Journal of Dental Sciences (2016) 11, 146–151

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.e-jds.com

ORIGINAL ARTICLE

Periodontal status in Taiwanese pregnant women

Chuan-Chen Ho [a,b*], Ming-Yung Chou [a,b]

[a] School of Dentistry, College of Oral Medicine, Chung Shan Medical University, Taichung, Taiwan, ROC
[b] Department of Dentistry, Chung Shan Medical University Hospital, Taichung, Taiwan, ROC

Received 16 February 2016; Final revision received 17 March 2016
Available online 2 May 2016

KEYWORDS
gingivitis;
periodontal disease;
pregnancy;
trimester

Abstract *Background/purpose:* Few studies have investigated the periodontal status of Taiwanese pregnant women. This study aimed to investigate the periodontal status of pregnant women and to examine its relation to oral hygiene.
Material and methods: This study randomly recruited 477 pregnant women. Among them, 203 women were in their first trimester. Forty-six women completed the study to the end of their third trimester. We also recruited 160 nonpregnant women as the control group. Clinical periodontal parameters were recorded and included probing pocket depth [PPD (mm)], clinical attachment level [CAL (mm)], gingival index simplified [GI-s (%)], and plaque index [PI (%)].
Results: The GI-s of the pregnant group (PG) was higher than that of the control group [CG; (i.e., nonpregnant)], but only the third trimester was statistically significantly different ($P < 0.001$).The full mouth dental PI was higher in the PG than in the CG ($P < 0.001$), particularly in the interproximal areas. The mean PPD was greater in the PG than in the CG ($P < 0.001$) in all tooth areas. The mean CAL was higher in the PG than in the CG ($P < 0.001$), but no difference existed between the different trimesters. The CG had a higher percentage of sites with a shallow PPD, compared to the PG ($P < 0.001$); the PG had a higher percentage of sites with a PPD of 4–6 mm, compared to the CG ($P < 0.001$). Only the PI of the full mouth and lingual tooth surfaces in the third trimester were better than in the first trimester throughout the pregnancy.
Conclusion: Gingival inflammation in pregnant women is positively correlated with the increased deposition of a dental plaque biofilm.

* Corresponding author. School of Dentistry, Chung Shan Medical University, 110, Section 1, Jianguo North Road, Taichung, Taiwan, ROC.
E-mail address: chcho@csmu.edu.tw (C.-C. Ho).

http://dx.doi.org/10.1016/j.jds.2016.03.007

Introduction

Periodontal diseases such as gingivitis and periodontitis are initiated and perpetuated by microbial infection.[1] The results of such infection could lead to gingival redness and bleeding, and develop to periodontitis with loss of clinical attachment, alveolar bone resorption, tooth mobility, and tooth loss. In Taiwan, a national periodontal survey, which covered the years of 2007 and 2008, was administered to adults aged 18 years or older.[2] Ninety-nine percent of adults had periodontal disease to some extent with 54% of them having periodontal pockets. The link between pregnancy and periodontal inflammation has been known for many years. Pregnancy gingivitis is extremely common and occurs in 30–100% of all pregnant women.[3–6] Current research implies that periodontal disease may alter the systemic health of a patient and adversely affect the well-being of the fetus by elevating the risk of low-birth-weight preterm delivery.[7–11]

A dental plaque biofilm is necessary for initiating periodontal inflammation,[12,13] and other factors (including systemic and local factors) can affect the occurrence and severity of periodontal diseases. Pregnant women are prone to gingival redness, swelling and bleeding, increased probing pocket depth, and tooth mobility in the 2nd–8th month of pregnancy,[14,15] but with no statistically significant attachment loss.[15] It has been postulated that the association of gingivitis with pregnancy is because increased plasma levels of progesterone and estrogen,[16,17] which aggravate pre-existing gingivitis,[13,16–18] and inadequate oral hygiene lead to the persistent accumulation of a dental plaque biofilm.[19,20]

The results of cross-sectional and longitudinal epidemiological studies indicate that the severity of gingival inflammation is positively correlated with the amount of a dental plaque biofilm.[21–23] Experimental gingivitis in a study conducted by Loe et al.[21] in 1965 directly proved that the deposition of a dental plaque biofilm could lead to the development of gingivitis. Furthermore, certain microbes in dental plaque can induce periodontal disease in animals.[24,25] In contrast to nonpregnant women, Kornman and Loesche[17] found that the proportions of anaerobes and aerobes are increased in the second trimester, particularly in *Prevotella intermedius* (*P. intermedius*), until the third trimester, at which point the *P. intermedius* level is decreased. These microbial changes may be associated with the plasma levels of estrogen and progesterone. The purpose of this study was to investigate the oral hygiene status (using the PI) in relation to gingival inflammation in Taiwanese pregnant women.

Material and methods

This study randomly recruited 477 pregnant women [i.e., pregnant group (PG)] from the Obstetrics Department of Chung Shan Medical University Hospital (Taichung, Taiwan) between January 2010 and July 2011. Among these individuals, 145 women were in the third trimester of pregnancy, 129 women were in the second trimester of pregnancy, and 203 women were in the first trimester of pregnancy. These 203 women were followed up during pregnancy. We lost 157 patients because they did not complete their follow up on account of moving to other cities and changing doctors, or because they did not want to continue follow up. Forty-six women completed the study to the end of their third trimester. The inclusion criteria for the PG were: they had to have no systemic disease, have a minimum of 20 remaining teeth (not including the 3rd molars), and had no antibiotic medications or periodontal therapy (including ultrasonic scaling) 6 months before the study. The control group (CG, $n = 160$) had the same inclusion criteria, except they were not pregnant (Tables 1 and 2).

The periodontal parameters included the probing pocket depth (PPD) (measured in mm) from the gingival margin to bottom of the pocket,[26,27] the CAL (in mm) from the cementoenamel junction (CEJ) to the bottom of the pocket,[28,29] the gingival index simplified (GI-s; measured by %) to indicate gingivitis,[30] and the PI (measured by %).[31,32] Only one periodontal specialist performed all examinations.

Statistical analysis

This study compared the periodontal condition of the pregnant women in the three trimesters versus the nonpregnant controls. We used one-way analysis of variance to evaluate the significance of the difference between the means of the three trimesters. Scheffe's multiple comparison testing was used to determine the significance of the difference between the three pregnancy trimesters. The Student *t* test was used to evaluate the periodontal condition of the longitudinal follow up of the pregnant women and to evaluate between the first trimester and third trimester. A value of $P < 0.05$ was considered statistically significant.

Results

The clinical periodontal parameters between the PG and the CG

The GI-s, PI, PPD, and clinical attachment level (CAL) were significantly different between the PG and the CG ($P < 0.001$); however, these parameters were not significantly different between the trimesters (Tables 3 and 4). The full mouth GI-s was only significantly different at the third trimester ($P < 0.001$). In addition, the GI-s was not

Table 1 Distribution of the study participants.

	Patients	
	No.	%
Control	160	25
1st Trimester[a]	203	32
2nd Trimester	129	20
3rd Trimester	145	23
Total	637	100

[a] Forty-six of the study participants in the first trimester were followed up at the third trimester.