Original Article

Prevalence of Oral Mucosal Lesions in Pregnant Women of Bihar: A Cross-sectional and Observational Study

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Abstract

Background: Oral changes observed during pregnancy have been studied, but their magnitude and frequency have not been stressed on. This study was undertaken to determine the prevalence of oral mucosal lesions (OML) among pregnant women attending the dental outpatient department (OPD) in a government hospital in Patna, Bihar, Eastern India. **Materials and Methods:** Women with confirmed pregnancy aged 18 years and older, attending the dental OPD over a period of 6 months from August 2021 to January 2022 formed the study population. Clinical examination was performed according to the World Health Organization guidelines by a single examiner. Diagnosis was made on the basis of clinical features of the lesion. Data obtained were analyzed descriptively. **Results:** The prevalence of OML was 38.37%. The most commonly encountered lesions were pregnancy gingivitis, followed by burning mouth syndrome, geographic tongue, ulceration, melanosis/pigmentation, gingival enlargement, morsicatio buccarum, and pregnancy tumor/pyogenic granuloma. **Conclusion:** Higher prevalence of OML in pregnant women indicates the importance of timely oral examination and subsequent treatment plans.

Keywords: Oral mucosal lesions, Pregnancy gingivitis, Pregnancy, Prevalence.

Introduction

Pregnancy is characterized by complex physiological and hormonal changes that results in noticeable effects throughout a female's body, including the oral cavity.[1] Ten folds increase in estrogen and 30 folds increase in progesterone levels during pregnancy facilitates fetal growth and also induces varied systemic as well as local, physiologic, and physical changes.[2] Several changes are also seen in the oral cavity due to these hormonal fluctuations, including oral mucosal lesions (OML) (pregnancy gingivitis, benign oral gingival lesions, and periodontitis) and teeth or hard tissue related changes (tooth mobility, tooth erosion, and dental caries).[3]

These OML are chronic in nature and can impede the quality of living through detrimental effects on mastication, swallowing, and speech with symptoms of burning, irritation, pain, and bleeding.[4] Studies have also reported negative effect of altered oral mucosal changes on pregnancy outcome like association between periodontal diseases and pre-term labor and low birth weight.[5] Moreover, poor maternal oral health, untreated caries, and greater level of Streptococcus mutans increases the risk of early childhood caries in infants.[6] Thus, oral health maintenance is an integral, yet neglected part of healthy pregnancy.

Taking the above facts into consideration, and the fact that no similar studies have been done in Eastern Indian population, the present study was undertaken to determine the prevalence of OML among pregnant women attending the dental outpatient department (OPD) in a government hospital in Patna, Bihar, Eastern India. The findings of this study would gather data which can be used to educate patients about the ill effects of poor oral health during pregnancy and also encourage the oral health providers to follow best practices and advocate in favor of programs and policies that would help the mothers and their unborn babies.

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Materials and Methods

Women with confirmed pregnancy aged 18 years and older, attending the dental OPD of a government hospital in Patna, Bihar over a period of 6 months from August 2021 to January 2022 formed the study population. Ethical clearance was obtained from the Ethical Committee (IEC/082/2021), and informed written consent from all the study participants. Patients who denied consent were excluded from the study.

Exclusion criteria were mothers with chronic conditions such as diabetes mellitus, congenital heart disease, pulmonary hypertension, and asthma. Pregnant women with history of substance abuse including alcohol and illicit drugs, associated with increased risk of adverse pregnancy outcomes were excluded from the study. Women with contributory medical history of pathological conditions and history of drug therapy that could result in OML or alter salivary flow and pH were also not included in the study.

A detailed medical and dental history was recorded for each patient along with the demographic details. Clinical examination was performed according to the World Health Organization guidelines by a single examiner using sterile armamentarium under adequate artificial illumination. Sterile gauze was used to remove debris and to test if a white lesion could be wiped off. Diagnosis was made on the basis of clinical features of the lesion. Features of the lesion including its location, number, size, color, type, margins, surface, discharge and duration were recorded. Data obtained were systematically tabulated and subjected to descriptive analysis.

Results

During the period of 6 months, 671 pregnant women attended the dental OPD, of which 69 were excluded from the final analysis due to exclusion criteria or due to unwillingness to participate in the study. Thus, a total of 602 pregnant women ranging between the age group of 18–42 years formed the study population. Of these participants, 216 (35.88%) were in the first trimester, 288 (47.84%) in the second trimester, and 98 (16.28%) in the third trimester. A total of 133 (22.09%) patients presented with more than one complaint and oral findings.

Of the entire study population, 327 (54.32%) patients presented with pain due to dental caries. Eighty-four (13.9%) women presented with tooth mobility, and the majority of them exhibited mobility of lower anterior teeth and molars. Eighteen (2.99%) of the pregnant women showed evidence of dental erosion, specifically in the lingual aspect of lower anterior teeth. Evidence of erosion was majorly seen in women with history of multiple pregnancies.

Out of the 602 women forming the study population, evidence of OML was seen in 231 (38.37%) individuals. Table 1 presents the most commonly encountered OML and the proportion of women affected by them. The most commonly encountered lesions were pregnancy gingivitis (35.93%), burning mouth syndrome (22.9%), geographic tongue (20.78%), ulceration (19%), melanosis/pigmentation (16.88%), gingival enlargement (14.72%), morsicatio buccarum (11.68%), and pregnancy tumor/pyogenic granuloma (9.1%).

Table 1: Overview of the various oral mucosal lesions encountered in the study population

S. No.	Oral mucosal lesion	Number of individuals affected	Percentage
01	Pregnancy gingivitis	83	35.93
02	Burning mouth syndrome	53	22.9
03	Geographic tongue	48	20.78
04	Ulceration	44	19
05	Melanosis/pigmentation	39	16.88
06	Gingival enlargement	34	14.72
07	Morsicatio buccarum	27	11.68
08	Pregnancy tumor	21	9.1
09	Lichen planus	16	6.92
10.	Candidiasis	7	3.03
11.	Petechiae	4	1.73
12.	Fissured tongue	2	0.86

Discussion

A myriad of physiological and hormonal changes occur during pregnancy, the systemic effects of which are seen throughout the body. Several epidemiological studies on pregnancy are present in the literature; however, very few describe the prevalence of OML in pregnant women. Moreover, there is paucity of data in the literature regarding prevalence of OML in Eastern India population.

Our study showed that OML were present in 38.37% of the study population. It has been reported that high levels of estrogen hormone during pregnancy causes inhibition of inflammatory cell function, thereby leading to immune suppression. Therefore, alterations in body's reaction to bacterial plaques may occur, which could lead to increase in clinical presentation of oral lesions.[7]

Prevalence rate of 44.2% was reported by Jain and Kaur which was comparatively more than our study.[8] They also reported that the incidence of fissured tongue was highest in the first trimester, while that of gingival enlargement was highest in the third trimester, and an almost equal incidence of fissured tongue and gingival/mucosal enlargement was found in the second trimester.[8] da Silva *et al*. reported that approximately 20% of pregnant women presented with OML, and the most prevalent lesions were exostosis, coated tongue, and benign oral brownish pigmentation.[9] Bett *et al*. in their meta-analysis observed that disorders of the oral mucosa were present in approximately one out of ten pregnant women, and gingival hyperplasia was the most prevalent lesion.[10] Rezazadeh *et al*. reported that the prevalence of oral mucosal disorders was higher in pregnant women (23.5%), compared to their non-pregnant counterparts (7.5%).[11] According to them, the most

common oral disorders in pregnant women were burning mouth sensation, cheek biting, petechia, and geographic lesions.[11] The prevalence rate found in our study was more than the abovementioned studies. This difference could have resulted due to difference in methodology, geographical locations, age, and ethnicity of the study population.

Pregnancy gingivitis is an increased inflammatory reaction to dental plaque during pregnancy, which causes the gingiva to swell and bleed easily.[12] Untreated gingivitis may progress to periodontitis, causing pocket formation, and loose teeth. High levels of circulating estrogen has been documented to be associated with high prevalence of gingivitis and gingival hyperplasia in pregnant women.[13] Moreover, delay in metabolism of progesterone during pregnancy results in increased concentration of the hormone in the tissue and intensifies reaction to local stimuli. In addition, increased amounts of vascular endothelial growth factor and fibroblast growth factor, which are responsible for vascularization, are the causes of high prevalence of this finding in pregnancy.[14,15] Gingivitis and periodontitis observed in pregnancy are also a result of decreased oral care in pregnant women.[16] In few pregnant women, a highly vascularized and pedunculated lesion known as pyogenic granuloma, granuloma gravidarum, or pregnancy epulis is seen which may be painful, bleed, or interfere with mastication.

Burning mouth syndrome is commonly encountered in pregnant women, the pathogenesis of which remains unknown. However, burning mouth could result due to a variety of factors like iron deficiency anemia or folic acid deficiency during pregnancy, or due to systemic diseases like gestational diabetes, or fungal infections like Candidiasis.[17]

Geographic tongue is characterized by an asymptomatic presentation of multiple variable sized, well-demarcated, erythematous areas usually surrounded by elevated, yellowish-white borders, which usually occur on the anterior two-third of dorsal tongue.[18] Hormonal changes and stress associated with pregnancy have been considered the primary cause of geographical tongue in pregnant women. Moreover, Ghalayani *et al*. reported that level of sex hormones was not the only etiologic factor of geographic tongue in pregnant women, but other factors such as genetic potential, human leukocyte antigen marker, and stress could aggravate the incidence of this lesion.[19]

Morning sickness, commonly experienced by pregnant females, results in increased gastric acid exposure in the oral cavity, which could result in enamel loss due to erosion.[20] In addition to this, factors like increased sugary dietary cravings and inability to maintain good oral health is evident during pregnancy. Furthermore, increased progesterone reduces the plasma bicarbonate levels, contributing to reduced pH, thus, increasing the risk of dental caries and *Candida* colonization.[4] It has been reported that the periodontal ligaments and alveolar bone supporting the teeth, may temporarily loosen during pregnancy, due to the effect of relaxin hormone, resulting in tooth mobility.[21] However, tooth loss is generally not encountered unless other complications are present.

Fissured tongue may be associated with nutritional deficiencies that are commonly present in early pregnancy.[22] These fissures serve as protective harbors of bacteria. Thus, there could be a possible association between bacterial increase during pregnancy and the incidence of fissured tongue.[8] Melanosis could be due to changes in hormonal levels during pregnancy.[23] The pathogenic mechanism of aphthous ulcers is unknown; however, immunologic factors or vitamin and mineral deficiencies may be involved.[24] Immunologic factors, altered salivary pH, and oral flora could be responsible for oral *Candida* infection in pregnant women.[4,25]

The prevalence of OML is a significant index for oral health evaluation in every population. Therefore, planning of healthcare for target groups such as pregnant women should include the oral health needs of this population. Moreover, due to a possible relationship between periodontal diseases and individual health, and a possible correlation between oral health of the mother and child, comprehensive medical care for pregnant women should also include regular dental visits. In addition, pregnant women must also be educated about the importance of oral hygiene, and should be advised to closely observe their oral health during pregnancy.

Conclusion

Maintaining good oral hygiene before and during pregnancy is crucial for ensuring oral health. This study highlighted the poor oral health status and increased prevalence of OML among pregnant women in Patna, Bihar. Attempts should be made to facilitate improvement in oral health and quality of life of these women through assessment, education, and proper treatment planning.

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