



## EVALUATION OF PERIODONTAL PATHOGENS AMONG PREGNANT WOMEN IN TAMILNADU

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### ABSTRACT

**Aim:** To find out the prevalence of periodontitis among pregnant women in Tamil Nadu and evaluate the presence of both aerobic and anaerobic bacteria associated with periodontitis. **Introduction:** Periodontitis and pregnancy are closely associated. Different studies outside India and within India shows varied results. This study intends to correlate periodontitis and pregnancy involving the various changes occurring in the oral micro flora. **Materials and Methods:** A total of

180 subjects were taken for the current study. With the help of paper points subgingival plaque was taken from women at second trimester of pregnancy and at post partum stage.. The sample was processed for both aerobic and anaerobic bacteria. **Results:** From the results it can be seen that the percentage of women having periodontitis was high at second trimester. There was a slight decrease in the post partum stage. Apart from *E.coli*, other aerobic bacteria showed statistical significance. Among anaerobic bacteria there was a reduction in anaerobic flora from second trimester to post partum stage. *Stomatococcus*, *Peptococcus*, *Eubacterium*, *Aggregatibacter sp*, *Bacteroides*, *Prevotella sp*, *Fusobacterium*, *Treponema denticola* and *Tannerella forsythia* showed statistical significance. **Conclusion:** Till date in India, routine dental care is not recommended by gynecologists to the prospective mothers. Proper advice from gynecologists, in routine dental check up will eventually lead to reduction in uneventful childbirth due to lack of knowledge in oral health care.

**KEYWORDS:** Periodontal pathogens, Periodontitis and pregnancy, uneventful childbirth.

## INTRODUCTION

A popular old wives tale is “A tooth for every pregnancy.” Various studies have been done in different parts of the world to find out the association between periodontitis and outcomes of pregnancy.

Calcium is drawn in large amounts from the maternal bones and teeth to meet the foetal requirements. Though calcium is present in the teeth as stable crystalline form, it is mobilized easily to meet the demands of the foetus. There is exaggerated inflammatory response to local irritants due to change in hormones and blood circulation to the gums during pregnancy.<sup>[1]</sup>

The fiery red marginal gingiva and formation of interdental papillae is characteristic of inflamed gingiva. There is an increase in the depth of periodontal pocket. From the second month of pregnancy gingival changes can be noticed and increases till the eighth month of gestation. There is a reversal of gingivitis after childbirth, but need not return to a healthy condition. If pregnancy gingivitis is left untreated it may progress with lower severity.<sup>[2]</sup>

Studies have revealed that Periodontitis during pregnancy is related to Pre-term delivery i.e.37 weeks of gestation and lower birth weight of the baby. In a study conducted by Carrillo-de Albornoz et al. they found that in pregnant women there is a high microbial flora in the oral cavity when compared to post partum women. Gingival inflammation was found to be more severe in pregnant women with high periodontal pathogens. The study also shows that in the case of non-pregnant women there is no observable difference between the two checkups made at a 6 month interval. But in the case of pregnant women they showed significant difference during the first trimester.<sup>[3]</sup>

Evidences from other studies show that about 36 to 100% of pregnant women suffer from pregnancy related periodontitis. Gingival inflammation is initially caused by plaque and advanced by endogenous sex steroid hormones. Pregnancy gingivitis does not have much difference from other gingival inflammation, but only that there is no change in the plaque levels.<sup>[4]</sup>

There is an increase in the prevalence of anaerobic bacteria *Prevotella intermedia*, as they are able to substitute vitamin K and Hemin with progesterone and estrogen. A high level of the hormone progesterone during pregnancy increases the permeability and dilation of the capillary system, which in-turn increases the gingival exudates.<sup>[5]</sup>

At the time of pregnancy a pedunculated granulomatous growth can be seen. This is known as epulis. This growth is mainly seen on the anterior papillae of the maxillary region of the teeth. Even after surgical removal there is chance of recurrence.

Pregnancy granuloma or pregnancy tumour is also seen, in addition to generalized gingivitis. The tumor grows fast and reaches a maximum size of 2 cm. Post partum the tumor is removed surgically for complete recovery.<sup>[6]</sup>

### **Periodontitis**

‘Periodontitis’ is defined as an apical extension of the gingival inflammation involving the tissues supporting the tooth, including the periodontal ligament and the bone surrounding tooth. A periodontal pocket is being formed when there is a destruction of the fiber attachment. It has been observed that 1g of dental plaque contains more than  $10^{11}$  microorganisms.<sup>[7]</sup>

### **MATERIALS AND METHOD**

The study was conducted at SRM Dental College and SRM Multi Speciality Hospital, Ramapuram. 60 non pregnant women and 120 pregnant women were taken. The total sample size for this study was 180. Ethical clearance for this study was obtained from SRM University Ethical Committee. Consent was obtained from each subject.

#### **Specimen collection**

During each trimester, two sterile paper points (#40) were gently inserted into periodontal pockets for 30 seconds after removing the supra gingival plaque. Supra gingival plaque was removed with a sterile scaler and cotton pellets.

#### **Procedure adopted for aerobic and anaerobic cultivation**

One paper point was transferred to 1.0ml of Thioglycollate broth, dispersed by a vortex mixer for 30 seconds and diluted ten-fold. An aliquot of 0.1 ml was plated onto Blood agar plates supplemented with Haemin and Vitamin K. The inoculated plates are incubated at 37°C for six days, in an anaerobic culture jar using anaerobic Gaspak® (procured from Hi-media private laboratory, Mumbai).

The second paper point was transferred into Brain Heart Infusion (BHI) broth for aerobic cultivation. The BHI broth with the paper point was incubated at 37°C for 24 hrs. The broth

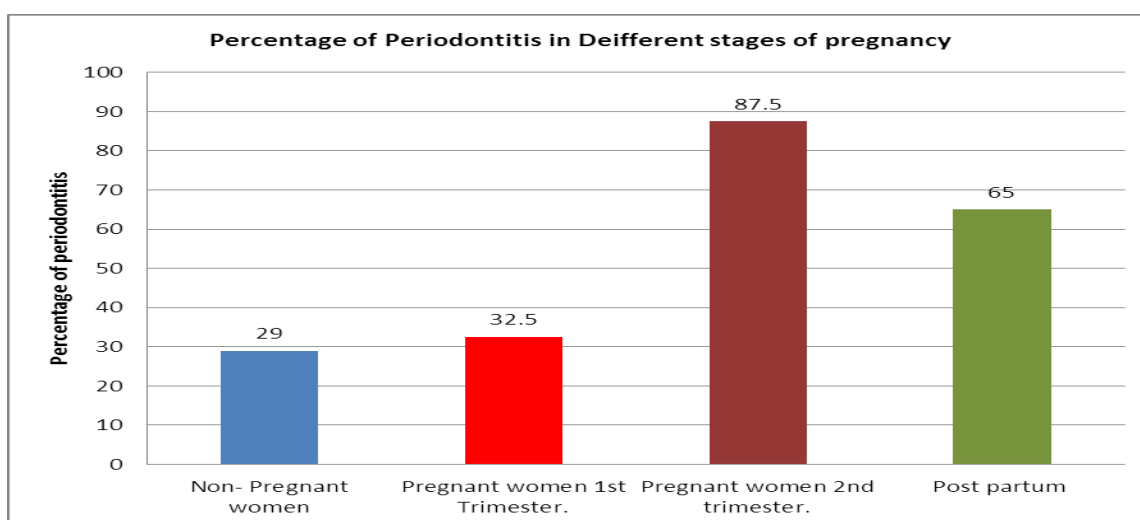
was sub cultured onto Blood Agar and Mac Conkey agar plates and incubated overnight at 37°C.<sup>[8]</sup>

### Identification of Bacterial Colony

The colonies were identified based on Colony morphology, Gram staining, biochemical tests, and enzymatic tests.

### RESULTS

The results of this study showed that there was an increase in the inflammation of gingiva and periodontal pocket from 1st Trimester as she reaches into the second trimester. There was a gradual decrease in the gingivitis among post-partum women. Periodontitis was present among 87.5% of pregnant women at second trimester. A gradual reduction of periodontitis was seen among post partum women.



**Fig: 1 Comparison of percentage of Periodontitis among various stages among pregnant women.**

### Frequency of periodontitis among pregnant women

In a comparative analysis of periodontitis among various stages in pregnancy shows that the frequency of periodontitis is high among pregnant women in second trimester. During first trimester it can be noted that 30 out of 120 subjects had periodontitis. In second trimester there was an increase in the frequency of subjects with periodontitis to 105 out of 120. However during post partum stage, a decrease can be noted.

**Table 1: Frequency of periodontitis among pregnant women**

Stage of pregnancy	Non pregnant n= 60 n (%)	1 <sup>st</sup> Trimester n= 120 n(%)	2 <sup>nd</sup> trimester n= 120 n (%)	Post partum n=120 n (%)	Chi square
Periodontitis	16 (26.6)	30 (32.5)	105 (87.5)	78 (65)	100.3846 <i>p value</i> 0.0001*
Non periodontitis	44(73.3)	90 (75)	15/(12.5)	42 (35)	

**Table 2: Incidence of uneventful child birth, in pregnant women with periodontitis**

	Pre term birth (7-8month gestation) n(%)	Low Birth weight (Below 2kg at the time of birth) n(%)	Birth weight (2kg-2.5kg at time of birth) n(%)	Normal Delivery n(%)
With Periodontitis n= 105	21 (20)	17 (16)	45 (42.8)	22 (20.9)
Without Periodontitis n=15	2 (13.33)	Nil	4 (26.6)	9 (60)

In mothers who had periodontitis at the time of delivery, 20.9%(22 out of 105) had normal delivery. 20% (21 out of 105) had preterm birth. 16%(17 out of 105) babies weighed below 2 kg and 42.8%(45 out of 105) of the babies weighed between 2kg to 2.5kg.

**Table 3: Aerobic bacteria in Pregnant women at pregnancy and at post partum stage. (n=120)**

Organisms Isolated	Frequency of aerobic bacteria at 2 <sup>nd</sup> Trimester	Frequency of aerobic bacteria at post partum stage	Chi square	<i>p value</i>
<b>Gram Positive Cocci</b>				
<i>Staphylococcus sp.</i>	43	14	19.35	0*
<i>Staphylococcus aureus</i>	37	36	0.8884	0.197*
<i>Streptococcus mutans</i>	54	78	9.67	0.001*
<i>Streptococcus sp.</i>	71	53	5.406	0.020*
<i>Enterococcus sp.</i>	23	39	5.672	0.018*
<b>Gram Positive Bacilli</b>				
<i>Lactobacilli sp.</i>	54	102	42.197	0.0*
<i>Corynebacterium sp.</i>	41	66	10.540	0.001*
<b>Gram Negative Cocci</b>				
<i>Neisseria catrhallis</i>	29	48	6.903	0.008*
<b>Gram Negative Bacilli</b>				
<i>Escherichia coli</i>	26	32	0.818	0.365
<i>Haemophillus sp.</i>	07	18	5.402	0.020*

There is statistical significance in all the aerobic bacteria that were looked for among pregnant women during second trimester and in post partum stage, except *E.coli*. The most predominant bacteria during post partum stage was found to be *Lactobacilli spp.* and during second trimester it was *Streptococcus spp.*

**Table 4: Anaerobic bacteria in Pregnant women at pregnancy and at post partum stage.(n=120)**

	Frequency of anaerobic bacteria at 2 <sup>nd</sup> Trimester	Frequency of anaerobic bacteria at post partum stage	Chi square	p value
<b>Gram Positive Cocci</b>				
<i>Stomatococcus</i>	35	12	13.99	0.003
<i>Gemella sp.</i>	1	0	1.0042	0.3163
<i>Peptostreptococcus sp.</i>	87	81	0.7143	0.398
<i>Peptococcus sp.</i>	54	73	6.037	0.014*
<b>Gram Positive Bacilli</b>				
<i>Bifidobacterium</i>	2	0	2.0168	0.155
<i>Eubacterium</i>	54	29	11.804	0.0005**
<i>Propionibacterium</i>	10	12	0.2002	0.6545
<i>Aggregatibacter sp.</i>	63	42	7.466	0.006*
<i>Actinomyces</i>	26	35	1.7804	0.182
<b>Gram Negative Cocci</b>				
<i>Vellionella sp.</i>	82	72	1.812	0.178
<b>Gram Negative Bacilli</b>				
<i>Bacteroides</i>	65	42	12.178	0.004*
<i>Prevotella sp.</i>	67	48	6.0271	0.0140*
<i>Porphyromonas sp.</i>	34	27	1.077	0.299
<i>Fusobacterium</i>	53	39	3.4548	0.063*
<i>Treponema denticola</i>	32	11	12.494	0.004**
<i>Tannerella forsythia</i>	76	32	32.592	0**
<i>Capnocytophaga sp.</i>	42	31	2.38	0.122

Among anaerobic bacteria there was a reduction in anaerobic flora from second trimester to post partum stage. *Stomatococcus*, *Peptococcus*, *Eubacterium*, *Aggregatibacter sp.*, *Bacteroides*, *Prevotella sp.*, *Fusobacterium*, *Treponema denticola* and *Tannerella forsythia* showed statistical significance.

According to the current study it can be found that there is an increase in periodontitis in the second trimester when compared with First trimester and post partum stage. Non pregnant women had a lesser prevalence of periodontitis when compared with the Pregnant counterparts. This is in correlation with the results obtained from the current study. Jensen et al had

suggested a similar result. His opinion was that during pregnancy, the systemic levels of sex hormones showed an increase which can be correlated to the increase of some gram negative anaerobes in the oral cavity.<sup>[9]</sup>

Gursoy's study shows that the presence of *Prevotella intermedia* increased twice in the second trimester. He also noted there was no change in the oral microflora of the non pregnant women. This shows resemblance with the current study as it shows low prevalence of periodontitis among the non pregnant group.<sup>[10]</sup>

## CONCLUSIONS

From this study it can be concluded that there is an increase in periodontitis with advancing pregnancy. In certain subjects a decrease in the inflammation of gingiva is seen following delivery. Till date in India, routine dental care is not recommended by gynecologists to the prospective mothers. Proper advice from gynecologists, in routine dental check up will lead to reduction in uneventful childbirth due to the lack of knowledge on oral health.

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