



Association between Maternal Periodontal Health Status and Health Status of New Borns

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Abstract

Aims: Mothers play primary role in the health of their children and the oral health of the mother is a crucial part of her general health and could have an effect on the baby's health. The study aimed to determine the relationship between maternal periodontal disease and the health status of newborns using Apgar scores in relation to maternal oral/periodontal parameters (loss of attachment, pocket depth, and bleeding on probing). **Materials and Methods:** The case group included 100 pregnant women with periodontal disease, while the control group included 100 pregnant women without periodontal disease. In both groups, periodontal parameters such as loss of attachment (LoA), pocket depth (PD), bleeding on probing (BoP), and Apgar scores were recorded. Mann-Whitney Test and Spearman's correlation coefficient were used to investigate the relationship between periodontal parameters LoA, PD, and BoP on one hand and Apgar score on the other. **Results:** No significant associations between Apgar scores and maternal periodontal index scores were discovered. **Conclusions:** Within all limitations of this study, it was concluded that there was no direct relationship between maternal periodontal health and infant health status was found.

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الخلاصة

الأهداف: تلعب الأمهات دورًا أساسيًا في صحة أطفالهن، وتعد صحة فم الأم جزءًا مهمًا من الصحة العامة للجسم ويمكن أن يكون لها تأثير على صحة الطفل. اذن فالهدف من الدراسة هو تحديد العلاقة بين أمراض اللثة عند الأمهات والحالة الصحية للمواليد الجدد باستخدام مؤشر Apgar فيما يتعلق بالمعايير الفموية / اللثوية للأم (فقدان التعلق وعمق الجيب والنزيف عند الفحص). **المواد وطرائق العمل:** ضمت مجموعة الحالات 100 امرأة حامل مصابة بأمراض اللثة، بينما ضمت المجموعة الضابطة 100 امرأة حامل غير مصابة بأمراض اللثة. في كلتا المجموعتين، تم تسجيل المعاملات الداعمة للسن مثل فقدان الارتباط (LoA) وعمق الجيب (PD) والنزيف عند الفحص (BoP) ومؤشر (Apgar) للأطفال. تم استخدام اختبار Mann-Whitney Test ومعامل ارتباط Spearman للتحقق من العلاقة بين معلمات اللثة (PD, BoP, LoA) من ناحية ومؤشر (Apgar) من ناحية أخرى. **النتائج:** لم يتم اكتشاف ارتباطات ذات دلالة إحصائية بين مؤشر Apgar ودرجات مؤشر اللثة. **الاستنتاجات:** ضمن حدود هذه الدراسة تم استنتاج ان لا توجد علاقة مباشرة بين صحة اللثة الأم وحالة الطفل حديث الولادة الصحية.

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INTRODUCTION

During pregnancy changes in hormone levels promote an inflammatory response, increasing the risk of developing gingivitis and periodontitis, two types of periodontal disease involving the gingivae and alveolar bone, respectively ⁽¹⁾. The term "periodontal diseases" refers to a group of chronic inflammatory conditions affecting the gingiva (or gums, the soft tissue surrounding the teeth), bone, and ligament (the connective tissue collagen fibers that anchor a tooth to alveolar bone) that support the teeth ^(2,3). Many of the probable periodontal pathogens are Gram-negative bacteria, and it has been observed that systemic exposure to derived endotoxin increases the risk of premature birth in women with generalized periodontal infection ^(4,5). In 1952, Dr. Virginia Apgar, an anesthesiologist at Columbia University, developed the Apgar score. The score is a quick way to evaluate a newborn immediately after birth and to respond to revival. Apgar scoring is still an accepted evaluation method and is supported by both the American College of Obstetricians and the American Pediatrics Academy. While Apgar scores were originally established to identify the need for intervention to establish breathing at 1 minute, the Neonatal Resuscitation Program's guidelines declare that they do not determine the initial need for intervention because resuscitation must be started before the 1-minute Apgar score is assigned ⁽⁶⁾.

This study aims to determine the relationship between maternal periodontal disease and the health status of newborns using Apgar scores in relation to maternal oral/periodontal parameters (loss of attachment, pocket depth, and bleeding on probing).

MATERIALS AND METHODS

The study was approved by the Research Ethics Committee board (University of Mosul, College of Dentistry, REC reference No. UoM.Dent/H.4/21).

Sample Collection

The study sample consisted of young females their ages were between 18-35 years old. Two hundred pregnant females were included in the study, (one hundred) pregnant females with periodontal disease and (one hundred) pregnant females without periodontal disease. All the females had no history of medical or genetic problems.

Criteria for Selection of the Sample Inclusion and Exclusion Criteria were:

The Inclusion Criteria

1. Women between the ages of 18 and 35 who are pregnant.
2. There is no history of abortion.
3. One delivery's history.
4. Females agree to share in the study ⁽⁷⁾.

The Exclusion Criteria

1. A history of a medical condition.
2. Use of corticosteroids in the past.
3. Abortion's history.

4. The first pregnancy.
5. A history of giving birth to many children.
6. Consumption of alcoholic beverages or cigarette smoking.
7. Females refuse to share in the study ⁽⁸⁾.

Clinical Examination

Data were collected using a standardized specially designed case sheet that included maternal variables such as name, age, weight, height, body mass index before and during pregnancy, and educational level of the mother which was administered via a questionnaire by the investigator.

Clinical evaluations were carried out, and periodontal indices were recorded by using of Williams' probe Figure (1) which is 13 millimeters long and one-millimeter-wide, with demarcation lines at 1, 2, 3, 5, 7, 8, 9, and 10 millimeters ⁽⁹⁾. Oral examination was done at a chairside during the admittance to the hospital for delivery with adequate artificial light attached to the head of the investigator. Maternal oral health status was determined by measuring the clinical indices and periodontal condition only two surfaces which were the mesial and distal surfaces of the Ramfjord teeth (teeth that are regularly used in investigations) of the periodontal disease epidemiology ⁽¹⁰⁾ as seen in Figure (2).

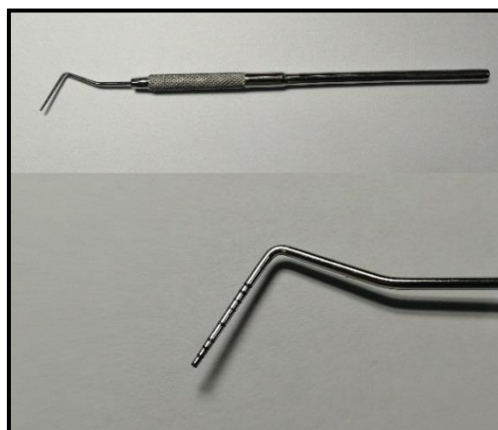


Figure (1): Michigan Williams Probe



Figure (2): (A) Measurement Loss of Attachment in Upper Right First Molar (B) Measure Loss of Attachment and Pocket Depth in Upper First Premolar.

If the Ramfjord index tooth was not present it was substituted with the adjacent distal tooth to the index tooth and to be included in the measurements of all the other parameters.

Clinically loss of attachment was measured from the cemento-enamel junction to the base of the pocket with the Williams Michigan probe and was scored as the following ⁽¹¹⁾:

1. Absent (<1 mm).
2. Mild (1–3 mm).
3. Moderate (>3– 6 mm).
4. Severe (>6 mm).

Pocket depth was measured in millimeters with a Williams Michigan periodontal probe which has special markings from the base of the pocket to the free gingival margin and was graded as according to the system adapted from Offenbacher ⁽⁵⁾ namely:

1. Absent (< 3 mm).
2. Mild (\geq 3–5 mm).
3. Moderate (> 5–7 mm).
4. Sever (> 7 mm).

The mean pocket depth was calculated by summing the measurements per tooth and dividing it by 2 (which is the number of the measurements per tooth) ⁽¹²⁾.

Bleeding on probing (BoP) was assessed and recorded after PD was measured, by the dichotomous index (presence or absence of bleeding).

For newborns, the total number of two hundred newborns were examined for the Apgar score at 1,5 and 10 minutes after

birth which done by the investigator and the supervision of the same gynecological permanent doctor and baby's vital signs were recorded.

RESULTS

We did Spearman correlation coefficient for both groups (cases and controls) and a false-positive relations began to appear in the control group due to the repeating the 0 and 1 numbers which lead to making fake relations between the variables in control group, so the control group results were not taken into consideration.

Table (1) shows that the mean scores \pm standard deviation of the three periodontal parameters (LoA, PD, and BoP) between the case and control groups by using the Mann-Whitney test. All the three parameters examined showed a highly statistical significant difference in the case group in comparison with the control group ($P \leq 0.01$). Table (2) depicts that the relationship between the LoA and Apgar score was an inverse and very weak relationship that demonstrate the more increase in LoA readings the less Apgar score readings were recorded but it's still not enough evidence to say that there was a relationship between them, while in the PD category the same type of weak inverse correlation was found but it's still wasn't a strong evidence of presence of any relationship between the PD and the Apgar score and in the BoP category also was

found that the weak inverse relation was appeared in the 1 minute and returned into

a weak positive but still not strong to say that the BoP could affect the Apgar score.

Table 1: Comparison Between Mean Values of Periodontal Parameters (LoA, PD, and BoP) Between the Two Groups.

Group	N	Mean ±Std. Deviation	Mann-Whitney Test Mean Rank	Test Value	P-value
Loss of Attachment					
Case	100	2.906 ±0.351	150.500	5050.000	0.000**
Control	100	1.689 ±0.196	50.500		
Pocket Depth					
Case	100	2.026 ±0.371	149.960	54.500	0.000**
Control	100	1.094 ±0.142	51.050		
Bleeding on Probing					
Case	100	0.779 ±0.166	146.850	365.500	0.000**
Control	100	0.233 ±0.232	54.160		

**Highly significant difference at $P \leq 0.01$.

Table 2: The Relationship Between Apgar Score and Mother's Periodontal Parameters for the Cases.

Apgar	LoA		PD		BoP	
	Correlation Coefficient	Sig.	Correlation Coefficient	Sig.	Correlation Coefficient	Sig.
1 min	-0.081	0.425	-0.127	0.209	-0.003	0.975
5 min	-0.066	0.513	-0.114	0.259	0.155	0.124
10 min	-0.086	0.395	-0.089	0.379	0.142	0.159

DISCUSSION

In the past few years, there was a great interest among scientific and academic community in understanding the relationship between periodontal diseases and pregnancy problematic outcomes and many studies have been done about this topic but the relation itself is still controversial.

According to many previous studies, the pathogens of periodontal disease and their virulence factors can disseminate and induce both local and general changes in

addition to systemic inflammatory responses in the host and the periodontal disease may have an impact on tissues other than periodontal tissues^(5,13).

The current study compared between case and control groups in many variables and according to our results, it was noticed that the mean loss of attachment, pocket depth, and bleeding on probing between case and control groups were all higher in cases than in controls and can be said that there was a highly significant difference between the two groups due to many

reasons like the lack of care about oral hygiene, neglecting daily brushing and little or no visits to dental clinic among cases females which is in agreement with the theory that said large proportion of pregnant women knowing of the importance of dental care during pregnancy did not receive care due to many possible causes ⁽¹⁴⁾.

The results of the current study confirmed there was no direct relationship between periodontal parameters and infant Apgar score which agrees with previous study ⁽⁸⁾ in which they found some type of difficulty of determining that if there was any relationship between periodontal parameters and Apgar score.

Periodontal pathogens can enter the placenta via the bloodstream, membranes, and amniotic fluid, resulting in many pregnancy outcomes but its effect on Apgar score itself is undetermined. As a result, the critical question of “if the permanent observation of pregnant females oral health can change the adverse problematic pregnancy outcomes??” should be kept into our minds, because some studies have shown an improvement in child’s health and an increase in Apgar value while others have not. Considering the findings of this study and other studies in this subject, it is suggested that prenatal health programs, mothers should be encouraged to receive dental treatments, including periodontal treatment, before deciding to have children.

CONCLUSION

Based on the findings of this study and within the all clinical limitations of the current study like limited sample size and difficulty in recruitment of the pregnant females to participate in the current study; all pieces of evidence agree with that there was no strong, direct relationship between maternal periodontal parameters (LoA, PD, and BoP) and infant Apgar score.

Declaration of interest

The authors declare that there are no conflicts of interest regarding the publication of this manuscript

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