Original Article

# Oral Hygiene and Gingival Health Among Pregnant Women

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## Abstract

Objective: To evaluate the oral hygiene (Oral Hygiene Index OHI) and the gingival health among women during pregnancy.

Methodology: A descriptive cross-sectional study, conducted at gynae and obstetrics, outpatient department (OPD) of LUMHS, from November 2023 to January 2024. Pregnant women attending antenatal clinic, aged 18 to 40 years, any trimester of either parity and gravidity were included. The oral hygiene status was assessed using the Simplified Oral Hygiene Index (OHI-S) comprises two components the Debris Index-Simplified (DI-S) and the Calculus Index-Simplified (CI-S) each scored on six surfaces of the tooth. The gingival health was evaluated assessed using the Gingival Index (GI), where gingivitis was considered with GI score ≥1.0. SPSS version 23 was used for data entry and analysis.

Results: Overall mean age of women 29.58 ± 6.53 years. Majority of the women were in the 3rd trimester of pregnancy 45.5%**,** followed by the 2nd 35.2% and 1st trimester 19.3%. Around, half of the pregnant women had poor oral hygiene**,** 42% exhibited fair and only 8% showed good oral hygiene, while 56.8**%** of participants were affected by gingivitis. Furthermore, findings revealed a significant association of gingivitis with anemia (p = 0.036), while there was no significant association found of oral hygiene status and gingivitis with sociodemographic or behavioral factors p->0.05.

Conclusion: A higher proportion of pregnant women observed with unsatisfactory oral hygiene and compromised gingival health, with around half demonstrating poor oral hygiene and more than half affected by gingivitis**.**

Keywords: Pregnancy, Oral Hygiene, gingivitis, OHI-S, GI.

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## Introduction

Pregnancy represents a complex physiological state characterized by extensive physical and biological changes. It is a distinctive condition involving various temporary functional and structural adaptations in the body, primarily driven by elevated levels of certain hormones.[1,2] Such physiological changes may aggravate existing oral health problems or contribute to the development of new conditions, thereby affecting both maternal and fetal well-being.[1] Additionally these hormonal fluctuations bring about changes in the oral microbiome and immune response, leading to gingival enlargement, bleeding, and inflammation collectively referred to as pregnancy gingivitis.[1,3] Furthermore, the oral diseases during pregnancy can negatively affect various dimensions of quality of life, including psychological and physical health.[4,5] Along with hormone-induced oral health problems, poor oral hygiene can lead to more severe conditions that may adversely affect both maternal and fetal health. Therefore, maintaining proper oral hygiene is very important not only to improve the mother's overall well-being but also to positively influence general health and fetal development.[4]

Gingivitis is one of the most prevalent periodontal diseases, characterized by inflammation of the gingival tissues caused by bacterial plaque accumulation.[6] Th dental plaque serves as a major etiological factor for both dental caries and periodontal diseases and during

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pregnancy, the gingiva exhibits an exaggerated inflammatory response to bacterial plaque, primarily due to elevated levels of hormones.[6] However the oral hygiene practices generally improve during the second trimester, as women are better able to maintain consistent oral care routines, while during the third trimester, increased physical discomfort and restricted mobility often make it challenging for women to sustain proper oral hygiene practices.[7] In the relevant literature have reported a link between periodontitis and unfavorable pregnancy outcomes, including preterm delivery and low birth weight. Consequently, oral health assessment has been recognized as an essential component of routine antenatal care in many developed nations.[8] Numerous studies have highlighted that the oral health care requirements of pregnant women differ significantly from those of the general population.[9,10] Unfortunately, in developing countries, including Pakistan, studies among pregnant women consistently reveal inadequate knowledge and misconceptions about oral health especially regarding its importance and influence on pregnancy outcomes, as well as the oral and overall health of their offspring.

Moreover, a considerable number of women continue to engage in habitual or addictive substance use during pregnancy. Continuously failure to maintain proper oral care, particularly during pregnancy, may result in maternal infections and potential complications for the developing fetus.[11] Despite its significance, oral hygiene is frequently ignored in comparison to other aspects of prenatal healthcare,[11] specifically in developing nations including Pakistan and this neglecting can adversely influence the pregnancy outcomes and oral health of women after pregnancy.

Present study is therefore conducted to explore the association between oral hygiene status, gingival health, among women during pregnancy. After highlighting the burden of poor oral hygiene and its potential consequences, the findings may raise the concern among healthcare providers and women during pregnancy. Ultimately, the improving oral hygiene practices during pregnancy could contribute to reducing preventable pregnancy-related complications and enhance the overall health outcomes of during pregnancy.

## Methodology

This was a descriptive cross-sectional study, conducted at gynae OPD of LUMHS, from November 2023 to January 2024. All the pregnant women attending antenatal clinic, aged 18 to 40 years, any trimester of either parity and gravidity were included. All the women with systemic medical disorders like diabetes, hypertension, women history of periodontal treatment, women with oral mucosal lesions and those who were not agreeing to take a part in study were excluded.

Non-probability consecutive sampling technique was used. Verbal informed consent was obtained from women before data collection with confidentiality and privacy maintained throughout the study, and participation was voluntary. After taking demographic information including (age, parity, hemoglobin level, iron supplement usage, oral hygiene practices and addictive habits) a complete oral clinical examination was conducted using a mouth mirror and WHO periodontal probe by a single calibrated examiner to minimize observer bias, with all infection control measures ensured through the use of disposable gloves and the sterilized measurements. The oral hygiene status was assessed using the Simplified Oral Hygiene Index (OHI-S) comprises two components the Debris Index-Simplified (DI-S) and the Calculus Index-Simplified (CI-S) each scored on six surfaces of the tooth. Oral hygiene status was categorized based on above scales particularly as (score 0-1.2 good oral hygiene, 1.3 -3.0 fair oral hygiene and >3.0 poor oral hygiene). Furthermore, the gingival health was evaluated assessed using the Gingival Index (GI) with gingival score from 0 to 3, where 0 indicated normal gingiva, 1 mild inflammation without bleeding, 2 moderate inflammation with bleeding on probing, and 3 severe inflammation with marked redness, hypertrophy, and spontaneous bleeding. The gingivitis was considered present when the mean GI score was ≥1.0.

All the data collection was done using a structured questionnaire, followed by the data entry and analysis was done using SPSS version 23.

## Results

Overall 88 pregnant women were evaluated for oral hygiene and gingivitis with an average of 29.58 ± 6.53 years. Overall mean OHI-S score was 2.95±1.02, indicating, women had fair to poor oral hygiene, the mean Gingival Index (GI) score was 1.66±0.57, reflecting moderate level of gingival inflammation in the study participants and mean Hb level of the women was 10.96 ± 1.26 g/dL. Majority of the women were in the 3rd trimester of pregnancy 45.5%, followed by the 2nd 35.2% and 1st trimester 19.3%. mostly women were rural residents 59.1%, 17% were uneducated, 33% were

primiparous, and remaining were multiparous. Around 50% women were anemic and were on supplementation was found in 52.3%. Additionally, according to the oral hygiene habits, 47.7% brushed twice daily, 42% once daily, while only 10.2% occasionally and dental visited status is shown in table: 1.

**Table I: Baseline characteristics of the patients.(n=88)**

| Variables | | N | % |
|---|---|---|---|
| Trimester of pregnancy | First trimester | 17 | 19.3 |
| | 2nd trimester | 31 | 35.2 |
| | 3rd trimester | 40 | 45.5 |
| Residence | Rural | 52 | 59.1 |
| | Urban | 36 | 40.9 |
| Educational level | Un-educated | 15 | 17.0 |
| | Primary | 20 | 22.7 |
| | Secondary | 44 | 50.0 |
| | Higher | 9 | 10.2 |
| Parity | Primiparous | 29 | 33.0 |
| | Parity I | 22 | 25.0 |
| | Parity II | 25 | 28.4 |
| | Parity III | 12 | 13.6 |
| Anemia | Mild | 24 | 27.3 |
| | Moderate | 20 | 22.7 |
| | None | 44 | 50.0 |
| Iron supplement | No | 42 | 47.7 |
| | Yes | 46 | 52.3 |
| Brushing frequency | Occasionally | 9 | 10.2 |
| | Once | 37 | 42.0 |
| | Twice | 42 | 47.7 |
| Dental visits | No | 66 | 75.0 |
| | Yes | 22 | 25.0 |

According to the oral hygiene status half of the women 50% had poor oral hygienic status, 42% found with fair oral hygiene, and only 8% women had good oral hygiene during pregnancy. Additionally, based on the gingival health, around 56.8% of the women had gingivitis, indicating that a significant proportion of study population had compromised oral hygiene and gingival health as shown in figure 1 and 2.

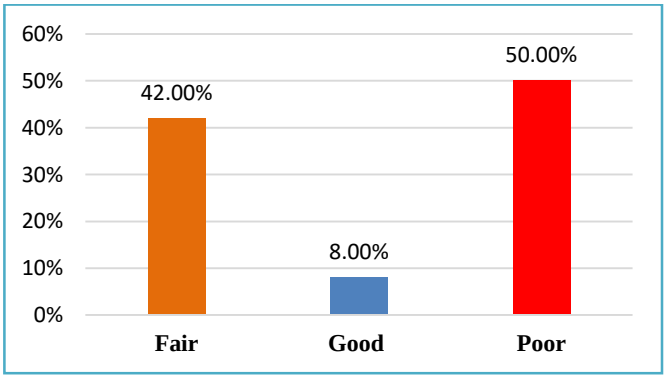


**Figure 1. Frequency of oral hygienic status. (n=88)**

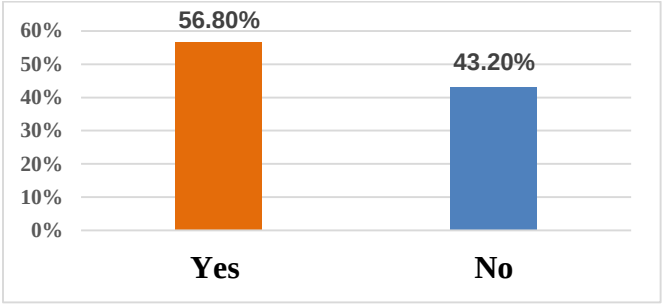


**Figure 2. Frequency of gingivitis. (n=88)**

**Table II: Frequency of gingivitis according to baseline characteristics. (n=88)**

| VARIABLES | | GINGIVITIS | | | p-value |
|---|---|---|---|---|---|
| | | No | Yes | Total | |
| Residence | Rural | 23 | 29 | 52 | 0.811 |
| | | 26.1% | 33.0% | 59.1% | |
| | Urban | 15 | 21 | 36 | |
| | | 17.0% | 23.9% | 40.9% | |
| Iron supplementation | No | 17 | 25 | 42 | 0.624 |
| | | 19.3% | 28.4% | 47.7% | |
| | Yes | 21 | 25 | 46 | |
| | | 23.9% | 28.4% | 52.3% | |
| Anemia | Mild | 7 | 17 | 24 | 0.036 |
| | | 8.0% | 19.3% | 27.3% | |
| | Moderate | 6 | 14 | 20 | |
| | | 6.8% | 15.9% | 22.7% | |
| | None | 25 | 19 | 44 | |
| | | 28.4% | 21.6% | 50.0% | |
| Brushing frequency | Occasionally | 3 | 6 | 9 | 0.807 |
| | | 3.4% | 6.8% | 10.2% | |
| | Once | 16 | 21 | 37 | |
| | | 18.2% | 23.9% | 42.0% | |
| | Twice | 19 | 23 | 42 | |
| | | 21.6% | 26.1% | 47.7% | |
| Dental visits during pregnancy | No | 29 | 37 | 66 | 0.804 |
| | | 33.0% | 42.0% | 75.0% | |
| | Yes | 9 | 13 | 22 | |
| | | 10.2% | 14.8% | 25.0% | |

## Discussion

In the recent years, increasing attention has been directed toward understanding how pregnancy affects both systemic and oral health. Among the oral conditions linked to pregnancy, pregnancy related gingivitis characterized by the gum inflammation and bleeding remains one of the most frequently observed health issues. This study has been done on 88 pregnant women to evaluate the oral hygiene and the gingival health among women during pregnancy, with an overall mean age of 29.58 ± 6.53 years, most of the women 3rd trimester of pregnancy 45.5%, followed by the 2nd 35.2% and 1st trimester 19.3%. In aligns to this study Shrestha R et al[13] reported that the mean age of women was 24.78±4.46 years and higher prevalence of gingivitis 76.3% in second trimester of pregnancy. In the comparison of this Schröter U et al[14] also reported that the study participants had a mean age of

**Table III: Frequency of oral gynogenic status according to baseline characteristics. (n=88)**

| VARIABLES | | ORAL HYGIENIC STATUS | | | | p-value |
|---|---|---|---|---|---|---|
| | | Fair | Good | Poor | Total | |
| Residence | Rural | 24 | 3 | 25 | 52 | 0.505 |
| | | 27.3% | 3.4% | 28.4% | 59.1% | |
| | Urban | 13 | 4 | 19 | 36 | |
| | | 14.8% | 4.5% | 21.6% | 40.9% | |
| Iron supplementation | No | 17 | 2 | 23 | 42 | 0.487 |
| | | 19.3% | 2.3% | 26.1% | 47.7% | |
| | Yes | 20 | 5 | 21 | 46 | |
| | | 22.7% | 5.7% | 23.9% | 52.3% | |
| Anemia | Mild | 10 | 2 | 12 | 24 | 0.621 |
| | | 11.4% | 2.3% | 13.6% | 27.3% | |
| | Moderate | 6 | 1 | 13 | 20 | |
| | | 6.8% | 1.1% | 14.8% | 22.7% | |
| | None | 21 | 4 | 19 | 44 | |
| | | 23.9% | 4.5% | 21.6% | 50.0% | |
| Brushing frequency | Occasionally | 3 | 1 | 5 | 9 | 0.838 |
| | | 3.4% | 1.1% | 5.7% | 10.2% | |
| | Once | 18 | 3 | 16 | 37 | |
| | | 20.5% | 3.4% | 18.2% | 42.0% | |
| | Twice | 16 | 3 | 23 | 42 | |
| | | 18.2% | 3.4% | 26.1% | 47.7% | |
| Dental visits during pregnancy | No | 28 | 6 | 32 | 66 | 0.756 |
| | | 31.8% | 6.8% | 36.4% | 75.0% | |
| | Yes | 9 | 1 | 12 | 22 | |
| | | 10.2% | 1.1% | 13.6% | 25.0% | |

30.46 ± 5.40 years, with the majority being in their second or third trimester of pregnancy.

Additionally, in this study according to the oral hygiene habits, 47.7% brushed twice daily, 42% once daily, while only 10.2% occasionally and dental visited status, which was lower than study by Zini A et al[15] where self-reported oral hygiene practices was in 98% of participants wiht regular dental cleanings or checkups, with 84% attending biannual visits, particularly around 80% women reported brushing at least twice daily using a manual toothbrush and toothpaste, while the majority ≥69% indicated using mouthwash, dental floss, and an electric toothbrush no more than once per week. According to an Indian study by Erchick DJ et al[16] reported that the around 74% of women were using a toothbrush, while a considerable number (43%) indicated the use of “datiwan,” a traditional tooth-cleaning tool made from the twigs of various local trees. Indicating that women in developing countries are not properly following hygienic practices during pregnancy.

In this study according to the oral hygiene status half of the women 50% had poor oral hygienic status, 42% found with fair oral hygiene, and only 8% women had good oral hygiene during pregnancy, while around 56.8% of the women had gingivitis, indicating that a significant proportion of study population had compromised oral hygiene and gingival health. The findings were supported by the Erchick DJ et al[16] where out of all 1452 participants, 40% of the women had signs of clinical gingivitis. In aligns to this study Priya et al[17] reported that the 68.8% of the participants experienced gum problems during pregnancy; particularly 1.7% reported pain, 10.7% had redness, 34.2% experienced swelling, and 53.4% reported bleeding gum. In the study by Dhivya S et al[18] 34% of women were reported to have gingivitis, characterized by redness and swelling of the gums. In aligns to present study, Kaura MA et al[19] observed a higher prevalence of gingivitis (82.3%) among pregnant women, indicating a significant burden of gingival inflammation in this group. Consistent with the present findings, their study also demonstrated a significant association between oral hygiene status and gingival health, suggesting that poor oral hygiene contributes to an increased risk of gingivitis during pregnancy.

Similarly, Negi P et al[20] reported that approximately 84.5% of mothers had poor oral hygiene, primarily due

to gum bleeding, dental caries, and gingivitis, while only 3% maintained good oral hygiene. Additionally, Gare J et al[21] found that about 88% of women were affected by gingivitis, with 15% showing a moderate and 73% a severe degree of inflammation. Overall studies found higher prevalence of gingivitis and poor oral hygiene among pregnant women during antenatal visits, highlighting a significant public health concern that may contribute to adverse feto-maternal outcomes. Regardless of some evidence linking poor oral hygiene to unfavorable pregnancy outcomes. This study also restricted by its very limited sample size and the absence of prolonged follow up till births. Hence, large-scale, longitudinal studies are recommended to establish stronger evidence on the impact of poor oral hygiene and gingival disease on maternal and fetal health.

## Conclusion

The study revealed that a substantial proportion of pregnant women had unsatisfactory oral hygiene and compromised gingival health, with half demonstrating poor oral hygiene and more than half affected by gingivitis. Despite assessing various sociodemographic and behavioral factors, none showed a statistically significant association with oral hygiene status. These findings highlight that poor oral health during pregnancy is a widespread concern, likely influenced by overall neglect of oral care rather than specific demographic factors. Therefore, targeted oral health education, regular dental checkups, and integration of oral hygiene counseling into antenatal care are strongly recommended to promote better maternal oral health and prevent pregnancy-related oral complications.

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