

Evaluation of oral health awareness in pregnant

pregnants

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Abstract

Background: This study aimed to evaluate the time-dependent effect of verbal and practical oral health education provided by dentists on 6- to 22-week-old pregnant women whose pregnancy is followed up by family physicians in health centers.

Methods: The study included fifty-four pregnant women participated. Oral hygiene education was given to the participants verbally and using a toothbrushing model. Periodontal indices such as the probing pocket depth (PPD), plaque index (PI) and gingival index (GI) were measured and recorded at the first and third month follow-up. The IBM SPSS v.26 statistical software was used for statistical analysis. All data were analyzed using the dependent t test.

Results: There was a statistically significant decrease in the PPD and PI parameters at the end of the one month ($p<0.05$). There was a decrease in the GI, yet it was not significant. At the end of the third month, there was a significant decrease in the PPD. There was a significant increase in the PI and GI ($p<0.05$).

Conclusion: Periodontal health status and oral hygiene habits should reach their optimum levels before pregnancy. In addition, follow-up appointments should be called during the whole pregnancy to ensure that oral hygiene habits are permanent.

Keywords: Oral and Dental Health Education, Preventive Dentistry, Pregnancy Education.

Cite this article as: Altıntepe Doğan S S, Karakan N C, Doğan Ö, Çelik İ H, Akgül E N. Evaluation of oral health awareness in pregnant. Arch Curr Med Res. 2024;5(1):7-11

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INTRODUCTION

The periodontium consists of the gingiva, cementum, periodontal ligament and alveolar bone surrounding and supporting teeth. The primary role of the periodontium is to provide functional requirements and maintain teeth in the mouth (1). The primary etiology of periodontal disease is microbial dental plaque. Systemic diseases and conditions that affect the body's response to plaque accumulation have also an impact on the progression of periodontal disease. Clinicians not only treat the periodontium with periodontal treatment but also control many systemic components caused by this disease. Although the leading cause of periodontal disease is microbial dental plaque, pregnancy is also a compelling factor in the etiology of periodontal disease (2).

The female body has developed an adaptation mechanism for all the changes from the first day of pregnancy to the moment of birth. Many hormonal and physiological changes are caused by the adaptations that pregnant woman develop to protect the fetus. However, these adaptive mechanisms sometimes cause complications (3).

Elevated progesterone levels up to 32 weeks of pregnancy trigger mucosal inflammation by decreasing the saliva flow rate and causing edema in the gums. Elevated estrogen levels cause gingival hyperplasia and inflammation. One of these negative changes is pregnancy gingivitis, which is commonly observed. Pregnancy gingivitis is observed in 30% to 100% of pregnancies and is characterized by erythema, edema, hyperplasia, and increased bleeding (2). Pregnancy gingivitis typically begins in the second month of pregnancy and reaches its peak in the eighth month. It resolves spontaneously after delivery (4).

Improving oral hygiene levels should be a priority for pregnancy-related oral complications. Oral hygiene education against gingivitis has been recommended for these patients. In severe cases, professional cleaning and chlorhexidine-containing mouthwashes should be used (5). The poor oral and dental health of the expectant mother during pregnancy adversely affects the duration and outcome of pregnancy, as well as the oral and dental health of the baby (6). Adverse pregnancy outcomes include preterm birth, low birth weight, miscarriage, and preeclampsia (7).

In light of this information, pregnant individuals should have sufficient knowledge about periodontal diseases

and the effects of these diseases on the general health and pregnancy processes. In this respect, it would be beneficial for pregnant individuals to be informed about the causes and prevention of periodontal diseases and how they may affect pregnancy. Verbal education methods are commonly used in the field of health. Healthcare professionals make suggestions to their patients verbally in most cases. The main advantage of the verbal method, used almost every day in all areas of health care, is that it is free of charge. However, there are concerns about the distraction of the listener and the permanence of the information provided by verbal methods (8).

There are a limited number of studies on the education of pregnant women in Turkey. A significant limitation is that only the current knowledge level of pregnant women was determined in most published studies. This study aimed to evaluate the time-dependent effect of verbal and practical oral health education provided by dentists on pregnant individuals with the help of clinical periodontal parameters. Adequate oral health knowledge among expectant mothers and women who have recently given birth can make positive contributions to oral health.

MATERIALS AND METHODS

This study was approved by the Ankara University Faculty of Dentistry Clinical Research Ethics Committee (Date and Number: 25.02.2019-36290600/10). The randomized cross-sectional clinical study group consisted of 54 pregnant women living in Afyonkarahisar Province between six and 22 weeks of pregnancy (Table 1). The reason for paying attention to pregnant individuals between six and 22 weeks of pregnancy was that pregnant women were followed up for three months during the study. The clinical follow-up of mothers who have given birth after delivery is difficult.

Table 1. Mean age and educational status percentages of pregnant women

Characteristics of patients		
Number of patients		54
Age		18-39 (27.51±5.29)
Education status	Primary school	16.66%
	Middle school	33.33%
	High school	29.62%
	University	20.37%

Between April 2019 and March 2020, individuals whose pregnancy follow-ups were performed by family physicians at the health center were referred to the Department of Periodontology for clinical control. After giving their informed consent, the pregnant women were provided with oral hygiene education verbally and using the toothbrushing model. The modified Bass tooth brushing technique, flossing, and the use of an interdental brush of appropriate size in the presence of diastema or interdental space were explained to the patients and these were used for three months.

The study excluded smokers, people with diabetes, patients receiving regular medical treatment, and patients with any systemic disease. Patients with fixed, removable or implant prostheses were also excluded from the study. The study included individuals with a maximum of three missing teeth in the mouth.

Clinical Periodontal Measurements

After education, the probing pocket depth (PPD), plaque index (PI) and gingival index (GI) were measured using a 0.5 mm diameter Williams probe at six sites [mesio-buccal, mid-buccal, disto-buccal, disto-lingual (or disto-palatinal), mid-lingual (or palatinal), or mesio-lingual (or mesio-palatinal)] of each tooth in the mouth. Measurements were taken at baseline at the beginning of the study and repeated after one and three months. The mean score of the collected data was calculated by dividing the sum of the values given to each tooth measured by the product of the number of teeth present and the number of tooth surfaces measured (Table 2).

Table 2. Comparison of the means and SDs of clinical parameters (PPD, PI, GI) according to time

		Mean	Standard deviation	Standard error of the mean	Sig.
PPD	Baseline	2.3176	0.47671	0.06487	<0.001*
	First month	1.7859	0.55129	0.07502	
	Baseline	2.3176	0.47671	0.06487	<0.001*
	Third month	2.2607	0.59035	0.08034	
PI	Baseline	1.2511	0.36801	0.05008	<0.001*
	First month	0.8489	0.44265	0.06024	
	Baseline	1.2511	0.36801	0.05008	<0.001*
	Third month	1.3207	0.46220	0.06290	
GI	Baseline	1.3335	0.24188	0.03292	0.309
	First month	0.9137	0.40737	0.05544	
	Baseline	1.3335	0.24188	0.03292	<0.001*
	Third month	1.3978	0.27025	0.03678	

*Paired sample t test; p<0.05 denotes a significant difference

PPD: probing pocket depth, PI: plaque index, GI: gingival index

Statistical Analysis

The Statistical Package for Social Science, IBM SPSS®, version 26, Chicago, USA (SPSS) software was used for statistical analysis to evaluate the results of the study. A p<0.05 was considered statistically significant. All data were analyzed using the dependent t test.

RESULTS

Although 96 pregnant women participated in the study, 54 (56.25%) pregnant women completed the study. The study was completed with 54 pregnant women aged 18-39 years with a mean and standard deviation (SD) of 27.51±5.29 years. There was no significant difference between the individuals in terms of the mean plaque index (PI), probing pocket depth (PPD) or gingival index (GI) at baseline (p<0.05). Sixteen percent of the pregnant women were primary school graduates, 33.33% were middle school graduates, 29.62% were high school graduates, and 20.37% were university graduates. (Table 1)

At the end of one month, there was a significant decrease in the probing pocket depth (PPD) and plaque index (PI) (p<0.05). While there was a decrease in the gingival index (GI), it was not significant. At the end of the third month, there was a significant decrease (p<0.05) in the PPD. There was a significant increase in the PI and GI (p<0.05). (Table 2)

DISCUSSION

The relationship between periodontal health status and pregnancy has been an important research topic since the 1960s (9). Gingival inflammation during pregnancy starts with dental plaque and becomes more severe with the addition of endogenous steroid hormones (10). Although the amount of plaque does not change during pregnancy, GI values peak in the third trimester and significantly decrease three months after delivery (11). Numerous studies have reported that periodontal disease can cause serious pregnancy complications, such as premature birth, low birth weight, and preeclampsia. Considering that periodontal disease can be prevented through good oral care, oral hygiene education and motivation can provide significant protection against

the risk of serious complications such as birth, low birth weight, and preeclampsia that may be observed during pregnancy (12,13).

In our study, at the end of the three-month follow-up period, similar increases in gingival indices were observed between 4.5 and 8 months of pregnancy. In another study, the gingival index and the formation of 4 mm or more deep pockets, which increase in a nonproportional manner with the amount of plaque, started to regress after the first two trimesters (14).

In our study, the significant decreases in the PPD and PI values of pregnant individuals over a one-month period may be attributed to the oral hygiene education they received at the beginning of the study. However, the decrease in GI values was not significant ($p < 0.309$) during this one-month period, which may be associated with the change in hormonal balance and increased gingival inflammation during pregnancy. It seems contradictory that there was a significant decrease in PPD and PI but no decrease in GI at the end of the first month. However, this was interpreted as the PI decreasing with the development of the patients' oral hygiene habits. A decrease in the PPD was observed with the decrease in gingival edema, but with no significant decrease in the GI due to hormonal changes. The overall evaluation of the PPD, PI and GI parameters revealed that there was a significant ($p < 0.05$) decrease in these parameters after one month. However, at the end of 3 months, the parameters returned to the initial level and even increased. This may occur as a result of hormonal changes during pregnancy (15).

Changes in estrogen and progesterone levels during pregnancy also alter the subgingival microflora. The prevalence of several periodontal pathogens, such as *Prevotella intermedia*, *Bacteroides* species and *Campylobacter rectus*, increases during pregnancy. An increase in the abundance of these pathogens and interaction between the periodontal microflora and the host also increase susceptibility to periodontal damage. Machado et al. (2012) reported that bacteria in the mouth may cause localized inflammation and adverse pregnancy outcomes through transfer to the uterus, regardless of the presence of clinical periodontitis (16).

Due to the hormonal changes during pregnancy and the increase in gingival inflammation, there was no significant decrease in periodontal parameters at the end of the three

months. These values decreased further compared to the initial values. The small sample size of pregnant women included in the study can be considered a limitation of the study. The fact that the periodontal parameters decreased one month after the commencement of the study and returned to the baseline level or even increased further in the third month revealed that the oral hygiene education provided initially was effective for a temporary period. However, the patients subsequently returned to their old habits. Oral hygiene education and motivation to be given to pregnant individuals can provide significant benefits in preventing serious complication risks, such as preterm birth, low birth weight and preeclampsia that may be observed during pregnancy.

In light of these findings, the oral hygiene habits and periodontal health status of patients should be evaluated before pregnancy, oral hygiene should reach the optimum level, and the habit of maintaining oral hygiene should be acquired before pregnancy. We believe that in future studies regarding this subject, it would be more beneficial to provide video information to pregnant women in addition to both verbal and model training. It can also be beneficial to send reminder messages at regular intervals and to have dentist check-ups on the days of gynecologist appointments to follow up more frequently on the oral hygiene of pregnant women.

Declarations

The authors received no financial support for the research and/or authorship of this article. There are no conflicts of interest. This study was approved by the clinical research ethics committee of the Ankara University Faculty of Dentistry (Date: 25.02.2019, Number: 36290600/10).

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