynecology, Sharif Medical and Dental College, and Raiwind Polyclinic Lahore (Outreach program of the Sharif Medical and Dental College, from Mar 2019 to Aug 2019.
Methodology: The periodontal and gingival health of 44 pregnant and 52 non-pregnant females was evaluated using the community periodontal index of treatment needs and gingival index.
Results: A total of 44 pregnant and 52 non-pregnant were evaluated. The periodontal health and pregnancy status were significantly associated (p=0.008). The periodontal health and the trimester of pregnancy were not significantly associated (p=0.787). There was no significant association between the gingival health of the females with the status of pregnancy (p=0.773). Maximum calculus deposition in the oral cavity of pregnant women was during the third trimester (36.4%).
Conclusion: The pregnant females had a higher percentage of bleeding gums, while calculus deposition was higher in non-pregnant females. Pregnant females had more periodontal pockets of 4-5 mm, while pocket depths of 6mm or more were seen in non-pregnant females only.

Keywords: Community periodontal index for treatment needs (CPITN), Gingival index (GI), Periodontal health.

How to Cite This Article: *Butt H, Khan N, Tahir F, Piracha MH. Periodontal and Gingival Health of Pregnant Women in Comparison to Non-Pregnant Women. Pak Armed Forces Med J 2022; 72(2): 551-554. DOI: https://doi.org/10.51253/pafmj.v72i2.5463*

INTRODUCTION

Periodontitis is an inflammatory disease of supporting tissues of teeth caused by specific micro-organisms or groups of micro-organisms.[1,2] Hormonal imbalance that initiates an inflammatory response, promoting gingivitis and periodontitis. In female patients, hormone fluctuations are the primary reason for periodontal problems. These changes occur primarily during puberty, the menstrual cycle, pregnancy, or menopause.[3,4]

During pregnancy, the periodontal problems increase and decrease in severity alternatively, and the gingival tissue undergoes severe inflammation and becomes edematous.[5,6] This inflammatory response is mediated by estrogen and progesterone hormones.[7,8] The severity of the periodontal disease begins in the second month of pregnancy. The periodontal status further deteriorates and reaches the most severe form in the eighth month and eventually decrease in the ninth month of pregnancy.[9,10] Tumour like masses of gingival tissue known as pyogenic granuloma has been observed in pregnant females.

Correspondence: Dr Hira Butt, Demonstrator, Oral Pathology department, Sharif Medical and Dental College, Lahore Pakistan
Received: 12 Oct 2020; revision received: 20 Apr 2021; accepted: 30 Apr 2021

This study will help us compare the gingival and periodontal health of pregnant andnon-pregnant women and find the impact of the trimester of pregnancy on the periodontal and gingival health of pregnant women.

METHODOLOGY

This cross-sectional comparative study was conducted among pregenant and non-pregnant females visiting the Gynaecology Department Sharif Medical and Dental College and Raiwind Polyclinic, Lahore. The study was conducted over six months after ethical approval (Certificate No. SMDC/SMRC/85-2019) from the Ethical Committee of Sharif Medical Research Centre (SMRC).

Inclusion Criteria: Women of the child bearing age were included in the study.

Exclusion Criteria: Women who had any systemic illness were excluded from the study.

The sample size was calculated, taking the minimum prevalence of periodontal disease to be 5%11 among pregnant women and keeping the significance level at 5% with the power of study 90%. The calculated sample size was 52 using WHO sample size calculator. A specially designed questionnaire was distributed among 96 women (44 pregnant and 52 non-

pregnant). The sampling technique used was non–probability consecutive sampling. 52 pregnant women were included as cases and 52 non-pregnant women as controls. Informed consent was taken from the participants. Data collection was based on the following parameters: gingival index (G1) and community periodontal index of treatment needs (CPITN).

Statistical Package for Social Sciences (SPSS) version 23.0 was used for the data analysis. Numerical data were presented as mean and standard deviation, whereas nominal data were presented as frequency and percentage. Fischer exact test was used to find the association. Man Whitney U test was used to find a statistical difference in the CPITN scores. The *p*-value of ≤0.05 was considered statistically significant.

RESULTS

This study was conducted on 96 women, 44 pregnant and 52 non-pregnant, visiting the Gynaecology Department Sharif Medical and Dental College and Raiwind Polyclinic, Lahore, with the mean age of 29.15 ± 6.45 years. The majority of the women (88.5%) were homemakers, while 11.5% were working. It was seen that 9.4% of women were illiterate, 17.7% had a primary level of education, 26% had matricula-tion certificate, 15.6% had intermediated level of education, 16.7% were graduates, and 14.6% were postgraduates.

Primigravidity was reported in 31.8% pregnant women and 13.5% non-pregnant women, and multigravidity was seen in 68.2% pregnant and 57.7% non-pregnant women. In comparison, 28.8% non-pregnant and none of the pregnant women were nulligravidae. The majority of the pregnant females (56.8%) were in their third trimester, 15.9% in the second trimester and 27.3% in their first trimester.

It was seen that the mean CPITN score for pregnant females was 1.59 ± 0.897, while that for non-pregnant females was 2 ± 0.485. There was a significant correlation between periodontal health and pregnancy status, as shown in Table-I.

Table-I: Association between periodontal health and status of pregnancy.

Parameter	Study Groups			*p*-value
	First Trimester	Second Trimester	Third Trimester	
Healthy n (%)	2 (4.5%)	1 (2.3%)	6 (13.6%)	0.787
Bleeding n (%)	-	1 (2.3%)	2 (4.5%)	
Calculus n (%)	9 (20.5%)	4 (9.1%)	16 (36.4%)	
Pocket Depth 4-5mm n (%)	1 (2.3%)	1 (2.3%)	1 (2.3%)	
Pocket Depth 6mm or more n (%)	-	-	-	

There was a significant difference in the CPITN scores of pregnant and non-pregnant women (*p*=0.019) as demonstrated by the Man Whitney U test. Furthermore, it was revealed that there was no significant association between the trimester of pregnancy and periodontal health, as shown in Table-II. It was also seen that the trimester of pregnancy had no significant association with the gingival health of the pregnant females (*p*=0.708).

Table-II: Association between gingival health and study groups.

Parameter For Gingival Health	Study Group		*p*-value
	Pregnant Females n=44	Non Pregnant Females n=52	
Excellent n (%)	4 (4.2%)	2 (2.1%)	0.773
Good n (%)	2 (2.1%)	3 (3.1%)	
Fair n (%)	27 (28.1%)	35 (36.5%)	
Poor n (%)	11 (11.5%)	12 (12.5%)	

It was seen that the mean gingival index score for pregnant women was 3.02 ± 0.821 while that for non-pregnant women was 3.10 ± 0.664. There was no significant association between the gingival health of the females with the status of pregnancy.

DISCUSSION

This cross-sectional comparative study was conducted on periodontal and gingival health of pregnant and non-pregnant patients.

Periodontal health is a delicate balance of many factors, including the host's immune response, the complex of oral microbial species, some extrinsic factors, and the inflammatory response of the host.[12-13] The release of inflammatory mediators further contributes to periodontal health progression and deterioration of periodontal health.[14] The oral health-related quality of life in pregnant patients reported that their quality of life was impacted more by oral health issues than the non-pregnant women with a higher mean oral health impact score (OHIP) for the former.[15]

Literature reports that various studies have used the community periodontal index for treatment needs (CPITN) to assess pregnant females' periodontal health. According to a study conducted by Kruger *et al*, in South Brazil in 2017 on the periodontal health of pregnant females, it was seen that 7.8% had a healthy

period ontium while 46.6% had calculus deposition.[16] These results are very comparable to our study, where 9.4% of the pregnant females were found to have a healthy periodontium, and 30.2% had calculus deposits. Their study[16] further reported that 29.1% of women had bleeding gums and 3.7% had pocket depths of 6mm or more which is very different from our study where only 3.1% of females were found to have bleeding on probing. In contrast, none had a 6 mm or more periodontal pocket depth.

According to a study conducted by Kashetty et al, in India in 2018 on the periodontal health of pregnant in comparison to non-pregnant females, 3.33 % of the latter had a healthy periodontium while none of the pregnant females fell in this category.[17] These findings are very different from our study, where it was seen that more pregnant women (9.4%) had a healthy periodontium in comparison to the non-pregnant females (1%). Kashetty *et al*, study also reported a more significant percentage of pregnant females with periodontal pocket depths of 4-5 mm (50%) compared to the non-pregnant females (36.67%). This finding is comparable to our study, where it was seen that the percentage of pregnant females with a pocket depth of 4-5 mm was higher in comparison to the non-pregnant females. Similarly, it was also reported that more pregnant women had periodontal pockets of 6 mm or more depth than non-pregnant women.[17]

The contrary was confirmed in our study, where none of the pregnant females had periodontal pockets of 6 mm or more. In the Kashetty et al, study there was a higher percentage of non-pregnant females with calculus deposition (56.66%) compared to the pregnant females (40%). These findings were very similar to our study, where more calculus deposits were found in non-pregnant females (47.9%) compared to the pregnant females (30.2%).

According to a study conducted by Gupta *et al*, in India in 2016 to assess the oral health status of pregnant women about the three trimesters, it was reported that in the first trimester there were 8.2% of women with a healthy periodontium which was decreased to 3% in the third trimester.[18] This is contrary to our study, where an increase in the number of women with healthy periodontium was seen with the progression of gestational age, i.e. 4.5% in the first trimester and 13.6% in the third trimester. Their study also reported that 10.3% of women in their first trimester had bleeding gums lowered to 6.9% for those in the third trimester.[18] On the other hand, the percentage of women with bleeding gums was 0% in the first trimester in our study, which increased to 4.5% in the last trimester. It was further reported 18 that 66% of women had calculus deposition in their first trimester, which reduced to 46.5% in the third trimester. This is another finding different from our study, where the calculus deposition increased with an increase in gestational age.

Regarding periodontal pocket depths, the study in discussion reported an increase in the percentage of periodontal pocket depths of 4-5 mm from the first to the third trimester, i.e. 10.3% and 32.7%, respectively. A similar trend was reported in the presence of 6mm or more periodontal pocket depths, which were found to be 5.2% in the first trimester and 10.9% in the third.[18] In our study, the periodontal pocket depth of 4-5 mm was 2.3% in all three trimesters, while none of the women had periodontal pocket depths of 6mm or more.

It was reported in a study that non-pregnant women have healthier gingiva in comparison to pregnant women, with 66.66% having poor gingival health as compared to the non-pregnant women (0%).[17]

According to our study, a more significant percentage of non-pregnant women had poor gingival health (12.5%) than pregnant women (11.5%). It was also reported that 70% of the non-pregnant women had good gingival health compared to the pregnant women (6.67%).[17] Similarly, in our study, it was seen that the percentage of non-pregnant women with good gingival health was slightly higher than the pregnant women. Our study also showed that 4.2% of pregnant women had excellent gingival health compared to non-pregnant women (2.1%). In contrast, according to a previous study,[17] none of the non-pregnant women had excellent gingival health.

It was seen that calculus deposition was the major periodontal problem in pregnant and non-pregnant women. The pregnant females had a higher percentage of bleeding gums than the controls. Moreover, on the one hand, where it was seen that none of the pregnant females was found to have a pocket depth of 6mm, it was also observed that a higher percentage of them had a pocket depth of 4-5mm in comparison to the controls. It was reported that while, on the one hand, the maximum calculus deposition in the oral cavity of pregnant women was during the third trimester, the maximum percentage of pregnant females with a healthy periodontium were also in their third trimester. It was seen that the percentage of pregnant

women with excellent gingival health was higher in comparison to the non-pregnant females, while the contrary was true for poor gingival health.

CONCLUSION

The pregnant females had a higher percentage of bleeding gums, while calculus deposition was higher in non-pregnant females. Pregnant females had more periodontal pockets of 4 to 5 mm, while pocket depths of 6mm or more were seen in non-pregnant females only.

RECOMMENDATIONS

There is a dire need to develop oral health awareness programs and the provision of dental treatment in rural areas. Efforts should be made to ensure the provision of oral health care facilities to individuals, particularly those susceptible to deterioration of oral health, including the elderly, children, and pregnant women.

ACKNOWLEDGEMENTS

We thank and acknowledge all the Gynaecology Department of Sharif Medical and Dental College and Raiwind Polyclinic, Lahore (SMDC) for allowing us to conduct this study.

Conflict of Interest: None.

Authors' Contribution

HB: Conception of design, acquisition of data, analysis and interpretation of data, drafting, critical revision, final approval, NK: Conception of design, acquisition of data, supervision, FT: Acquisition of data, drafting, critical review, MHP: Acquisition of data, drafting, critical revision.

REFERENCES

1. Mira A, Simon Soro A, Curtis MA. Role of microbial communities in the pathogenesis of periodontal diseases and caries. J Clin Periodontol 2017; 44(1): S23-S38.
2. Sultan AS, Kong EF, Rizk AM, Jabra-Rizk MA. The oral microbiome: A Lesson in coexistence. PLoS Pathog 2018; 14(1): e1006719.
3. Vieira AT, Castelo PM, Ribeiro DA, Ferreira CM. Influence of oral and gut microbiota in the health of menopausal women. Front Microbiol 2017; 8(1): 1884.
4. Turton M, Africa CW. Further evidence for periodontal disease as a risk indicator for adverse pregnancy outcomes. Int Dent J 2017; 67(3): 148-156.
5. Wei BJ, Chen YJ, Yu L, Wu B. Periodontal disease and risk of preeclampsia: a meta-analysis of observational studies. PLoS One. 2013; 8(8): e70901.
6. Murakami S, Mealey BL, Mariotti A, Chapple IL. Dental plaque–induced gingival conditions. J Clin Periodontol. 2018; 45(1): S17-S27.
7. Sooriyamoorthy M, Gower DB. Hormonal influences on gingival tissue: relationship to periodontal disease. J Clin Periodontol 1989; 16(4): 201-208.
8. González-Jaranay M, Téllez L, Roa-López A, Gómez-Moreno G, Moreu G. Periodontal status during pregnancy and postpartum. PLoS One 2017; 12(5): e0178234.
9. Morelli EL, Broadbent JM, Leichter JW, Thomson WM. Pregnancy, parity and periodontal disease. Aust Dent J 2018; 63(3): 270-278.
10. Kim JH, Park HY. Concurrent occurrence of mucocele and pyogenic granuloma. Ann Dermatol 2011; 23(Suppl 1): S108.
11. Qureshi A, Qureshi A, Sutia S, Farooq A, Khan AA. Periodontal status of women during pregnancy. J Sheikh Zayed Med Coll 2007; 21(2): 87-94.
12. NP L. Bartold PM. Periodontal Health. J Periodontol 2018; 89(1): s9-s16.
13. Gupta S, Shrestha B, Gupta N, Tuladhar A, Kc S, Dhami B. Periodontal Health Status and Pregnancy Outcomes: A Survey in Medical Doctors. J Nepal Med Assoc 2018; 56(210): 565-571.
14. Afacan B, Öztürk VÖ, Paşalı Ç, Bozkurt E, Köse T, Emingil G. Gingival crevicular fluid and salivary HIF- 1α, VEGF, and TNF- α levels in periodontal health and disease. J Periodontol 2019; 90(7): 788-797.
15. Geevarghese A, Baskaradoss JK, Sarma PS. Oral health-related quality of life and periodontal status of pregnant women. Matern Child Health J 2017; 21(8): 163416-42.
16. Krüger MS, Casarin RP, Gonçalves LB, Pappen FG, Bello-Correa FO, Romano AR. Periodontal health status and associated factors: findings of a prenatal Oral Health Program in south Brazil. Int J Dent 2017; 2017: 3534048.
17. Kashetty M, Kumbhar S, Patil S, Patil P. Oral hygiene status, gingival status, periodontal status, and treatment needs among pregnant and nonpregnant women: A comparative study. J Indian Soc Periodontol 2018; 22(2): 164.
18. Gupta R, Acharya AK. Oral health status and treatment needs among pregnant women of Raichur District, India: A population based cross-sectional study. Scientifica (Cairo) 2016; 9860387. [Internet] Available at: https://pubmed.ncbi.nlm.nih.gov/27293984/