INSIGHTS-JOURNAL OF
HEALTH AND REHABILITATION

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

ASSOCIATION OF GRAVIDITY AND PARITY WITH GINGIVAL HEALTH IN PREGNANT WOMEN

Original Research

Hina Rafiq Sheikh[1], Surat Babar[2], Farwa Shabir Bhatti[3], Maria Khawaja[4], Maira Tasleem[5], Yahya Zia Ahmed Toor[6], Hira Butt[7]*
[1]Specialist, Obstetrics and Gynaecology, MedCity Medical Center, Ras Al Khaimah, UAE.
[2]House Officer, Bakhtawar Ameen Dental College, Multan, Pakistan.
[3]General Dental Practitioner, Tasleem Dental Clinic, Gujranwala, Pakistan.
[4]General Dental Practitioner, I Smile Dental Care, Lahore, Pakistan.
[5]General Dental Practitioner, Ismail Dental Clinic, Gujranwala, Pakistan.
[6]General Dental Practitioner, Teeth & Gums, Lahore, Pakistan.
[7]General Dental Practitioner, Lahore, Pakistan.
Corresponding Author: Hira Butt, General Dental Practitioner, Lahore, Pakistan. hira.ah.butt@gmail.com
Acknowledgement: The authors acknowledge the support of Sharif Medical and Dental College, Lahore, in facilitating this research.

Conflict of Interest: None

Grant Support & Financial Support: None

ABSTRACT

Background: Pregnancy has been associated with significant changes in oral health due to hormonal fluctuations that alter gingival vasculature and immune response. Increased levels of progesterone and estrogen contribute to inflammatory changes, leading to a higher susceptibility to plaque accumulation and gingivitis. Without adequate oral hygiene and timely dental care, these changes may progress to more severe periodontal conditions. Gravidity and parity have been suggested as potential factors influencing gingival health, yet their association remains inconclusive, warranting further investigation.

Objective: To assess the association between gravidity and parity with gingival health in pregnant females.

Methods: This cross-sectional study was conducted over one year, from August 2019 to August 2020, in the Gynecology Department of Sharif Medical and Dental College, Lahore, Pakistan. A total of 44 pregnant females were enrolled using a convenient sampling technique. Informed consent was obtained, and demographic details, including trimester of pregnancy, gravidity, and parity, were recorded. Intraoral examinations were performed, and gingival health was assessed using the Gingival Index. Based on the index scores, gingival health was categorized as excellent (0), good (0.1–0.9), fair (1.0–1.9), or poor (2.0–3.0). Statistical analysis was conducted using SPSS version 23, with Fisher's exact test applied to determine associations. A p-value of ≤0.05 was considered statistically significant.

Results: The mean age of participants was 26.86±4.51 years. Among them, 31.8% were primigravida and 68.2% were multigravida. The majority of participants had fair gingival health, with 57% of primigravida and 63% of multigravida falling into this category. Poor gingival health was observed in 30% of multigravida and 14% of primigravida women. The association between gravidity and gingival health was not statistically significant (p=0.168). Regarding parity, 57% of nulliparous, 42% of primiparous, and 79% of multiparous women exhibited fair gingival health. Poor gingival health was more prevalent among primiparous women (41.7%) compared to nulliparous (14%) and multiparous (22%) women. However, the association between parity and gingival health was also statistically non-significant (p=0.111).

Conclusion: The study found no significant association between gravidity, parity, and gingival health in pregnant women. While most participants maintained fair gingival health, multigravida women exhibited a higher prevalence of poor gingival health compared to primigravida women. Similarly, poor gingival health was more common among primiparous women than in nulliparous and multiparous women. These findings highlight the importance of routine dental assessments and oral hygiene education during pregnancy to mitigate gingival inflammation and prevent disease progression.

Keywords: Cross-sectional studies, Gingival index, Gingivitis, Oral health, Parity, Pregnancy, Pregnancy complications.

INTRODUCTION

Hormonal fluctuation in pregnancy lead to alterations and development of pathologies in the stomatognathic system (1). This system includes teeth and associated oral structures (2). Gingivitis is an oral condition that is highly prevalent among pregnant females (3). Women suffering from gingivitis tend to have bleeding and swollen gums that if left untreated progress to periodontitis (4). This gingival issue can be attributed to the surge to inflammatory mediators due to Estrogen in the expectant mother`s blood stream (5). Parity is the number of times a woman has given birth (6). It has been reported that the deteriorated periodontal health and high parity are strongly associated (7). High parity is connected with a high surge of progesterone and estrogen which has a detrimental impact on the periodontium that effects the gingiva and progresses to periodontium which ultimately culminates in tooth loss (8).

Gravidity is the number of a women gets pregnant (9). The interplay of Estrogen and progesterone in pregnancy takes its toll on the expectant mother`s oral health (10). The prevalence of gingivitis has been reported to 30 to 100% among pregnant women (11). This can be attributed to the high blood flow to the gingiva due to the hormonal surge (11). In addition to hormonal fluctuation other factors also paly a role in oral health in pregnant women (12). These factors include the maintenance of oral hygiene, receiving adequate dental care, oral health awareness, socioeconomic background of the women and level of education (12). It is generally believed that with the correct level of oral health awareness and adequate access to dental care and treatment the effects of pregnancy, parity and gravidity on oral health can be controlled (13).

Literature reports many studies that have assessed the influence of pregnancy on the gingival and periodontal health of females (14). Studies that explore the specific influence of parity and gravidity on oral health are still inadequate. Our study tends to unravel findings on this specific pregnancy associated factor. The aim of our study is to find the association between gravidity and parity with the gingival health of pregnant females.

METHODS

This cross-sectional study was conducted on 44 pregnant females over a one-year period from August 2019 to August 2020 in the Gynecology Department of Sharif Medical and Dental College, Lahore, Pakistan. Ethical approval was obtained from the Ethical Committee of Sharif Medical Research Centre (SMRC) (No. SMDC/SMRC/85-2019). Participants were selected using a convenient sampling technique. The estimated prevalence of gingivitis in pregnant females was considered to be 5%, with a significance level of 5% and a study power of 90%. Based on these parameters, the sample size was calculated to be 44. Written informed consent was obtained from all participants before data collection (15).

Demographic information, including trimester of pregnancy, gravidity, and parity, was recorded. A comprehensive intraoral examination was performed, and gingival health was assessed using the Gingival Index. Based on the Gingival Index scores, gingival health was categorized as excellent (0), good (0.1–0.9), fair (1.0–1.9), or poor (2.0–3.0). Pregnant females of childbearing age who provided informed consent were included in the study, while those with any systemic illness were excluded. Data analysis was performed using SPSS version 23, with a p-value of ≤0.05 considered statistically significant. Fisher’s exact test was applied to determine the association between gravidity, parity, and gingival health.

RESULTS

This study included a total of 44 pregnant women with a mean age of 26.86±4.511 years. Among these women 31.8% were primigravid and 68.2% were multigravida. It was seen that most of the women were multiparous (40.9%) followed by nulliparous (31.8%) and the least were primiparous (27.3%).

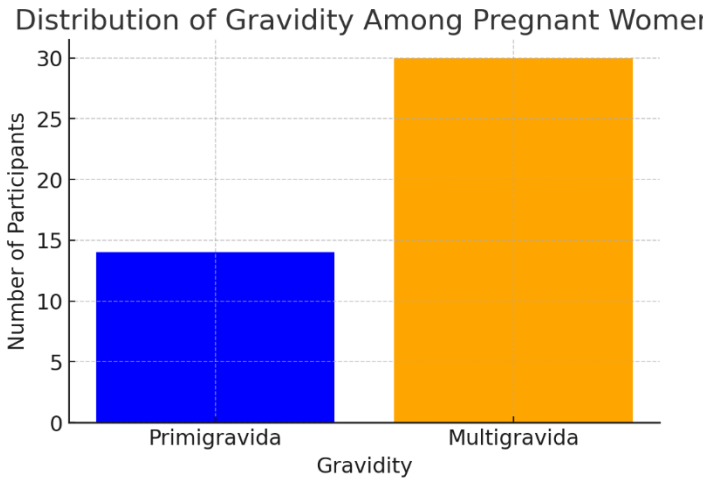

Figure 2 Distribution of Gravidity Among Pregnant Women

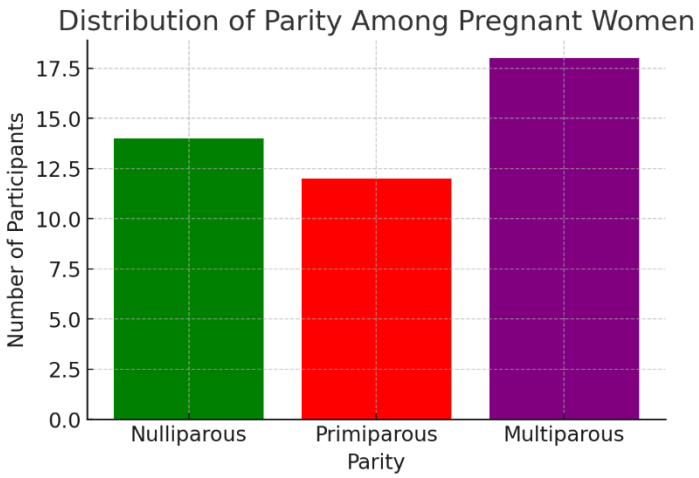

Figure 1 Distribution of Parity Among Pregnant Women

The first chart illustrates the distribution of gravidity among pregnant women in the study, showing that a higher proportion were multigravida (68.2%) compared to primigravida (31.8%).

The second chart represents the parity distribution, indicating that most participants were multiparous (40.9%), followed by nulliparous (31.8%), with the least being primiparous (27.3%).

Table 1: Association of gravidity with gingival health in pregnant females

Gravidity	**Gingival health**				**Total**	
	Excellent	**Good**	**Fair**	**Poor**		**P value**
Primigravida	3 (21%)	1 (7%)	8 (57%)	2 (14%)	14 (100%)	0.168
Multigravida	1 (3%)	1 (3%)	19 (63%)	9 (30%)	30 (100%)	

Table 1 shows that the association between gingival health of pregnant women and gravidity was not significantly associated (p=0.168). it was seen that majority of the primigravid and multigravida females a fair gingival health (57% and 63% respectively). The prevalence of poor gingival health was higher among multigravida (30%) as compared to primigravida women (14%) as shown in table 1.

Table 2: Association of gingival health of pregnant females with parity

Parity	**Gingival health of pregnant females**				**Total**	
	Excellent	**Good**	**Fair**	**Poor**		**P value**
Nulliparous	3(21%)	1 (7%)	8(57%)	2(14%)	14(100)	0.111
Primiparous	1(8.3%)	1(8.3%)	5(41.7%)	5(41.7%)	12(100%)	
Multiparous	0(0%)	0(0%)	14(77.8%)	4(22%)	18(100%)	

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

Table 2 shows a statistically non-significant association between gingival health of pregnant females and parity (p=0.111). It was seen that majority of the Nulliparous, Primiparous and Multiparous pregnant females had fair gingival health (57%,42% and 79% respectively). Poor gingival health was more prevalent in among primipara as compared to nullipara and multipara women as shown in table 2.

DISCUSSION

Pregnancy-induced gingival changes are largely attributed to modifications in vascular structure and immune response, leading to increased susceptibility to plaque accumulation and bacterial proliferation (16,17). Elevated progesterone levels during pregnancy have been found to favor the growth of anaerobic bacteria, which play a crucial role in the progression of periodontal disease (18). The hormonal fluctuations and increased vascularity further contribute to gingival inflammation, making pregnant women more vulnerable to developing gingivitis compared to non-pregnant individuals. Previous research has highlighted the impact of parity on oral health, with studies indicating that multiparous women experience greater gingival deterioration due to repeated exposure to hormonal changes across multiple pregnancies (20). This hormonal cyclicity leads to increased gingival blood flow, fostering an environment conducive to inflammation (20). In contrast, another study suggested that parity had a stronger influence on tooth loss than smoking, underscoring its significance in oral health outcomes (19). The present study, however, found no statistically significant association between parity and gingival health (p=0.111). Despite this, most nulliparous, primiparous, and multiparous women had fair gingival health, with a higher prevalence of poor gingival health among primiparous women compared to nulliparous and multiparous women. This contrasts with findings from prior studies where primiparous women exhibited better gingival health, potentially due to heightened oral hygiene awareness and preventive behaviors (21).

Gravidity, defined as the number of times a woman has conceived irrespective of pregnancy outcomes, is another factor that has been linked to changes in oral health (22). Pregnancy-associated alterations in immune function, oral microbiota composition, and vascularity due to hormonal surges have been documented as contributing factors to increased gingivitis prevalence among pregnant women compared to non-pregnant or postpartum females (22). While gravidity has been suggested to influence periodontal health, the current study found no statistically significant association between gravidity and gingival health (p=0.168). Most primigravida and multigravida women exhibited fair gingival health (57% and 63%, respectively). However, the prevalence of poor gingival health was observed to be higher among multigravida women (30%) than among primigravida women (14%). This aligns with prior research indicating that, although the association was not statistically significant, multigravida women had greater calculus deposition and deeper periodontal pockets compared to primigravida women (23). In contrast, some studies have reported that multigravida women were more likely to have a healthier periodontium than primigravida women, possibly due to increased awareness of oral health care in subsequent pregnancies (23).

This study adds to the existing body of knowledge by exploring the underexamined relationship between gravidity, parity, and gingival health. The findings emphasize the need for improved access to preventive dental care for pregnant women, as well as targeted oral health education programs to mitigate the risk of gingival deterioration during pregnancy. One of the strengths of this study is its focus on a relatively unexplored aspect of oral health in pregnant women, contributing to the understanding of gingival health dynamics across different pregnancy statuses. However, some limitations should be acknowledged. The study had a relatively small sample size, which may have influenced the statistical power and generalizability of the findings. Additionally, it was conducted at a single center, which limits the inclusion of women from diverse socioeconomic backgrounds. A multicenter study with a larger and more heterogeneous population would provide a more comprehensive understanding of the impact of gravidity and parity on gingival health. Despite these limitations, the study highlights the importance of timely dental interventions and awareness programs to promote optimal oral health among pregnant women.

A recent comparative study conducted by Lee et al. (2021) explored the impact of gravidity and parity on periodontal health among pregnant women from diverse socioeconomic backgrounds. The study included 300 participants and categorized them into primigravida, multigravida, nulliparous, primiparous, and multiparous groups. Periodontal health was assessed using the Community Periodontal Index (CPI) and bleeding on probing (BOP) scores. Findings revealed that multigravida and multiparous women exhibited significantly higher BOP scores and greater pocket depth compared to their primigravida and nulliparous counterparts. The researchers attributed these differences to cumulative hormonal exposure, increased inflammatory response, and potential negligence in maintaining oral hygiene over successive pregnancies. Unlike the present study, which did not find a statistically significant association, Lee et al. reported a strong correlation between parity, gravidity, and worsening periodontal parameters. The study also emphasized that multiparous women

from lower socioeconomic backgrounds had the highest prevalence of moderate to severe periodontitis, highlighting the role of financial constraints and limited access to oral healthcare services. Moreover, oral hygiene awareness was observed to be significantly lower in multigravida women, particularly those who had undergone frequent pregnancies within short intervals. These findings underscore the need for targeted preventive strategies, such as routine dental screenings and pregnancy-specific oral health education programs, to mitigate periodontal complications among pregnant women. The discrepancies between the current study and Lee et al.'s findings may be attributed to differences in sample size, study design, and population characteristics. Further large-scale, multicenter studies are warranted to establish a clearer understanding of how gravidity and parity influence gingival and periodontal health (24).

CONCLUSION

The findings of this study indicate that gravidity and parity influence gingival health in pregnant women, with varying degrees of susceptibility to gingival deterioration. While most participants maintained fair gingival health, signs of worsening conditions were more evident among those with multiple pregnancies. Multigravida women exhibited a greater tendency toward poor gingival health compared to primigravida women, suggesting a cumulative effect of hormonal fluctuations and inflammatory responses across successive pregnancies. Similarly, among different parity groups, primiparous women showed a higher prevalence of gingival inflammation compared to nulliparous and multiparous women, highlighting the potential impact of physiological changes associated with childbirth. These findings reinforce the need for early periodontal assessment and preventive oral health interventions in prenatal care, emphasizing the importance of routine dental check-ups and oral hygiene education to minimize pregnancy-related gingival complications.

AUTHOR CONTRIBUTIONS

Author	Contribution
Hina Rafiq Sheikh	Literature review
Surat Babar	Literature review and manuscript write-up
Farwa Shabir Bhatti	Data collection
Maria Khawaja	Manuscript writeup and literature review
Maira Tasleem	Manuscript writeup and literature review
Yahya Zia Ahmed Toor	Literature review
Hira Butt*	Data Collection, concept and design, Manuscript write-up, Critical Revision, Supervision and Final Approval

REFERENCES

1. Rehbein E, Kogler L, Kotikalapudi R, Sattler A, Krylova M, Kagan KO, et al. Pregnancy and brain architecture: associations with hormones, cognition and affect. 2022;34(2):e13066.

2. Gil-Montoya J, Leon-Rios X, Rivero T, Expósito-Ruiz M, Perez-Castillo I, Aguilar-Cordero MJQoLR. Factors associated with oral health-related quality of life during pregnancy: a prospective observational study. 2021;30(12):3475-84.

3. Gil-Montoya JA, Rivero-Blanco T, Leon-Rios X, Exposito-Ruiz M, Pérez-Castillo I, Aguilar-Cordero MJAoG, et al. Oral and general health conditions involved in periodontal status during pregnancy: a prospective cohort study. 2023;308(6):1765-73.

4. Talebessy R, Cecilia SJCJoD, Research H. Gingivitis and oral health diseases related to pregnancy. 2023;1(1):1-5.

5. Parisi F, Fenizia C, Introini A, Zavatta A, Scaccabarozzi C, Biasin M, et al. The pathophysiological role of estrogens in the initial stages of pregnancy: molecular mechanisms and clinical implications for pregnancy outcome from the periconceptional period to end of the first trimester. 2023;29(6):699-720.

6. Dai J, Shi Y, Wu Y, Guo L, Lu D, Chen Y, et al. The interaction between age and parity on adverse pregnancy and neonatal outcomes. 2023;10:1056064.

7. Oziegbe EO, Schepartz LAJPo. Parity, dental caries and implications for maternal depletion syndrome in northern Nigerian Hausa women. 2023;18(3):e0281653.

8. Tabassum R, Das D, Kramat H, Gulshan R, Rafiq T, Yaseen T, et al. HIGH LEVEL OF MATERNAL PROGESTERONE IN EARLY SECOND TRIMESTER WITH PCOS AND its ROLE IN OBSTETRIC COMPLICATIONS: A COMPARATIVE STUDY. 2024;26:1777-85.

9. Oladapo-Akinfolarin TT, Akinfolarin OM, Maduagwu MC, Amadi CFJBJI. Effect of gravidity on biochemical parameters in normotensive and hypertensive 3rd trimester pregnant women. 2022;26(2):25-33.

10. Da Silva ID, Wuidar V, Zielonka M, Pequeux CJC. Unraveling the Dynamics of Estrogen and Progesterone Signaling in the Endometrium: An Overview. 2024;13(15):1236.

11. Godínez-López MJJMJoMRI. Oral health in pregnancy. 2024;12(23):27-32.

12. Belay AS, Achimano AAJC, cosmetic, dentistry i. Prevalence and risk factors for periodontal disease among women attending antenatal care in public hospitals, Southwest Ethiopia, 2022: A multicenter cross-sectional study. 2022:153-70.

13. Petit C, Benezech J, Davideau J-L, Hamann V, Tuzin N, Huck OJOH, et al. Consideration of oral health and periodontal diseases during pregnancy: knowledge and behaviour among French pregnant women. 2021;19:b875513.

14. Karimi N, Samiee N, Moradi YJHSR. The association between periodontal disease and risk of adverse maternal or neonatal outcomes: A systematic review and meta-analysis of analytical observational studies. 2023;6(10):e1630.

15. 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.

16. Weng J, Couture C, Girard SJB. Innate and adaptive immune systems in physiological and pathological pregnancy. 2023;12(3):402.

17. Li X, Zheng J, Ma X, Zhang B, Zhang J, Wang W, et al. The oral microbiome of pregnant women facilitates gestational diabetes discrimination. 2021;48(1):32-9.

18. Poole RK, Pickett AT, Oliveira Filho RV, de Melo GD, Palanisamy V, Dass SC, et al. Shifts in uterine bacterial communities associated with endogenous progesterone and 17β-estradiol concentrations in beef cattle. 2023;82:106766.

19. Abdelrasoul M, Bahamdain B, Hasanain R, Barayan R, Bugis N, Fallatah A, et al. Does Multiparity Affect Periodontitis Associated Adverse Pregnancy Outcomes' Awareness?

20. Wu M, Chen SW, Jiang SY. Relationship between gingival inflammation and pregnancy. Mediators of inflammation. 2015;2015:623427.

21. Yulita I, Purnama T, Marliani YJIRJPMS. Knowledge and Attitudes of Dental and Oral Health Maintenance in Pregnant Women (Case Study: Obstetrics and Gynecology Polyclinic at Pertamina Central Hospital, Jakarta). 2021;4(2):9-11.

22. Niederman RJE-bd. Pregnancy gingivitis and causal inference. 2013;14(4):107-8.

23. Fatima ST, Momin T, Nasim MA, Jamil F, Butt H, Jabbar MJPJoM, et al. An Assessment of Association of Gravidity of Pregnant and Non-Pregnant Females with Periodontal Health and Periodontal Treatment Needs. 2023;17(04):485-.

24. Lee H, Park J, Kim S, Choi Y, Kim D. Association between parity, gravidity, and periodontal health in pregnant women: A comparative cross-sectional study. J Clin Periodontol. 2021;48(7):934-942.

