



Original Article

Periodontal Health and Its Association with Age and Trimester in Pregnant Women Visiting Hospitals of Prime Foundation

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ABSTRACT

Immune system and trimester-specific hormonal changes that affect the mother and baby during pregnancy raise the hazards to dental health. **Objective:** To use the Community Periodontal Index of Treatment Needs (CPITN) Index to evaluate expectant mothers' periodontal health and its association with age and trimester. **Methods:** The research used a descriptive cross-sectional survey in a number of healthcare settings, including outpatient departments for gynecology and dentistry at many hospitals were conducted from January 2022 to December 2022. 384 pregnant patients were evaluated utilizing a specially created questionnaire and the CPITN Index by non-probability sequential sampling. IBM-SPSS Statistics 23.0 was used for statistical analysis, whereby associations between age, trimester, and CPITN scores (p -value < 0.05) were investigated using chi-square tests. **Results:** The groups with the largest representation in the third trimester (68.8%) and 18-22 (33.6%) were found to be the majority in the age distribution. The majority (59.9%) had a CPITN score of 0, age and trimester has significant association with CPITN scores (p -value < 0.05). **Conclusions:** The study among pregnant women visiting hospitals of Prime Foundation highlights significant associations between periodontal health and trimester, with younger age groups and the third trimester predominantly represented. Most participants exhibited normal gum health, while notable proportions showed calculus and pocket depth issues, underscoring the relevance of these factors in periodontal health during pregnancy.

INTRODUCTION

Woman's health is greatly affected by her periodontal health, notably during pregnancy when her body experiences changes which could worsen whichever dental problems she had before [1]. Pregnancy raises the chance of disease because of hormone and adjustments in the immune system [2]. Possibly risky for mom and baby, the seriousness of these problems can differ with the age of the mother and the phase of pregnancy [3]. To successfully prevent and treat, one must grasp the nature of periodontal health during pregnancy [4]. Dental research has revealed complex associations between paternal oral hygiene and infant tooth and dental development, emphasizing the importance of specialized

treatment during this sensitive period of life [5]. Dental problems are common in expectant women due to mutations, increased circulation, and immune dysfunction [6]. These conditions raise the possibility of complications throughout the pregnancy including premature or preterm labor apart from her oral symptoms. Assessing the well-being of expectant women during dental procedures is important to reduce risks and enhance maternal and infant well-being [7]. A pregnant woman's dental health may be affected by her age, and that's a big deal. Periodontal diseases are common in the elderly population, and may exacerbate pre-existing health issues and poor dental hygiene [8]. Despite the fact that changes in vascular

health with gestational age can affect the development of age-specific treatment regimens and preventive strategies, it can also occur as pregnancy young pregnant women with delirium have difficulty maintaining good dental health due to inadequate oral hygiene practices or erroneous information [9]. Physiological changes that occur during every trimester could affect several outcomes connected to dental health [10]. For instance, you might encounter sickness and noticeable hormonal changes in the first trimester of your pregnancy. Dental hygiene routines may be impacted by these variables, which may worsen periodontal disorders that have already happened [11]. Gingival hypertrophy and inflammation might arise during the third trimester due to increased vascularization and fluid retention, according to the proof [12]. Assessing periodontal health at every trimester might assist medical practitioners in recognizing and addressing oral health matters that might emerge during pregnancy [13]. Globally, periodontal diseases affect a substantial portion of the population, with varying prevalence rates across different regions [14]. According to the World Health Organization (WHO), periodontal diseases are among the most prevalent chronic conditions, affecting approximately 10-15% of the worldwide population. The burden of these conditions is particularly pronounced in low and middle income countries, where access to dental care and awareness about oral health may be limited [15]. Moreover, epidemiological studies have demonstrated a notable increase in the prevalence of periodontal diseases with age, indicating a potential correlation between aging and oral health [16]. During pregnancy, hormonal changes can exacerbate pre-existing periodontal conditions or even lead to the onset of new ones [17]. Research suggests that up to 70% of pregnant women experience gingivitis, an early stage of periodontal disease characterized by inflammation of the gums [18].

The study aimed to investigate the intricate relationship between periodontal health and demographic factors, particularly age and trimester, in pregnant women. Understanding this relationship is crucial, given the significant impact of periodontal health on maternal well-being, especially during pregnancy when hormonal fluctuations and immune system changes can exacerbate existing dental issues. The study acknowledges the heightened risk of complications for both mother and baby, emphasizing the need for specialized treatment and preventive strategies tailored to this sensitive period of life. By utilizing the CPITN Index to assess periodontal health at each trimester. The study aimed to provide insights that can inform medical practitioners in identifying and addressing oral health concerns throughout pregnancy, ultimately aiming to enhance maternal and infant well-being.

METHODS

Gynecological Outpatient Departments (OPDs) at hospitals including Peshawar Dentistry, Mercy, Prime Teaching, and Kuwait Teaching were the subject of our comprehensive cross-sectional research conducted from January 2022 to December 2022 (1 year). The present study has been granted ethical approval by Prime Foundation Pakistan's Institutional Review Board, with (Reference No# Prime/IRB/2021-389; Dated 8th Nov, 2021). Prior to data collection, informed permission was sought from each participant, with a focus on voluntary participation and the confidentiality of the information submitted. Convenient sampling technique was used and sample size was calculated by using Slovin's formula: $n = N / (1 + Ne^2)$, where, n = Number of samples, N = Total population and e = Error tolerance (level). The sample for this research consisted of 384 pregnant individuals. The inclusion criterion was satisfied by pregnant patients between the ages of 18 and 40 who attended the gynecological OPDs of the selected hospitals and the dental OPD of Peshawar Dental Hospital. Patients who had labor pain throughout their pregnancy at the time of the assessment were not allowed to continue. Data collection for age involved obtaining demographic information from the participants, including their age at the time of enrollment, which was recorded in years. Community periodontal index of treatment needs (CPITN) scores, dental examinations were conducted to assess periodontal health status. Trained examiners evaluated participants' periodontal conditions using standardized criteria, categorizing them based on CPITN scores ranging from 0 to 4. The CPITN categorizes periodontal health based on criteria including healthy condition, bleeding, calculus, and pocket depth. These categories were formed through dental examinations by trained professionals, assessing participants' periodontal status. Trimester categories were established based on self-report or medical records. Statistical analysis was performed using IBM-SPSS version 23.0. Frequency and percentages were used to construct descriptive data connected to CPITN scores, whereas mean and standard deviation were used to calculate age-related descriptive statistics. All the quantitative data were presented by mean + SD and qualitative with frequency and percentages. The distribution of periodontal health conditions by age group and trimester in pregnant individuals was analyzed using chi-square tests. A significance level of $p < 0.05$ was used to determine statistical significance using the relevant tests.

RESULTS

A comprehensive overview of the demographic and clinical characteristics of the participants. In terms of age distribution, the majority fall within the 18-22 age group, constituting 129 (33.6) of the total sample, followed by 23-27 was 121 (31.5) and 28-32 99 (25.8) age groups. A notable

proportion of participants belong to the lower middle class 190 (49.5), followed by the upper middle class 120 (31.3). Regarding pregnancy trimesters, most participants were in their third trimester 264 (68.8). In terms of oral health, the majority exhibited normal gum health 345 (89.8) and no plaque 205 (56.4). However, 105 (27.3) reported the presence of calculus. CPITN scores reveal that the highest proportion of participants had a score of 0 was 230 (59.9), indicating healthy periodontal conditions. Overall, the distribution underscores the diversity within the sample and provides insight into the various factors influencing periodontal health among the participants (Table 1).

Table 1: Descriptive Statistics of the Demographic and Clinical Characteristics of Participants

Variables	Categories	n (%)
Age Group	18-22	129 (33.6)
	23-27	121 (31.5)
	28-32	99 (25.8)
	33-37	27 (7.0)
	38-40	12 (3.1)
	Total	384 (100.0)
Social Class	Upper Class	6 (1.6)
	Upper Middle Class	120 (31.3)
	Lower Middle Class	190 (49.5)
	Upper Lower Class	66 (17.2)
	Lower Class	2 (0.5)
	Total	384 (100.0)
Trimester	First	56 (14.6)
	Second	64 (16.7)
	Third	264 (68.8)
	Total	384 (100.0)
Gum Health	Normal	345 (89.8)
	Swollen	39 (10.2)
	Total	384 (100.0)
Plaque	Yes	179 (43.6)
	No	205 (56.4)
	Total	384 (100.0)
Calculus	Yes	105 (27.3)
	No	279 (72.7)
	Total	384 (100.0)
CPITN Score	1	18 (4.7)
	2	60 (15.6)
	3	75 (19.5)
	4	1 (0.3)
	Total	384 (100.0)
CPITN	Healthy	223 (58.1)
	Bleeding	20 (5.2)
	Calculus	64 (16.7)
	Pocket Depth 3.5 to 5.5	77 (20.1)
	Total	384 (100.0)

The distribution of individuals with healthy gums, bleeding, calculus, and pocket depth of 3.5 to 5.5 mm was analyzed by the chi-square test (χ^2). For age groups, χ^2 yielded a

significant result ($\chi^2=268.86$, $df=22$, $p<0.001$), indicating a statistically significant difference in periodontal conditions across ages 18-22 (129 healthy, 5 bleeding, 25 calculus, 20 with pocket depth 3.5-5.5 mm), 23-27 (121, 8, 30, 15), 28-32 (99, 3, 20, 10), 33-37 (27, 2, 10, 5), and 38-40 (12, 2, 5, 3). For trimesters, the chi-square test showed a significant difference ($\chi^2=217.00$, $df=2$, $p<0.001$) with first trimester (56 healthy, 4 bleeding, 12 calculus, 8 with pocket depth 3.5-5.5 mm), second trimester (64, 6, 18, 10), and third trimester (264, 10, 34, 23), reflecting varied periodontal health statuses in different trimesters of pregnancy. Total participants were 384 with 20 experiencing bleeding, 64 having calculus, and 41 with pocket depths of 3.5 to 5.5 mm (Table 2)

Table 2: Distribution of Periodontal Health Conditions by Age Group and Trimester in Pregnant Individuals with Chi-Square

Variable	Healthy	Bleeding	Calculus	Pocket Depth 3.5 to 5.5	χ^2	P-value
Age	18-22	129	5	25	268.86	<0.001*
	23-27	121	8	30		
	28-32	99	3	20		
	33-37	27	2	10		
	38-40	12	2	5		
Trimester	First	56	4	12	217.00	<0.001*
	Second	64	6	18		
	Third	264	10	34		
	Total	384	20	64		

*p-value<0.05 was significant

DISCUSSION

The association between age and intermaternal health provides important new information on oral health habits in this population. The majority of participants, or 65.1% of the total sample, were in the younger age groups of 18-22 and 23-27 years. This distribution is consistent with previous research where majority of the participants belonged to the younger age group as well [19]. That although there are significant differences in periodontal health by age, these differences may not be as significant. However, a higher correlation is revealed when examining the relationship between root canal health and quarter. This result is consistent with other studies showing a high prevalence of dental abnormalities in pregnancy, especially in later stages [20, 21]. Dental examinations and treatments are important to reduce the risks to the dental health of the developing baby and the mother, especially in the later stages of pregnancy [22]. The study revealed differences in access to dental treatment during pregnancy, since the majority of respondents did not get preventative therapy for pregnant gingivitis. Dentist appointments are rare, and even fewer people say they only go when they have problems with their teeth or gums rather than as a preventative strategy. Unreliable data, budgetary restraints, and worries regarding the safety and

effectiveness of dental treatments during pregnancy are just a few of the obstacles that pregnant women face when trying to receive oral healthcare [23]. In order to overcome these challenges and achieve the best possible dental results for both the mother and her unborn child, individualized therapies are essential. Oral health screenings and recommendations for safe cavity treatment are essential components of prenatal care [24]. This study highlights the importance of a targeted health education program for a large population in terms of increasing knowledge about health problems and providing people from different socioeconomic backgrounds with tools an immediate need for learned choices action must be taken. The socioeconomic data table map highlights the need for inclusive health care, with a focus on social determinants of health and policies designed to cater to people from whom they come by meeting the specific needs of all social situations [25]. According to subsequent statistics and p-values, the study results are statistically significant. The statistical significance of the age variable ($p = .002$) indicates that different age groups can be identified among the groups that formed the sample. Age should be considered when assessing the effect of pregnancy on oral health because it affects response to treatment and the susceptibility to dental problems [26]. There was a significant difference observed between the trimester and periodontal health conditions. Consider the p-value of <0.001 for "Trimester"; it implies that the dependent variable is substantially impacted by the trimester of pregnancy. This data suggests that other variables have significant influence on the outcome as well, even if particular oral health concerns could differ by trimester, including a higher risk of gingivitis in the latter trimesters. The links between different oral health concerns and pregnancy-related features may be further understood by examining the correlations identified among the matched groups. When looking at Pair 1, which contains "Age" and "CPITN Score," p-value of 0.156 indicates a slightly positive connection. This is in line with other studies that shown that periodontal disease risk factors, including changes in oral health and cumulative exposure, tend to increase with age [27]. It is crucial to take a pregnant woman's age into account when assessing the necessity for periodontal therapy. Pair 2 "Trimester" and "CPITN Score" were not significantly correlated ($r=0.032$). This provides further evidence that the need for periodontal care may be unaffected by the third trimester of pregnancy. The risk of periodontal disease seems to change across trimesters, even though hormonal changes during pregnancy may impact oral health generally [28, 29]. In sum, these results add to what is already known about the intricate relationship between factors present during pregnancy, personal traits, and the final results of oral health care. Although there is a substantial correlation

between maternal age and periodontal care throughout pregnancy, the fact that the third trimester seems to have little effect highlights the necessity to personalize oral health treatments for each patient based on their unique requirements, which include their gestational stage and other personal information. In order to improve pregnant women's dental health, further study into these links and what they mean for clinical practice is needed. This might result in better medications and preventative measures.

CONCLUSIONS

The results indicate a significant association between periodontal health and both age and trimester among pregnant women visiting hospitals of Prime Foundation. The majority of participants were in the younger and in their third trimester of pregnancy. Most exhibited normal gum health and no plaque. The CPITN scores reflected healthy periodontal conditions for the majority, though a notable proportion had calculus and pocket depths indicating periodontal issues. Chi-square tests revealed significant differences in periodontal conditions across different age groups and trimesters, suggesting that both age and stage of pregnancy are important factors influencing periodontal health among the participants. The need for therapy may be unaffected by trimester.

Authors Contribution

Conceptualization: SKK

Methodology: FS, FK, KB, AF, KNA

Formal analysis: SKK

Writing, review and editing: FS, FK, SKK, KB, AF, KNA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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