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TO STUDY THE RELATIONSHIP BETWEEN PREGNANCY, GINGIVITIS, DENTAL CARIES AND PERIODONTAL DISEASE

Bhavana Gupta¹, Attiuddin Siddiqui²

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STRUCTURED ABSTRACT: The pregnancy is associated with profound dental biological processes as a result of hormonal interactions within the mother's body, which result in both reversible and irreversible dental changes. The periodontal disease is associated with adverse pregnancy outcome. Increased public awareness, health education and medical intervention can improve the maternal and fetal outcome. The cohort study was carried out in the department of obstetrics and gynecology at Integral institute of medical sciences and research, Lucknow from January 2012 to February 2014, for the period of 2 year. The objective was to study the relationship between pregnancy, gingivitis, dental caries and periodontal disease. **METHODS:** The cohort study was carried out in the department of obstetrics and gynecology at Integral institute of medical sciences and research, Lucknow from January 2012 to February 2014, for the period of 2 year. The dental health status of 1200 antenatal cases were studied. The prevalence of gingivitis, dental caries and periodontal disease and the relationship with pregnancy was studied. **RESULT:** The oral hygiene was a significant determining factor in the disease process. The antenatal cases with poor oral hygiene were 2.5 times more likely to have dental caries. OR 0.0138, 95% CI (0.0033 to 0.0570) Z statistic 5.908, $P < 0.0001$. The antenatal cases with poor oral hygiene were 20 times more likely to have gingivitis. OR 0.0045, 95% CI (0.0006-0.0365) Z statistic 5.077, $P < 0.0001$. In the study the prevalence of dental caries, gingivitis and periodontal disease were 90%, 98% and 90.33% respectively. The oral disease process was characteristically noticed in the second trimester and/or pre-existing disease got aggravated in the second trimester.

KEYWORDS: Pregnancy, periodontal disease, dental caries, gingivitis.

INTRODUCTION: The gingivitis associated with pregnancy has been attributed to increased concentration of estrogen and/or progesterone. The female steroid hormones not only enhance the expression of angiogenic factors in inflamed tissue, but also decrease apoptosis of granuloma cells to extend angiogenic effect. The bacteria, *Fusobacterium nucleatum*, have been linked with adverse pregnancy outcome. The chemical mediator, principally CRP, might be plausible mediator of adverse pregnancy outcome like preterm delivery, preeclampsia, and intrauterine growth restriction. The oral hygiene and periodontal intervention results in a significant decrease in preterm delivery and improves pregnancy outcome.

MATERIAL AND METHOD: The cohort study was carried out in the department of obstetrics and gynecology at Integral institute of medical sciences, Lucknow from January 2012 to February 2014 for a period of 2 year. The institution provides service to the rural population of central Uttar Pradesh. The antenatal cases in the first trimester attending the OPD were registered in the study after informed consent. The detailed history regarding age, parity, socioeconomic status, education,

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religion, obstetric history was taken. A detailed history of addiction to tobacco/pan was taken. The hygiene of the case was assessed by the brushing habits and the use of tooth paste. The sample was grouped into symptomatic and asymptomatic groups. All the cases were subjected to routine dental examination on OPD basis. The WHO criteria, 'newly developed cavity (dental caries) and gingival bleeding on probing (gingivitis)', were taken into consideration. The oral hygiene was assessed by examination and questionnaire.

The two components the debris/plaque (DI) and the calculus (CI) were used to calculate the oral hygiene index (OHI-S index=DI+CI). The OHI-S index <1 was considered good and OHI-S index ≥ 1 was considered poor. The questionnaire pertaining to dental health care included the knowledge, attitude and behavioral habits. The cases were further categorized depending on the oral disease into cases treated conservatively medicine like paracetamol, amoxicillin and oral hygiene, and cases treated by procedure such as scaling, in second trimester and the untreated group.

The prevalence of gingivitis, dental caries and periodontitis in pregnant women were studied. The cases were subsequently followed up in each trimester, and the prognosis and response to dental education, counseling, hygiene and treatment was evaluated and change in the attitude and behavior was analyzed. The odds ratio (OR) and 95% confidence interval (CI) of risk factors for dental caries and gingivitis was calculated. A p-value of <0.05 was considered statistically significant.

RESULT: In the present study, a total of 1200 antenatal cases were studied for a period of 2 year. The subjects were registered in the first trimester. The detailed history and the dental health of cases were elicited by using a proforma. The cases were classified into symptomatic and asymptomatic cases. 8.6% of cases was symptomatic and 13.3% of cases were asymptomatic. The commonest symptom was bleeding from gums on brushing (84% of cases). Other symptoms were pain, loose tooth and sensitivity and bad breath.

The above symptoms were remarkably noticed in the beginning of second trimester in 86% of cases and in 14% of case symptoms were preexisting and/or got aggravated in the second trimester. 1176 cases had gingivitis, 1080 had dental caries and 1084 cases had periodontal disease.

The prevalence of dental caries, gingivitis and periodontal disease were calculated as 90%, 98% and 90.33% respectively. Among the cases with periodontal disease bleeding on probing was the commonest finding (62.5%), supragingival and subgingival calculus (22.6%), and pockets (14.9%). 68.60% of cases were given oral hygiene instruction only (twice daily brushing with fluoride paste). 18.97% of cases were given oral amoxicillin, paracetamol and advice regarding oral hygiene. 12.43% of cases required scaling, plaque removal, oral antibiotic and oral hygiene. All the procedures were timed in the second trimester.

The cases were subsequently followed up in second and third trimester. The OHI-S index showed perfect oral hygiene in 0%, good oral hygiene in 15.24%, satisfactory hygiene in 56.64% and bad oral hygiene in 28.12% of cases. The OHI-S index <1 was considered good and ≥ 1 was considered bad. Lack of knowledge, hygiene and illiteracy/low education status was significant predictor of dental caries and gingivitis.

Those cases with poor oral hygiene were 20times more likely to have gingivitis than those practicing good hygiene. Odds ratio 0.0045, 95% CI (0.0006-0.0365) Z statistic 5.077, p-value <0.0001. The pregnant women with poor dental care were 2.5 times more at risk of caries than those practicing good dental care. Odds ratio 0.0138, 95% CI (0.0033-0.570), Z statistic 5.908, p value <0.0001.

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DISCUSSION: The sex hormones contribute to the vascular changes in the gingival during pregnancy and are capable of altering the normal subgingival flora and the immune response in the oral cavity, resulting in intense and frequent gingivitis in pregnant women. Four oral diseases have been described as affecting pregnant women to a greater degree than their non-pregnant counterparts: gingivitis, pregnancy granuloma, periodontitis and dental caries.^{1,2,3} The dental changes were remarkably noticed in the second trimester and got aggravated in eight month. Some recent studies have shown the prevalence of gingivitis 86.2-98.8%. The prevalence of dental caries 74%.

The frequency of pyogenic granuloma varies from 0-9.6%.⁴ In our study, we found the prevalence of dental caries, gingivitis and periodontal disease were 90%, 98% and 90.33% respectively. Studies have shown a higher prevalence of gingivitis and dental caries among pregnant women with poor oral hygiene and low education status.⁵ In our study, the cases with poor oral hygiene were 2.5 times more likely to have dental caries and 20 times more likely to have gingivitis. Maternal infection with periodontal pathogens has a deleterious effect on fetal growth and viability.⁵

The periodontal disease has been associated with increased risk of preterm birth, low birth weight, preeclampsia and intrauterine growth retardation.

The periodontal disease represents an infectious disease affecting more than 23% of women between the age group 30-54 years. The pregnant women with periodontal disease are upto 7.5 times more likely to have a pregnancy complication.⁶ Pregnant women should be considered as a prime target group for oral health education. It is strongly recommended that dental examination by a dentist/trained medical staff of all the antenatal cases should be mandatory in outpatient department of maternity hospital.

Education of the patient and health care providers regarding the biological plausibility of association and the potential risks is indicated as adverse pregnancy outcome still present a major health problem worldwide. Nonetheless, it is the responsibility of the dentist and the medical professional to inform patients about the biological plausibility that untreated periodontal disease may increase the risk not only of unfavorable pregnancy outcome, but also may affect the wellbeing of the offspring.^{7, 8} A dental examination and appropriate dental care should become integral to routine management of every pregnant woman and that of medical curriculum.

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| Dental disease | Pregnant women Number (total cases 1200) | Percentage % |
|-------------------|---|-----------------|
| Caries | | |
| yes | 1080 | 90% |
| no | 120 | 10% |
| Gingivitis | | |
| Yes | 1176 | 98% |
| no | 24 | 2% |

TABLE 1

| Oral hygiene status | Caries | | No Caries | |
|------------------------|--------|-------|-----------|-------|
| | Number | % | Number | % |
| Good | 316 | 28.5% | 116 | 96.7% |
| Poor | 772 | 71.5% | 4 | 3.3% |

TABLE 2: ASSOCIATION OF DENTAL CARIES AND ORAL HYGIENE STATUS IN PREGNANT WOMEN

OR=0.0138, 95%CI (0.0033-0.0570) Z statistic 5.908, p-value <0.0001

| Oral hygiene status | Gingivitis | | No gingivitis | |
|------------------------|------------|-------|---------------|--------|
| | Number | % | Number | % |
| Good | 56 | 4.8% | 22 | 91.67% |
| Poor | 1020 | 92.2% | 2 | 0.83% |

TABLE 3: ASSOCIATION OF GINGIVITIS AND ORAL HYGIENE STATUS IN PREGNANT WOMEN

OR=0.0045, 95% CI (0.0006-0.0365) Z-statistics 5.077, p-value <0.0001

AUTHORS:

1. Bhavana Gupta
2. Attiuddin Siddiqui

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Obstetrics and Gynaecology, Integral Institute of Medical Sciences and Research. Lucknow.
2. Senior Resident, Department of Dentistry, Integral Institute of Medical Science and Research. Lucknow.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Bhavana Gupta,
8/341, Vikas Nagar,
Lucknow.
E-mail: bhavana_yajat@yahoo.com

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