

Comparison of intra oral manifestations of pregnant and non-pregnant women: an observational case-control study

Original Article

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Abstract

Introduction:

Hormonal changes during pregnancy are along with oral changes such as pregnancy gingivitis, halitosis, pregnancy tumor and teeth erosion. The aim of the current study is to evaluate the prevalence of these oral changes in pregnant and non-pregnant women.

Materials and methods:

In this observational, analytic, case-control study, 124 pregnant women and 124 non-pregnant women referred to Al-zahra hospital, Rasht, Iran, were examined. Age, education, number of pregnancy and pregnant status of patients were recorded. Also, gingival index, plaque index, halitosis, pregnancy tumor, erosion and geographic tongue were assessed and recorded. Statistical analysis was performed with SPSS 22. Data were analyzed using the Chi square and Mann-Whitney tests with $P < 0.05$ considered significant.

Results:

No statistical relation was found between age and pregnancy status. ($P=0.085$) Also, the relation of education and pregnancy status was not statistically significant. ($P=0.49$) Plaque index, gingival index and halitosis were significantly different between pregnant and non-pregnant women. ($P=0.018$, $P=0.001$ and $P=0.0001$ respectively) However, pregnancy tumor, erosion and geographic tongue were not significantly different based on pregnancy status. ($P=0.65$, $P=0.758$ and $P=0.23$)

Conclusion:

During pregnancy, occurrence of gingival inflammation and halitosis increases based on the current study. It should be noted that better oral hygiene is of benefits for pregnant patients, offering them comfort, function and aesthetics.

Key words:

•Pregnancy •Periodontal diseases •Halitosis
•Tooth Wear

Introduction

Oral health assess during pregnancy is critical since poor oral hygiene can lead to adverse problems such as low birthweight, preterm birth, and preeclampsia. (1-2) Also, hormonal changes during pregnancy may result in oral mucosal changes such as pregnancy gingivitis, halitosis, pregnancy tumor, teeth erosion, geographic tongue, chloasma, facial telangiectasia, sialorrhea, tooth mobility and oral apathies. (2)

Pregnancy gingivitis is the gingival inflammation which results from dental plaque accumulation and is exacerbated by pregnancy hormones. (3) 50 to 100% of pregnant women experience pregnancy gingivitis and almost 100% of pregnant women need periodontal treatment during their pregnancy. (1,4) Halitosis during pregnancy is the result of hormonal change and pregnancy gingivitis. Also, halitosis in pregnant women, is associated to periodontal disease, caries, xerostomia, vomiting, gastric reflux and gestational diabetes. (5) Pregnancy tumor is an exaggerated inflammatory response to an irritation which begin during the first trimester, and worsens as the pregnancy progresses up through the seventh month of pregnancy. (4-6) The prevalence of pregnancy tumor has been reported to vary between 0.5-100% in different studies. (1,4-5) Nausea and vomiting in pregnancy may lead to extensive erosions specially affecting the palatal surfaces of the maxillary incisors and canines. (2,5) Following the erosion of teeth, hyper sensitivity is a common finding as a result of dentin exposure. (3,5) Geographic tongue occurs because of the atrophy of the filiform papillae. Genetic factors, hormonal changes and oral contraceptive pills, pregnancy and diabetes mellitus are possible risk factors of geographic tongue. (7,8)

The aim of the current study was to evaluate the prevalence of potential intra-oral manifestations in pregnant and non-pregnant women.

Materials and Methods

In this observational, analytic, case-control study, 124 pregnant women and 124 non-pregnant women referred to Al-zahra hospital, Rasht, Guilan, Iran, were examined.

Pregnant and non-pregnant women with no previous history or presence of systemic disease,

aged between 20–45 years were included in the study as case group and control group, respectively. Patients who use contraceptive drugs, tobacco and alcohol, patients suffering from ovarian cyst or fibroma, and patients who are in their first 6 months after giving birth were excluded from the study. Written informed consents were provided from the subjects.

Age, education and pregnant status of patients were recorded. Age was documented as under 30 and over 30 years old. Education was determined as “up to diploma”, “bachelor” and “more than bachelor”. Pregnancy status was considered as being pregnant or not being pregnant.

Also, presence of gingival inflammation, halitosis, pregnancy tumor, erosion and geographic tongue were assessed and recorded.

Gingival inflammation was evaluated using O’Leary plaque index (9) and Löe and Silness gingival index (10). To determine O’Leary index, a disclosing agent was used and the stained surfaces of each tooth was recorded. O’Leary index was reported as the ratio of the total number of stained surfaces to the total number of existing surfaces. To assess Leo and Silness gingival index, a blunt explorer was used. Semi-erupted teeth, remaining root and teeth with peri apical lesion were not evaluated. Gingival index was recorded for each surface of a tooth as 0 (No inflammation), 1 (Mild inflammation, no bleeding on probing), 2 (Moderate inflammation, bleeding on probing) and 3 (severe inflammation, spontaneous bleeding). The sum of scores divided by the number of total surfaces was calculated. If the score was from 0.1 to 1, it would be described as mild gingivitis. If the score was from 1.1 to 2 and from 2.1 to 3, it would be described as moderate gingivitis and severe gingivitis, respectively.

To assess halitosis, Organoleptic Index defined by Rosenberg, was used. (11) The index is recorded as 0 to 5. After accurate examination of soft tissue, palatal surface of maxillary incisor teeth and tongue, existence of pregnancy tumor, tooth erosion and geographic tongue were recorded.

Statistical analysis was performed with SPSS 22. Data were analyzed using the Chi square and Mann-Whitney tests with $P < 0.05$ considered significant.

Results

The mean age of samples was 30.95±6.34. the mean age of pregnant women and non-pregnant women was 30.25±5.68 and 31.64±6.89, respectively. Data distribution of patients is presented in Table 1.

No statistical relation was found between age and pregnancy status. (P=0.085) Also, the relation of education and pregnancy status was not statistically significant. (P=0.49)

Plaque index, gingival index and halitosis were significantly different between pregnant and non-pregnant women. (P=0.018, P=0.001 and P=0.0001 respectively) As such, the above-mentioned parameters were significantly higher in pregnant women compared to non-pregnant women. However, pregnancy tumor, erosion and geographic tongue were not significantly different based on pregnancy status. (P=0.65, P= 0.758 and P=0.23) (Table 2)

Table 1. Data distribution of demographic information of patients.

		Pregnancy status		Total
		Pregnant	Non-Pregnant	
Age	Under 30 years old	50% (62)	48.4% (60)	49.2% (122)
	Over 30 years old	50% (62)	51.6% (64)	50.8% (126)
Education	Up to diploma	78.2 % (97)	77.4% (96)	77.8% (193)
	Bachelor	21% (26)	19.4% (24)	20.2% (50)
	More than bachelor	0.8% (1)	3.2% (4)	2% (5)

Table 2. Data distribution of plaque index, gingival index, erosion, pregnancy tumor, geographic tongue, halitosis.

		Pregnancy status		Total
		Pregnant	Non-Pregnant	
O'Leary Plaque index	Less than 50%	0 (0)	1.6% (2)	0.8% (2)
	51-70%	0 (0)	8.1% (10)	4% (10)
	71-90%	41.1% (51)	41.1% (51)	41.1% (102)
	91-100%	58.9% (73)	49.2% (61)	54% (134)
Gingival index	Score 0	0 (0)	0 (0)	0 (0)
	Score 1	31.5% (39)	52.4% (65)	41.9% (104)
	Score 2	66.1% (82)	47.6 % (59)	56.9% (141)
	Score 3	2.4% (3)	0 (0)	1.2% (3)
Erosion	With erosion	4.8% (6)	4 % (5)	4.4% (11)
	Without erosion	95.2% (118)	96% (119)	95.6% (237)
Pregnancy tumor	With pregnancy tumor	2.4% (3)	1.6% (2)	2% (5)
	Without pregnancy tumor	97.6% (121)	98.4 % (122)	98% (243)
Geographic tongue	With geographic tongue	6.5% (8)	3.2% (4)	4.8% (12)
	Without geographic tongue	93.5% (116)	96.8% (120)	95.2% (236)
Halitosis	Score 0	18.5% (23)	54% (67)	36.3% (90)
	Score 1	15.3% (19)	17.7% (22)	16.5% (41)
	Score 2	31.5% (39)	16.9% (21)	24.2% (60)
	Score 3	31.5% (39)	11.3% (14)	21.4% (53)
	Score 4	3.2% (4)	0 (0)	1.6% (4)
	Score 5	0 (0)	0 (0)	0 (0)

Discussion

Estrogen and progesterone increase during pregnancy. Estrogen blocks gingival tissue turnover and its ability to produce collagen which results to an increased response to plaque accumulation. (1) On the other hand, progesterone prevents mitogen activation, cytotoxic T cell generation and interleukin-6 production which make gingiva less resistant to inflammation. In conclusion, estrogen and progesterone make gingiva of pregnant women more susceptible to periodontal breakdown. (2)

In the current study, it was found that periodontal condition of pregnant women was worse than non-pregnant women which is reflected by measuring and comparing gingival index and plaque index. Lopez et al., Jain et al., Pentapati et al., Machuca et al., Soory, Mascarenhas et al., Chung et al. and Gonzales et al. reported occurrence of gingivitis to be higher in pregnant women compared to non-pregnant women. (12-19) Cohen et al., Miyazaki et al. and Maybodi et al. found that gingivitis gradually worsens from first semester to third semester in pregnant women. (20-22) However, Tilakaratne et al. found no significant difference between pregnant and non-pregnant women in term of plaque index values. (23) Also, Figuero et al. found no relation between gingival index and pregnancy. (24) Physiologic and hormonal changes during pregnancy can also decrease saliva PH and increase bacterial growth, consequently leading to halitosis and higher risk of caries. (1,7) In the current study and Fujiwara et al. study, occurrence of halitosis was significantly higher in pregnant women compared to non-pregnant women. (25) Kia et al. reported that 37.7% of pregnant women experience halitosis during pregnancy. (8) Pregnancy stimulates local production of angiogenic factors (vascular endothelial growth factor) in oral mucosal leading to the formation of pregnancy tumor. (26-27) Cardoso et al. observed an association between pregnancy tumor and pregnancy. (28) While, the current study found no statistical relation between pregnancy tumor and pregnancy, and reported that only 2.4% of pregnant patients had pregnancy tumor. Also, Chamani et al., Pirie et al. and Kia et al. found that respectively, 4.2%, 5% and 1% of pregnant patients had pregnancy tumor. (8, 29-30)

The current study reported dental erosion to have no significant relation with pregnancy status while AL-Sultani stated that erosion was significantly associated with pregnancy specially in the third semester. [31] Kia et al. found that only 1.3% of patients had dental erosion. (8) In accordance with the current study, Sarifakioglu et al. revealed no significant difference between pregnant and non-pregnant women in term of geographic tongue. (32) However, as opposed, Dvaz-Guzman et al. reported occurrence of geographic tongue to be more common in pregnant women. (7)

Conclusion

During pregnancy, occurrence of gingival inflammation and halitosis increases based on the current study. It should be noted that better oral hygiene is of benefits for pregnant patients, offering them comfort, function and aesthetics.

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