

Prevalence of Oral Lesions and Measurement of Salivary p^H in the Different Trimesters of Pregnancy

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Abstract

Introduction: Pregnancy is the physiological condition, in which hormonal changes will predispose for salivary changes and many oral problems such as gingival, periodontal problems, mucosal ulcers, increased melanin pigmentation, and fissured tongue.

Aims and Objectives: To assess the prevalence of oral lesions correlating with the measurement of salivary p^H during different trimesters of pregnancy.

Methods: Screening was done in the Obstetrics and Gynecology Department of K.A.P.V Medical College and Hospital, Trichy. Screening comprised 40 patients in each trimester and 40 in the control group. The p^H of each sample was determined using digital p^H meter.

Results: All parameters assessing the dental health progressively increased from the control group through the 1st and 2nd trimester groups to the 3rd trimester groups, but mean salivary p^H progressively decreased from the control group through the 3rd and 2nd trimester groups to the 1st trimester groups.

Conclusion: Salivary p^H plays a major role in the occurrence of oral lesions during different trimesters of pregnancy. This study reinforces the need for specific oral hygiene (OHI) practices and the need for educating the pregnant patients for the improvement of OHI.

Key words: 1st, 2nd, and 3rd Trimesters, Mucosal lesions, Oral hygiene status, Salivary p^H

INTRODUCTION

Pregnancy is the physiological condition, in which hormonal changes will predispose for salivary changes and many oral problems such as gingival, periodontal problems, mucosal ulcers, increased melanin pigmentation, and fissured tongue.

Many studies have been conducted so far based on the occurrence of oral lesions and the correlation to the dental health status in pregnant women.¹⁻⁵ However, there is a

scarcity in studies correlating dental status within different trimesters of pregnancy. Therefore, this study was undertaken to assess the prevalence of oral lesions and measurement of salivary p^H in different trimesters of pregnancy and to correlate the changes in oral cavity during different trimesters of pregnancy such as dental caries, gingival, and periodontal inflammation with changes in salivary p^H.

METHODS

The study group comprised a total of 160 members comprising 40 patients in each trimester ranging from 18-35 years old pregnant women who attended the Obstetrics and Gynecology Department of K.A.P.V Medical Hospital, Trichy, Tamil Nadu. The patients were grouped as below:
Group I - 1st trimester
Group II - 2nd trimester
Group III - 3rd trimester.

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The control group (Group IV) comprised 40 nonpregnant women in the same age group. Saliva samples were collected from each patient at least after 1 h after breakfast, which would yield unstimulated saliva. They were instructed to allow saliva to flow into the test tubes provided. In all, 8-10 ml of sample was collected for each participant. The p^H of each sample was determined within first half an hour after collection using digital p^H meter. The data were systematically tabulated and subjected to statistical analysis (Table 1). Statistical correlation among all parameters within the 1st, 2nd, and 3rd trimester group and control group was determined using Pearson's coefficient correlation. Chi-square test was used to determine differences in the prevalence of oral mucosal lesions between 1st, 2nd, and 3rd trimester groups.

Intraoral examination was carried out to allow a thorough evaluation of individual tooth structures and soft tissues of lip buccal mucosa, palate, alveolar mucosa, and gingiva. The dental status was evaluated based on oral hygiene (OHI); gingival index; decayed, missing, and filled teeth (DMFT); and periodontal index.

OHI Index

The combined debris index and calculus index were recorded and included the examination of the tooth numbers are 11, 16, 26 (labial surfaces) and 31, 46, 36 (lingual surfaces) were examined. It was examined by running the probe along the tooth surfaces. The soft tissue deposits and supragingival and the subgingival calculus were examined. The results were tabulated and mean values were calculated (Table 2).

16 (buccal surface)	11 (labial surface)	26 (buccal surface)
46 (lingual surface)	31 (labial surface)	36 (lingual surface)

OHI = Debris index + Calculus index (the total of U/L buccal scores + total of U/L lingual scores).

Gingival Index

The gingival bleeding was assessed by probing gently along the walls of soft tissue of gingival sulcus and looking for any changes in consistency of gingiva and the tendency for active bleeding. The grading was done as noted below:

- 0 - Normal
- 0.1-1 - Mild gingivitis, slight change in color
- 1.1-2 - Moderate gingivitis, glazing, redness, bleeding on probing
- 2.1-3 - Severe gingivitis, marked redness and hypertrophy, ulceration, spontaneous bleeding.

DMFT

In-field examination of individuals using probe and mouth mirror to count the decayed, missing (due to caries), and restored teeth and colored in the chart as below:

15	14	13	12	11	21	22	23	24	25
35	34	33	32	31	41	42	43	44	45

This index is represented using red, black, and green colors, in which red indicates missing teeth, black indicates decayed teeth, and green indicates filled teeth.

Periodontal Index

The gingival sulcus was probed with a WHO probe. The sulcus depth, presence of calculus, and bleeding were noted, and the results were recorded in community periodontal index of treatment needs index.

- 0 - No periodontal disease
- 1 - Bleeding on probing
- 2 - Calculus with plaque seen by probing
- 3 - Pathological pocket 4-5 mm
- 4 - Pathological pocket 6 mm or more than.

Mucosal Lesions

Mucosal lesions prevalent in pregnant women are gingivitis, fissured tongue, periapical abscess, pyogenic granuloma (pregnancy tumor), frictional keratosis, lichen planus, candidiasis, oral submucous fibrosis, leukoplakia, pemphigus vulgaris, etc.

The oral mucosal surfaces including gingiva, alveolar mucosa, buccal mucosa, vestibular mucosa, palate, and tongue mucosa were thoroughly examined for the presence of any of the above-mentioned lesions.

RESULTS

The results of the study were tabulated in Tables 1 and 2 and graphically represented in Figures 1-3.

Salivary p^H for each individual involved in the study was recorded using digital p^H meter. The results were collected, and mean value was calculated and tabulated (Table 1). The results show that the p^H recorded was lowest in the 1st trimester (5.5 - acidic) and gradually increased through the 2nd and 3rd trimester to attain a maximum of 6.5 in the 3rd trimester. However, this value was acidic when compared to the non-pregnant group who showed a basic p^H of 7.5.

Scores for all parameters assessing the dental health progressively increased from the control group through the 1st and 2nd trimester groups to the 3rd trimester groups, but mean salivary p^H progressively decreased from the control group through the 1st and 2nd trimester groups to the 3rd trimester groups.

Table 1: It represents the average mean value of salivary pH for both control group and study group

Group	Mean value salivary P ^H
Group I	5.5
Group II	6
Group III	6.5
Group IV	7.5

Table 2: It represents average mean scores of OHI, gingival index, periodontal index

Group	OHI mean score	Gingival index mean score	Periodontal index mean score
Group I	1.3 (fair)	0.8 (mild gingivitis)	0.8 (simple gingivitis)
Group II	3.6 (poor)	1.8 (moderate gingivitis)	1.4 (beginning destructive periodontal diseases)
Group III	4.5 (poor)	1.9 (moderate gingivitis)	1.6 (beginning destructive periodontal diseases)
Group IV	1.2 (good)	0.6 (mild gingivitis)	0.4 (simple gingivitis)

OHI: Oral hygiene

Pearson’s correlation coefficient measuring the strength and the linear relationship between the dental health status and salivary p^H shows a strong positive relation between the worsening of the OHI, gingival, and periodontal status of patients and the decrease in salivary p^H.

Out of 120 pregnant women, 47 had mucosal lesions. No mucosal lesions were found in the remaining 73 pregnant women. Mucosal lesions were seen in 7 patients in 1st trimester, 20 patients in 2nd trimester, and 20 patients in 3rd trimester. No oral lesions were observed in control group. The occurrence of pregnancy tumor and periapical abscess was predominant in 3rd trimester group. The incidence of gingival inflammation occurred mostly in 2nd trimester and had an almost equal incidence in the 3rd trimester. The difference in the oral mucosal lesions’ prevalence between the 2nd and 3rd trimester was not comparable, as the prevalence of mucosal lesion was similar in these 2 groups. In the 3rd trimester group, fissured tongue occurred the most.

DISCUSSION

Pregnancy is the physiological condition, in which hormonal changes occur during different trimesters of pregnancy. These changes also have far-reaching systemic effects that extend beyond the reproductive system.¹

This study was designed to assess the occurrence of oral lesions and changes in salivary p^H in different trimesters of pregnancy. Some of the most frequent and important pathological conditions of the oral cavity are strongly dependent on salivary p^H changes.⁶ In spite of determining the changes in salivary p^H, the study also assessed the

Presence Of Oral changes during Pregnancy

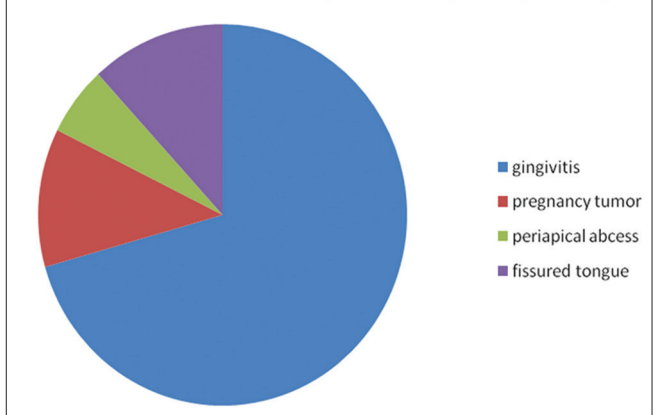


Figure 1: It represents the occurrences of oral lesions in the different trimesters during pregnancy

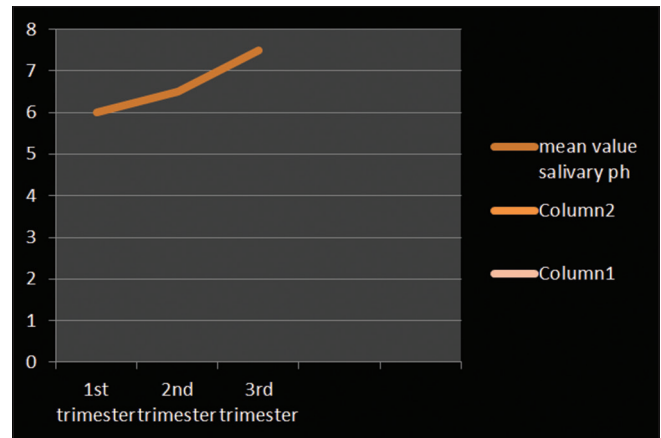


Figure 2: The mean value of salivary pH for different trimesters has been tabulated. This shows gradual increase in salivary pH from 1st to 3rd trimester

decayed tooth, inflammation of gingiva, periodontium, access, and fissured tongue. The participants’ age ranged from 18 to 35 years old.

Saliva maintains the p^H of the mouth. Saliva is supersaturated with various ions. These ions act as a buffer, keeping the acidity of the mouth within a certain range, typically pH 6.2-7.4. Decreased salivary p^H in pregnant women has been recorded since there is an increase in dental plaque, cariogenic microflora resulting in increased acid secretion.⁷ Dietary changes in early pregnancy, such as regular consumption of sugary snacks and drinks to satisfy cravings or to prevent nausea, may cause a decrease in salivary p^H. Decreased oral care in pregnant women leads to gingivitis and periodontitis. Buffering capacity of saliva mainly distributed by bicarbonates. Since the level of bicarbonate decreases, salivary p^H gets decreased during pregnancy. Regular episodes of vomiting induce cariogenic bacteria; thus, there is a decrease in salivary p^H.⁸

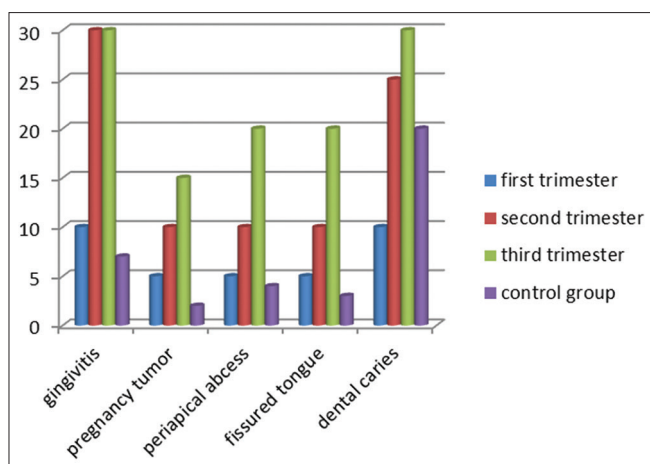


Figure 3: Comparison between control group and study group based on the occurrence of oral mucosal lesions

OHI status progressively decreased from 1st to 3rd trimesters due to a decrease in OHI practice. Similar results are given by Jain and Kaur in their study in the year 2015 who suggested that OHI in pregnant women was found to deteriorate progressively and gradually from 1st to 2nd to 3rd trimester groups.^{2,4,7}

Mucosal lesions are benign lesions, not premalignant. In our study, oral mucosal lesions were seen predominantly in pregnant women during 2nd and 3rd trimester groups when compared to the non-pregnant women (Figure 3).⁹

Gingivitis is an inflammation of gums, usually caused by bacterial infection. If left unchecked it leads to periodontal inflammation and results in separation of tooth from gingiva. According to our study, incidence of gingival inflammation occurred mostly in 2nd trimester and had an almost equal incidence in the 3rd trimester. The difference in the gingival inflammation prevalence between the 2nd and 3rd trimester was not comparable, as the prevalence of gingival inflammation was similar in these two groups. However, Lapp *et al.* in his study proved that increased incidence of gingivitis was identical in all the sample groups which is associated with local irritants such as dental plaque.¹⁰ The possible factors are (a) local irritants such as dental plaque, (b) effects of hormones on gingival vasculature, (c) subgingival microbiota, and (d) local immune system during pregnancy.¹¹ Another contrary study given by Vittek *et al.* found that significantly higher mean gingival score predominantly seen in women in 3rd trimester group.¹²

Fissured tongue is a deep, prominent groove in the middle. There may also be small furrows or fissures across the surface, causing the tongue to have a wrinkled appearance. In our study, fissured tongue occurred mostly in 3rd trimester group during pregnancy. Our study also correlated with that of Díaz-Guzmán and Castellanos-

Suárez¹³ who made to contrast the prevalence and severity of periodontal disease, the needs for periodontal treatment, and the prevalence of lesion of oral mucosa in pregnant and non-pregnant women and concluded that leukoedema, traumatic ulcerations, fissured tongue, irritative keratosis, and pregnancy tumor were predominant in pregnant women.

Periapical abscess is a collection of pus, usually caused by an infection that has spread from a tooth to the surrounding tissues. In our study, periapical abscess was predominately seen in 3rd trimester group. Pregnancy tumor is one of the inflammatory hyperplasias is seen in oral cavity. In our study, pregnancy tumor was predominant during 3rd trimester in pregnancy. Nevertheless, in the study by Sarifakioglu,⁹ there are no reported cases of pregnancy tumor. Lichen planus is a common inflammatory disease involving skin and mucous membranes. It is a chronic recurrent rash of unknown cause that is due to inflammation of skin and mucous membranes. Oral thrush is mainly due to the fungus *Candida albicans* which accumulates in mouth. Leukoplakia is a predominantly white lesion of oral mucosa which cannot be characterized as any other definable lesion.

Higher incidence of caries in pregnant women was seen than in non-pregnant women. This could be due to increased levels of *Streptococcus* and *Lactobacillus* are found in 3rd trimester.¹⁴ Since decrease in OHI practice during pregnancy was observed, there is decrease in salivary P^H which results in increase in occurrence of dental caries.¹⁴ Decreased OHI practice during pregnancy leads to poor periodontal status because of bacterial accumulation. In other study, Lenander-Lumikari and Loimaranta concluded that decreased concentration of salivary buffer (carbonic anhydrase enzyme) has been seen to lead to increase in the prevalence of dental caries.¹⁵ Similarly, a higher incidence of caries in pregnant women than in non-pregnant women has been seen in different studies.^{3,4}

CONCLUSION

The present study was undertaken to determine the changes occurring in oral cavity during different trimesters of pregnancy. The study correlated the changes against non-pregnant women. It can be concluded that salivary p^H decreased in 1st trimester and the acidity of saliva progressively reduced through the 2nd and 3rd trimester. Furthermore, changes were noted in the OHI, alterations in oral structures of gingival and periodontium throughout pregnancy. Mucosal lesions such as fissured tongue and pregnancy tumor were more prevalent in 3rd trimester of pregnancy. A further correlation can be attained between the prevalence of oral lesions and alterations in salivary p^H.

This study reinforces the need for specific OHI practices and the need for educating the pregnant patients for the improvement of OHI.

REFERENCES

1. Annan B, Nuamah K. Oral pathologies seen in pregnant and non-pregnant women. *Ghana Med J* 2005;39:24-7.
2. Agbelusi GA, Akinwande JA, Shutti YO. Oral health status and treatment needs of pregnant women in Lagos State. *Niger Postgrad Med J* 2000;7:96-100.
3. Tonello AS, Zuchieri MA, Pardi V. Assessment of oral health status of pregnant women participating in a family health program in the city of Lucas do Rio Verde - MT - Brazil. *Braz J Oral Sci* 2007;6:1265-8.
4. Vasiliauskiene I. Oral health status of pregnant women. *Stomatologija* 2003;5:57-61.
5. Fehder WP. Nursing care & management of pathological oral conditions among women and children. *MCN Am J Matern Child Nurs* 2008;33:38-44.
6. Ericsson Y. Clinical investigations of the salivary buffering action. *Acta Odontol Scand* 1959;17:131-65.
7. Jain K, Kaur H. Prevalence of oral lesions and measurement of salivary pH in the different trimesters of pregnancy. *Singapore Med J* 2015;56:53-7.
8. Al-Nuaimy KM, Al-Doski FS. Pregnancy-related changes in oral health and human unstimulated whole saliva. *Al Rafidain Dent J* 2003;3:108-15.
9. Sarifakioglu E, Gunduz C, Gorpelioglu C. Oral mucosa manifestations in 100 pregnant versus non-pregnant patients: An epidemiological observational study. *Eur J Dermatol* 2006;16:674-6.
10. Lapp CA, Thomas ME, Lewis JB. Modulation by progesterone of interleukin-6 production by gingival fibroblasts. *J Periodontol* 1995;66:279-84.
11. Mealey BL, Moritz AJ. Hormonal influences: Effects of diabetes mellitus and endogenous female sex steroid hormones on the periodontium. *Periodontol* 2000 2003;32:59-81.
12. Vittek J, Munnangi PR, Gordon GG, Rappaport SC, Southren AL. Progesterone "receptors" in human gingiva. *IRSC Med Sci* 1982;10:381-4.
13. Díaz-Guzmán LM, Castellanos-Suárez JL. Lesions of the oral mucosa and periodontal disease behavior in pregnant patients. *Med Oral Patol Oral Cir Bucal* 2004;9:430-3, 434-7.
14. Pirie M, Cooke I, Linden G, Irwin C. Dental manifestations of pregnancy. *Obstet Gynaecol* 2007;9:216.
15. Lenander-Lumikari M, Loimaranta V. Saliva and dental caries. *Adv Dent Res* 2000;14:40-7.

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