

**Oral Immune Factors and Salivary
Constituents in Relation to Oral Health
Status among Pregnant Women**

**A thesis
Submitted to the
College of Dentistry, University of Baghdad
in Partial Fulfillment of the Requirements
for the Degree of Philosophy in Dental Science
Preventive Dentistry/ Cariology**

**By
Wassan Hassan Ai-Zaidi
B.D.S., M.Sc.**

Supervised by

**Prof. Dr. Sulafa K. El-Sammarrai Prof. Dr. Abdul Wahab Hamad
Preventive Dentistry Biochemistry**

Baghdad –Iraq

2007

Abstract

The physiological and hormonal changes in pregnancy may affect dental and gingival health conditions. The aims of this study were to investigate the severity of both dental caries and periodontal diseases among pregnant women in relation to different salivary variables and constituents. The study group consisted of 60 pregnant women divided into three equal groups according to trimester and 20 control unmarried women with a mean age of 22.88 ± 1.41 years. Dental caries was recorded by lesion severity by application of D₁₋₄MFS index, while oral and periodontal health status were recorded by application of plaque index (PII), gingival index (GI), periodontal pocket depth (PPD) and clinical attachment level (CAL).

Stimulated salivary samples were collected and the following variables were recorded; flow rate, pH and buffer capacity. Salivary samples were chemically analyzed for detection of electrolytes (Ca, PO₄, Mg, Zn and HCO₃) and hormones (estradiol and progesterone). Immunoglobulins (IgA and IgG) were also detected in addition to interleukin 6 (IL-6). IgA and IL-6 in addition to tumor necrosis factor alpha (TNF- α), these were also estimated in serum samples taken from all the participants.

Results showed a higher caries experience among pregnant group (14.4 ± 7.71) compared to control group 12.20 ± 4.65 with no statistically significant differences and all subjects were caries active. For both groups the initial decayed surfaces (D₂) showed the highest value while deep frank cavitation was the lowest (D₄). An increase in initial caries lesion values (D₁) was recorded among study group with the progress of pregnancy.

Regarding dental plaque index a higher mean value was recorded in pregnant women 0.85 ± 0.39 , compared to control group 0.50 ± 0.55 with significant differences. Gingival index showed the highest level during second and first trimesters 1.09 ± 0.54 , 1.08 ± 0.39 compared to lowest in third and control groups 0.90 ± 0.53 , 0.44 ± 0.55 respectively, with highly significant differences between study and control groups. Calculus index was also higher among pregnant women especially during the second trimester 0.22 ± 0.19 with significant difference. The percentage of probing pocket depth was higher among pregnant group especially in the second trimester 33%, compared to control group 5% with significant difference, in addition the percentage of clinical attachment loss of more than 2mm was also higher among pregnant group 20.6% with significant differences between study and control groups.

Significant positive correlations were noticed between dental plaque and different indices (caries fraction, calculus index and gingival index).

Buffer capacity revealed a higher value among control group 6.62 ± 0.34 compared to lower value during second trimester 5.75 ± 0.64 with significant difference between study and control groups. Salivary buffer showed a negative correlation on caries experience and severity in all groups. While no significant differences were noticed regarding salivary pH and flow rate.

Salivary calcium was higher among control group 11.61 ± 2.46 mg/dl compared to 9.28 ± 2.23 mg/dl during pregnancy with significant differences between examined groups. On the contrary bicarbonate was higher among pregnant group 13.34 ± 2.01 mmol/L, compared to 12.53 ± 1.60 mmol/L in control group; differences were significant between the examined groups. In general calcium, zinc and bicarbonate ions were negatively correlated to caries experience and oral health variables.

Salivary progesterone was higher in pregnant women especially during third trimester 4.867 ± 4.34 ng/ml compared to control group 2.68 ± 2.19 ng/ml with statistically significant difference. Regarding estradiol the highest concentration was noticed among women of third trimester 266.8 ± 144.0 pg/ml where the lowest value was among the control group 12.58 ± 7.99 pg/ml with statistically highly significant differences.

Positive correlations were noticed between progesterone and caries experience, while estradiol revealed a negative correlations with caries severity. Different directions of correlation coefficient were recorded between sex hormones with plaque, calculus index and gingival index

Serum and salivary IL-6 displayed their lowest value among pregnant groups 109.91 ± 11.7 , 118.29 ± 11.28 than control group 112.37 ± 10.01 , 119.58 ± 18.82 pg/ml respectively, with no statistically significant differences between different groups. Similarly serum TNF- α showed a lower level during pregnancy compared to control group 38.93 ± 37.15 , 47.30 ± 37.14 pg/ml respectively with non significant difference. Only serum IgA showed significant differences with the higher concentration during pregnancy maximum level among third trimester group 367.6 ± 100 mg/dl compared to 229.5 ± 135.9 mg/dl in control group. Salivary IgA decreased from 81.54 ± 38.32 among control group to 67.10 ± 34.78 mg/L during pregnancy with no statistically significant difference between different groups. On the contrary IgG concentration increased from 10875 ± 3502 during control group to 12992 ± 3821 mg/L during pregnancy with no statistical differences. Similarly serum IgG revealed non significant differences.

Results showed that IL-6 was negatively correlated to caries experience, at the same time most correlation of TNF with caries experience and gingival inflammation were negative. Serum IgA showed negative correlations with different oral parameters while Serum IgG revealed the opposite.

Multiple linear regressions revealed that all salivary and serum factors had impact on DMFS by 30.4% and 31.6% with DS, while the impact on GI was about by 72.3%.

It is concluded that pregnant women do have dental and periodontal problems and may require preventive programs directed for improvement of oral health.