

Prevalence of Gingivitis in Second Trimester of Pregnancy

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ABSTRACT

Background

Gingivitis simply means the inflammation of gingiva. It is a reversible state but can lead to periodontitis. The final result could be the exfoliation of the tooth causing decreased masticatory function leading to a compromised quality of life. Gingivitis in the pregnant woman should be carefully assessed and treated and given special attention. There is rare documentation on the prevalence of gingivitis in pregnancy in the least developed countries.

Objective

To evaluate the prevalence of gingivitis in the second trimester of pregnancy and assess its relationship with age, parity, education, occupation, gravidity, oral hygiene habit and frequency of brushing.

Method

An observational descriptive study was conducted among 384 pregnant females in their second trimester in Kathmandu, Nepal. Demographic variables and general information including those related to oral hygiene practices and habits were collected during an interview. Plaque index and Gingival Index was recorded among the patients through full mouth examination at four sites.

Result

The prevalence of gingivitis in the second trimester of pregnancy was 76.3%. Statistically significant relationship was found between gingivitis and gravida and parity. A relation could not be established between gingivitis with age, education, occupation, oral hygiene habit and frequency of brushing.

Conclusion

The prevalence of gingivitis is found to be high in Nepalese pregnant women. Special strategies should be introduced targeting the pregnant women of least developed countries to uplift their periodontal health.

KEY WORDS

Gingivitis, Oral hygiene, Pregnancy

INTRODUCTION

Gingivitis is defined as the “Inflammation of the gingiva”.¹ Gingivitis is essentially a prudent attempt of the human body to wall-off the destructive aspects of the immunologically mediated mechanisms in response to the presence of a biofilm, which enhances the body to cease such perturbing consequences. The spectrum of the etiology of gingivitis in pregnancy includes hormonal fluctuations, an altered immune response, altered subgingival flora and relation with stress and anxiety during pregnancy, resulting in inadequate attention to oral hygiene and contributing to the deterioration in a woman’s oral condition.^{2,3}

The prevalence of gingivitis in pregnant women has reportedly ranged from 30% to 100%.⁴⁻⁶ Researches have revealed the percentage of pregnant women with gingivitis to be 89% in Ghana, 86.2% in Thailand, 97.3% in Brazil and over 66.8% in India.⁷⁻¹⁰ Studies from the Health Care Centers showed the prevalence of gingivitis in pregnant women as 98.0% in Bangkok, 86.3% in Nakornsawan and 98.8% in Yala.⁹ In context of Nepal, the prevalence was found to be 40% in a study done in Sarlahi district, in which the examination had been performed by community-based oral health workers.¹¹

To our knowledge, there is paucity of data in the Nepalese population on the prevalence of gingivitis in the second trimester of pregnancy. The purpose of the present study was to evaluate the prevalence of gingivitis in a sample of pregnant Nepalese women in their second trimester. It also aimed to reveal the relationship between gingivitis and a series of demographic variables.

METHODS

The observational descriptive study was carried out among 384 pregnant women in their second trimester attending the Antenatal Clinic (ANC) of the Paropakar Maternity and Women’s Hospital, Kathmandu, Nepal between December 2017 to April 2018 by convenience sampling. Written informed consent was obtained from all selected participants. This study was approved by the Institutional Review Board of National Academy of Medical Sciences, Kathmandu, Nepal.

The inclusion criteria were: (1) Pregnant women from age group 15-45 years in their second trimester (2) Patient attending ANC of Paropakar Maternity and Women’s Hospital who want to voluntarily participate in the study (3) Dentate patients with at least 16 permanent teeth.

The exclusion criteria were patients with any systemic illness that can influence gingivitis like diabetes mellitus, patient taking antibiotics since three months, patients taking drugs which may alter the findings such as antiplatelet drugs,

antihypertensives, immunosuppressants, third molars, periodontal pocket more than three millimeter, smokers or tobacco users in any form, individuals not able to carry out effective toothbrushing and patients with any orthodontic appliances.

Demographic variables and general information including those related to oral hygiene practices and habits were collected during the interview. Oral examination was performed in a well lit ANC with participants seated on a chair by a single examiner. Plaque index (PI) by Loe et al. and Gingival Index (GI) by Silness et al. was recorded among the patients.^{4,12} Full mouth examination using four different gingival areas of tooth-distofacial papilla, facial margin, mesiofacial papilla and entire lingual margin was performed, using a mouth mirror and periodontal probe, to record the Gingival Index. The case was defined as a case of gingivitis if the mean gingival index was more than 0.¹³

Standard normal deviate of 1.96 for a confidence level set at 95% was used, with a prevalence established at 50% and standard error of 0.05, to calculate the sample size. Chi square test was performed for qualitative or categorical variable. P-value was calculated under the predetermined level of significance and CI (confidence interval) of 95%. The data was entered in Statistical Package for the Social Sciences-SPSS version 23.0.

RESULTS

The demographic characteristics of the pregnant women are presented in table 1. The age range of the 384 participants was 15-37 years, with a mean age 24.78 (± 4.46) years. Majority of the subjects (59.9%) were in the age group ≤ 25 years. Multipara females formed 52.3% and multigravida formed 58.8% of the study population. 50.5% had completed secondary education and the maximum female participants 79.2% were housewives.

The mean gingival index obtained was 0.44 ± 0.55 and the mean plaque index was 0.55 ± 0.47 (Table 2).

Among 76.3% of the patients who had gingivitis, 62.8% showed mild gingivitis, 9.8% revealed moderate gingivitis and only 3.7% had severe gingivitis. The mean gingival index for mild, moderate and severe gingivitis was 0.258, 1.38 and 2.22 respectively (Table 3).

The data showed statistically significant relationship between gingivitis with parity and gravida of the pregnant female as shown in table 4. Other variables such as age, education, occupation and oral hygiene practice did not show any significant relationship with gingivitis.

Correlation (r) between PI and GI was obtained to be 0.63, indicating a positive association between plaque index and gingival index (Fig. 1).

Table 1. General characteristics of participants

Characteristic	Frequency	Percentage
Age		
≤ 25 years	230	59.9
> 25 years	154	41.1
Parity		
Primipara	201	47.7
Multipara	183	52.3
Education		
Uneducated	106	27.6
Primary	44	11.5
Secondary	194	50.5
Graduate	40	10.4
Occupation		
Housewife	304	79.2
Others	80	20.8
Gravidity		
Primigravida	161	41.9
Multigravida	223	58.8
Oral hygiene habit		
Toothbrush and tooth-paste	378	98.5
Toothpowder and finger	6	1.5
Others	0	0
Frequency of brushing		
None	2	0.5
Once a day	339	88.3
Twice a day	43	11.2

Table 2. Gingival and Plaque Index score

Variable	Maximum value	Mean	Standard deviation
GI	2.73	0.44	0.55
PI	2.67	0.55	0.47

Table 3. Categorisation according to the severity of gingivitis by Gingival Index

Severity	Frequency (%)	Mean Gingival Index	SD
Mild	241(62.8)	0.258	0.27
Moderate	38(9.8)	1.38	0.258
Severe	14(3.7)	2.22	0.196

DISCUSSION

The prevalence of gingivitis in the second trimester of pregnancy was 76.3%. This finding is consistent with that of studies done in India, where the prevalence was found to be 66.8 to 99%.^{14,15} In contrary to our study, in a previous research done in Nepal, the prevalence of gingivitis in pregnant women was found to be 40%.¹¹ The results may differ because of the difficulty in comparisons of periodontal researches as variations exist in the index system, the

Table 4. Association between severity of gingivitis with different parameters

Characteristic	Healthy	Mild	Moderate	Severe	p value
Age					
≤25 years	56(24.3)	145(63.1)	23(10)	6(2.6)	0.61
>25 years	35(22.7)	96(62.4)	15(9.7)	8(5.2)	
Parity					
Primipara	55(30.1)	111(60.6)	12(6.5)	5(2.8)	0.01*
Multipara	36(17.9)	110(64.7)	26(13.0)	9(4.4)	
Education					
Uneducated	8(7.5)	88(83.1)	6(5.7)	4(3.7)	
Primary	12(27.3)	28(63.6)	4(9.1)	0(0)	0.65
Secondary	42(21.6)	122(62.9)	22(11.3)	8(4.2)	
Graduate	29(72.5)	3(7.5)	6(15)	2(5)	
Occupation					
Housewife	67(22.1)	24(30)	33(10.8)	9(3)	0.14
Others	195(64.1)	46(57.5)	5(6.25)	5(6.25)	
Gravidity					
Primigravida	52(32.3)	97(60.2)	9(5.6)	3(1.9)	0.008*
Multigravida	39(17.5)	144(64.6)	29(13)	11(4.9)	
Oral hygiene habit					
Toothbrush and tooth-paste	91(24.1)	236(62.4)	7(9.8)	14(3.7)	0.5
Toothpowder and finger	0(0)	5(83.3)	1(16.7)	0(0)	
Others	0(0)	0(0)	0(0)	0(0)	
Frequency of brushing					
None	1(50)	1(50)	0(0)	0(0)	0.94
Once a day	80(23.6)	211(62.3)	35(10.3)	13(3.8)	
Twice a day	10(23.3)	29(67.4)	3(7.0)	1(2.3)	

*represents significant association between the parameters

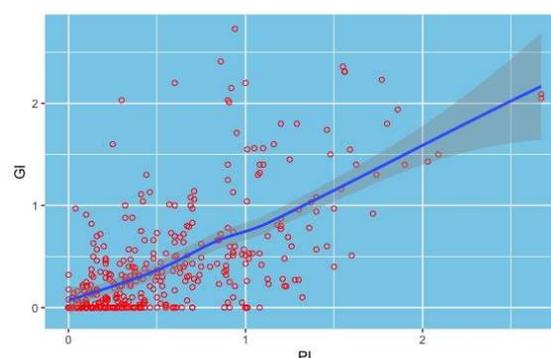


Figure 1. Scatter plot showing positive relation between gingival index and plaque index

population description, the sites examined and even the definition of gingivitis. Such inter-study variabilities among different researches impedes an unequivocal conclusion about the parameter considered under observation.

Bleeding gums has been reported as the most common problem in pregnant females in Nepal.^{16,17} Lack of proper dental health knowledge, low socioeconomic and educational level and neglect of oral health could be the

factors responsible for this high percentage of gingivitis. Majority of the population in Nepal do not go anywhere for dental treatment and consultation with medical practitioners is more common than visit to a dentist.¹⁸ Unfortunately, only 59.4% of the medical practitioners agree that periodontal problems could affect pregnancy outcomes.¹⁸ And only 12% of women acknowledge that poor oral health may contribute to low birth weight babies.¹⁶

The plaque index in our study was found to be 0.55. Pregnant women may find tooth brushing to be nearly impossible, especially in premolar and molar areas because of the pregnancy-related nausea.¹⁹ A significant connection between pregnancy-related vomiting and increased gingival inflammation has been reported in a study where the authors have speculated impaired capability for proper brushing to be the main culprit.⁵ In addition, during pregnancy there are alterations in mindset and behavior with the propensity towards lack of personal care.²⁰

The data showed that there is no association between age and severity of gingival index as seen in a previous study.²¹ This may be due to the fact that the sample in the study consisted mostly of young women. However, this result is in contrast to other studies in which the authors have suggested that aging is a natural process which results in changes in host immunity which may cause the loss of periodontal support tissue.^{11,21,22}

The severity of gingivitis showed an association with the gravida of the female patient. The findings in our study impersonates with another study done in Nepal.¹¹ Only a minority of pregnant women seek care for bleeding gums in the absence of pain.²³ They would rather brush their teeth with medicated toothpaste or wait for the problem to self-resolve thus carrying the disease in the next pregnancy.²³

Pregnant women with two or more previous births (multigravida) have significantly higher GI scores compared with those with one previous birth.³ Gravity plays a role in periodontal pathosis but its effect becomes apparent only with the passage of time.²⁴ However, researches with contrasting results also exist, where repeated pregnancies had undefined effect on the periodontal health status.^{21,25}

The study showed an association between gingival index and parity. Similarity was seen in a study conducted among Ugandan women.²⁶ This was interpreted as accumulated tissue destruction across time rather than an intrinsic parity related abnormality. Contradicting result has been reported by Onigbinde et al.²²

Lower educational status may directly lead to lower access to and utilization of dental services, low-degree of periodontal health awareness and negligence of oral hygiene.²² The level of education forms a scaffold for the knowledge of periodontal health. the level of oral health awareness, attitude and behavior is seen to improve with the level of education.²³ Lack of education is accountable

for the belief that dental treatment during pregnancy might have a detrimental result on pregnancy outcome.²⁷ However, in our study, there was no association between gingival index and education level of the patient. Previous studies have shown no significant differences in bleeding index scores and mean probing depth among different levels of education.^{22,28} Age may act as a confounding factor in this context as young mothers may be more enthusiastic to learn and build a healthy attitude towards oral hygiene maintenance.²⁹

The present study showed no association between occupation and gingivitis as seen in earlier study.²⁸ On the contrary, literature also demonstrates gingivitis to be more in housewives.¹⁵ It has been suggested that lower standard of living worsens the periodontal status, irrespective of the measure used to assess it.²⁶

The data showed that maximum number of the females used toothbrush and toothpaste and a very few used toothpowder and finger. Other means used in Nepal such as datiwani, ash, charcoal, salt, green crushed guava leaves were not reported.^{11,23,25,30-32} Most women brushed once daily as seen in Nepal.^{6,7,33,34} Our study showed no association between gingival index and oral hygiene habit or frequency of brushing.

Results of this study indicate a high prevalence of gingivitis among the pregnant females, which shows the oral hygiene methods employed by them is not effective. Nepal has one of the lowest dentist-population ratios among South Asian countries with only 2 dentists per 100,000 population.³⁴ This limited number of dental professionals are unable to treat these conditions adequately. The treatment is also hindered by limited access to qualified providers.²³

The results of this study may have implications for the periodontal health services aimed at the pregnant women in Nepal. Gingivitis is a risk factor for preterm low birth weight and periodontal treatment significantly reduces this risk.³⁵ Nationwide preventive programs should be planned and implemented to improve the oral hygiene level among pregnant women.

The authors recommend oral health screening of pregnant women on a regular basis. Community oriented, culturally sensitive and socially acceptable educational programs should be introduced for periodontal health promotion. To increase the validity of the study, multicentric studies should be encouraged to accommodate larger data. Study with larger sample size could represent the entire population.

The limitation of the study includes the ethnically and demographically heterogeneous sample. The research fails to address important parameters such as socio-economic status, stature of the female, weight of the female, effect of vitamin and iron supplementation and nutritional status.

CONCLUSION

The prevalence of gingivitis in the second trimester of pregnancy was found to be 76.3%. Statistically significant relationship was found between gingivitis and gravida and parity. Gingivitis being both preventable and readily treatable, early detection should be reinforced and intervention should be conducted as early as possible. The authors would also like to emphasize the need of behavior

changes in oral hygiene practice. Besides assessing the prevalence of gingivitis, the study also succeeded in motivating the obstetricians and the medical staffs for oral inquiry and early referral. The pregnant women received an opportunity to eliminate fears regarding safety of dental treatment and become aware about infant oral health care. Fostering good oral health in women during pregnancy is an ideal early intervention and good public health policy.

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