Food intake, oral hygiene and gingival bleeding in pregnancy: does lifestyle make a difference? A cross sectional exploratory study

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Abstract

Objectives: To investigate the association between lifestyle factors (food intake, sugary snacks consumption and oral health practices) and gingival bleeding during pregnancy.

Methods: A cross sectional exploratory study was conducted in the Maternity hospital, Dammam, Saudi Arabia. It included pregnant Saudi women selected using a convenience sample. Information was collected concerning participants' background, oral hygiene practices and visits to dentists. They were asked about the amount of food they consumed and their use of sugary snacks. Logistic regression analysis assessed the association between lifestyle factors and gingival bleeding.

Results: Responses were obtained from 197 women (92.1% response rate). Most women brushed their teeth but had < the recommended intake in the various food groups. Brushing was associated with lower odd of gingival bleeding (odds ratio= 0.47, 95% confidence interval= 0.23, 0.93) whereas intake of fewer servings than the recommended amounts in all food groups was associated with higher odds (odds ratio = 3.64, 95% confidence interval = 1.12, 11.82)

Conclusion: Brushing and food intake during pregnancy are associated with gingival bleeding. Pregnant women can potentially improve their oral health by modifying their lifestyle and following healthier practices.

Key Words: Pregnancy, oral health, lifestyle, food

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Introduction

Many oral conditions were reported to occur during pregnancy such as gingivitis and periodontal diseases. [1-3] This can be linked to hormonal changes, problems in seeking dental care during pregnancy and suboptimal oral health practices. [4, 5]

Several studies focused on the association between oral health and life style factors including smoking, alcohol consumption, dieting, physical activity and oral health practices. [6, 8] Economic development and modernization have led to changes in diet and increased snacking with subsequent impact on health, hence increasing the risk of diet-related systemic and oral diseases. [9] Various biological/ pathological mechanisms are behind the association of lifestyle factors with oral health. In addition, lifestyle represents the individual's approach to dealing with and accepting self and the environment thus summarizing exposure to risk factors, preventive practices in addition to psychological and social setup. Studies conducted to assess the relationship between oral health and lifestyle factors focused on some target groups such as adults [10] and pregnant mothers. [11] In the latter study, the focus was on investigating the relationship between mothers' lifestyle and subsequent children's caries experience at 5 years of age. There is a need to investigate the association between pregnant women's lifestyle and their own oral health in view of the changes in habits that may accompany pregnancy and the preventive potential of improving these habits.

The aim of this study was to investigate the association between lifestyle habits such as food intake, consumption of sugary snacks and oral health practices with gingival bleeding which is one of the oral problems pregnant women may suffer from. In this study, these lifestyle factors were used as proxy measures for how pregnant women deal with their own health rather than focusing on the underlying direct pathologic mechanism causing disease.

Methods

A cross sectional exploratory study was designed to collect data from pregnant women visiting the Maternity Hospital in Dammam, Saudi Arabia. Approval for the study was obtained from the Research Ethics Unit of the College of Dentistry, University of Dammam (#EA2014003). A convenience sample included all women visiting the hospital in the period February to March 2014. Non-Saudis were excluded to avoid confounding by ethnicity/ nationality especially since their number was small (n= 17). Similarly, only otherwise healthy women (based on medical history questions) were included to avoid confounding by diseases that increase bleeding tendencies such as diabetes and bleeding disorders. Informed consent was obtained from each subject before joining the study. Women who did not consent were excluded.

Data were collected using a self-administered, anonymous questionnaire that was developed in Arabic for the study purpose. The questionnaire collected data about participants' age, education, and the trimester of pregnancy. Participants were asked about their oral health practices (tooth brushing, miswak; a traditional alternative to tooth brush using a twig of medicinal plant to clean teeth and dental visits) and if their gingiva bled during pregnancy. They were asked about flossing and if they practiced other oral hygiene procedures but because of the few number of positive responses (n=8), we excluded these from analysis and focused on brushing and miswak only. Two teaching staff members not involved with the study checked the questionnaire for face and content validity.

The participants were asked to indicate if they consumed sugary snacks (sweets, cookies and chocolate etc.) regularly and to indicate the number of servings they consumed of the various food groups. Based on the recommendations of the United States Department of Agriculture (USDA), [12, 13] the amounts of food indicated by participants were categorized into: 1) less than the recommended amount, 2) as recommended and 3) more than the recommended amount. Fruits and vegetables intake was combined for analysis similar to other studies. [14 -16] A new variable was created to describe the overall intake of food by counting the food groups where a respondent had the recommended amount or more. The new variable "healthy eating" ranged from "0" where a respondent reported eating the recommended number of servings in none of the food groups to "4" where the respondent reported eating the recommended number of servings or more in the 4 food groups (dairy,

protein foods, fruits and vegetables combined and grains).

The association between reported gingival bleeding and food intake, snacking and oral health practices was assessed using logistic regression analysis with odds ratios and confidence intervals calculated. The dependent variable was reported gingival bleeding (yes/ no). The independent variables were consumption of sugary snacks (regular/ irregular), healthy eating (ranging from 0 to 4), brushing twice or more daily (yes/ no), using miswak (always, sometimes and never) and visiting the dentist (not visiting at all before or after pregnancy, not visiting before and started visiting after pregnancy, visiting before but not after pregnancy and visiting the dentist before and after pregnancy).Trimester (first, second and third), age (as decades) and education (less than university and university educated). They were all included in the regression model to assess their effect as confounders. Individual regression models were created for each one of the independent variables. A multivariate regression model was developed to include all independent variables in addition to the potential confounders using forward stepwise conditional selection with 5% significance level for entry and 10% significance level for removal. Statistical analysis was done using SPSS version 17.0.

Results

The study included 197 Saudi pregnant women (response rate: 197/ 214= 92.1%) in their 1st, 2nd and 3rd trimesters (16.4%, 22.6% and 61%). The majority were in the age groups 20-<30 years old and 30-<40 years old (47.4% and 42.2%) and with education up to secondary school (52.2%). Half of them brushed twice or more daily (51.5%) and 47.7% used miswak sometimes. Only 18.1% of the participants reported regular visits to the dentist before and after pregnancy. (Table 1).

Table 1: Sample description

Variables		N (%)
Trimester	1st	29 (16.4)
	2nd	40 (22.6)
	3rd	108 (61)
Age	<20 years old	12 (6.2)
	20- <30 years old	91 (47.4)
	30- <40 years old	81 (42.2)
	≥40 years old	8 (4.2)
Education	Illiterate	7 (3.8)
	Up to secondary school	96 (52.2)
	Diploma	25 (13.6)
	University and above	56 (30.4)
Brushing	<once daily	17 (8.8)
	Once daily	77 (39.7)
	Twice or more daily	100 (51.5)
Miswak	Always	17 (8.8)
	Sometimes	92 (47.7)
	Never	84 (43.5)
Dental visits	Did not visit the dentist before or after pregnancy	66 (35.1)
	Regularly visited the dentist before pregnancy but not after	62 (33)
	Did not visit the dentist regularly before pregnancy, started after	26 (13.8)
	Regularly visiting the dentist for checkup before and after pregnancy	34 (18.1)

Figure 1 shows the levels of intake of the various food groups. The greatest percentage had intake less than the recommended amount in all food groups with percentages ranging from 64.9% to 79.4% in the proteins and grains group. On the other hand, 68.4% of women reported they sometimes had sugary

snacks and 29% reported they regularly consumed them compared to 2.6% who indicated they never used sugary snacks.

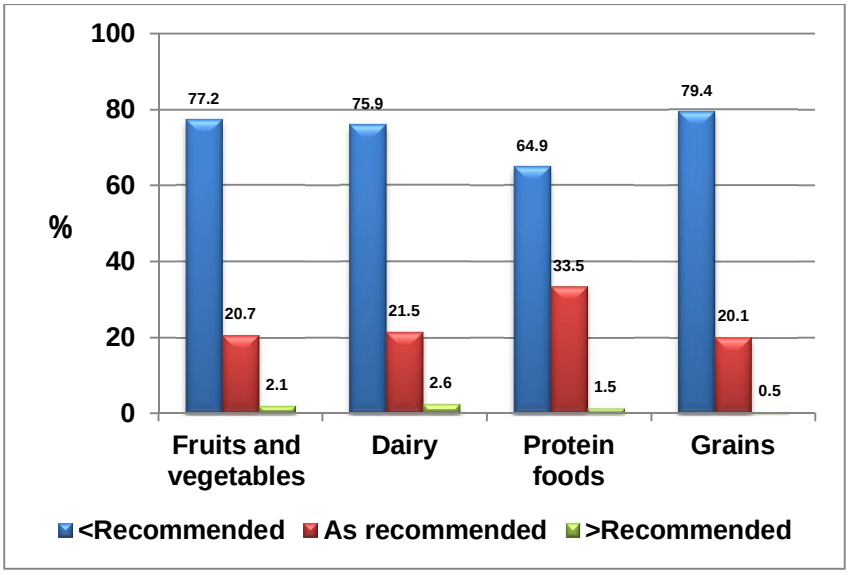

Fig. 1 Intake of various food groups among a sample of pregnant Saudi women

Among the women included in the study, 40.1% reported gingival bleeding. Table 2 shows the results of logistic regression analysis for the association between reported gingival bleeding and lifestyle factors and potential confounders. In univariate regression, women with education less than university level had higher odds of reporting gingival bleeding compared to women with university education (OR= 2.20). Reporting the intake of fewer servings than the recommended in all food groups was associated with higher odds of gingival bleeding (OR= 3.15) compared to reporting an intake equivalent to recommendation in three groups. No one reported the intake of servings following the recommendations in all four groups. Brushing twice daily or more was associated with lower odds of gingival bleeding (OR= 0.56). Having no previous history of dental visits (before or after pregnancy), visiting the dentist only after pregnancy and dental visits before but not after pregnancy were all associated with lower odds of gingival bleeding compared to visiting before and after pregnancy (OR= 0.16, 0.27 and 0.24).

Table 2: Association between lifestyle factors and reported gingival bleeding using regression analysis

		Univariate regression		Multivariate regression	
Variables		OR	95% C.I.	OR	95% C.I.
Age	<20 years old vs ≥40 years old	0.47	0.07, 3.34		
	20- <30 years old vs ≥40 years old	0.48	0.09, 2.52		
	30- <40 years old vs ≥40 years old	0.48	0.09, 2.52		
Trimester	1st vs 3rd	1.19	0.54, 2.66		
	2nd vs 3rd	1.36	0.65, 2.86		
Education	Educated to a level less than university vs university educated	2.20*	1.16, 4.14		
Sugary snacks consumption	Regular vs irregular	1.35	0.71, 2.57		

Healthy eating	≥recommended servings in no group vs 3 groups	3.15*	1.12, 8.83	3.64*	1.12, 11.82
	≥recommended servings in one group vs 3 groups	1.15	0.38, 3.43	1.37	0.39, 4.78
	≥recommended servings in two groups vs 3 groups	1.44	0.48, 4.34	1.38	0.39, 4.89
Brushing twice daily	Yes vs no	0.56*	0.32, 0.99	0.47*	0.23, 0.93
Miswak	Always vs never	1.59	0.54, 4.70		
	Sometimes vs never	1.56	0.86, 2.83		
Dental visits	Not before or after pregnancy vs before and after pregnancy	0.16*	0.06, 0.47		
	Started visiting after pregnancy vs visited before and after pregnancy	0.27*	0.08, 0.90		
	Visited before not after pregnancy vs visited before and after pregnancy	0.24*	0.08, 0.69		

Adjusted for age, trimester and education.
OR: odds ratio, CI: confidence interval, *: Statistically significant, CI does not include OR null value.

When all lifestyle factors were entered into multivariate regression with potential confounders to adjust for their effect, only the intake of fewer servings than the recommended amounts in all food groups and brushing were significantly associated with gingival bleeding. There was a minor change in the regression coefficients of these two variables compared to their values in the univariate regressions (3.64 compared to 3.15 and 0.47 compared to 0.56).

Discussion

It is useful to study the relation between lifestyle factors and oral problems during pregnancy since this period can have long term effects on the general and oral health of pregnant women and their infants. [11] Pregnancy offers a convenient opportunity to correct improper health practices due to the more intensive health monitoring that occurs during this period and because pregnant women are usually more receptive to health advice. [17] The main finding of the present study was that lifestyle factors (food intake and brushing) were associated with gingival bleeding during pregnancy. This emphasizes the importance of empowering pregnant women to manage their own health through adopting healthy practices that they routinely perform in their everyday life. Emphasizing self-care to prevent disease is based on the idea that subjects should assume the primary responsibility for maintaining health and preventing disease. These factors are part of the individual's attitude towards life responsibilities and extend beyond the direct effect of the pathologic insult.

One of our study strength is controlling for potential confounders known to affect food intake, snacking habits and oral health practices such as age, trimester and education. Other lifestyle factors, however, such as alcohol consumption and smoking were not assessed in view of the cultural norms of the society which would limit the involvement with these factors and their reporting. The study conclusions are limited by its cross sectional exploratory design which can only provide evidence of association. Proving causality requires longitudinal studies that follow pregnant women from the early stages of pregnancy to its end so that temporality can be ascertained. A study with larger sample size and randomly selected subjects is also needed so that conclusions can be more confidently generalized to the target population.

In the present study, the outcome was self-reported gingival bleeding. Other studies also used self-reporting to assess gingival problems [18] and a systematic review indicated its validity.[19] Similarly, lifestyle factors were assessed through self-reports. In theory, recall bias and social desirability could have affected the responses of the participants, a problem

encountered in all studies relying on questionnaires. These biases might have potentially over or underestimated the association between exposures and outcome. However, respondents were asked to report the number of servings they consumed in the various groups and these were later translated into categories equivalent to, less or more than the recommended amounts then the overall variable was developed. It is unlikely that recall bias would have affected the reported number of servings in all groups in the same subject.

Most participants reported daily brushing similar to the levels reported by pregnant women in Italy (99.1%), [20] the United States (84%) [21] and Saudi Arabia (90.1%). [22] The modest level of regular visits to the dentist during pregnancy in the present study is similar to that reported by Saudi pregnant women visiting public and/ or private hospitals in another study (22%). [23] However, visiting levels in neighboring countries were higher with 52% of Kuwaitis [24] and 58.3% of Emiratis [25] visiting the dentist during their pregnancy. This low frequency of dental visits may be attributed to the general misconception that dental treatment is not safe during pregnancy. [2, 4, 23]

Not visiting the dentist before or after pregnancy was associated with lower odds of gingival bleeding. This may be explained by a situation where women were more likely to visit the dentist when their gingiva bleeds; so that visiting is an effect of bleeding rather than its cause. This pattern is contrary to the finding by others that women reporting good oral health were more likely to have regular dental visits. [2]

Food intake and snacking were less than optimal among the participants in the present study similar to findings of a study conducted among healthy adults [26] and among pregnant women. [27, 28] Intake of food servings less than the recommended amounts was associated with higher odds of bleeding. This can be explained by a general lifestyle approach where individuals mind their health whether general (by proper eating) or oral (through adequate oral health practices). Pregnant women who have fewer servings than the recommended amounts are less likely to adopt proper oral health practices which in turn may be associated with higher odds of gingival bleeding. In addition, fewer servings of healthy food means there are fewer nutrients that protect the gingival tissues and support the immune system. [29] Healthy habits such as fruit consumption are considered part of a general health-enhancing behavior that affects health. [30, 31] Based on analysis of the National Health and Nutrition Examination Survey (NHANES) 2006 data of American adults, Liu [6] reported that subjects with bad diet had odds ratio= 4.22 compared to subjects with excellent diet of reporting bad tooth condition after adjusting for confounders. Bawadi et al.,[32] reported that diets with a healthy eating index of <50 points (poor diet) were significantly associated with increased odds of clinically assessed periodontitis among 340 adult Jordanians.

Our results support the association between lifestyle factors during pregnancy and gingival bleeding although confirmation needs to be obtained using longitudinal studies with larger, randomly selected samples. Addressing improper practices may control risk factors that affect the oral and general health of pregnant women. [33] It represents a population approach to improve oral health through encouraging individuals to drop risky behaviors and adopt better practices conducive to health. [34]

Conclusion

After controlling for potential confounders, not brushing twice daily and intake of less than the recommended amount of food servings were associated with gingival bleeding during pregnancy. The oral health of Saudi pregnant women can be improved by daily brushing and intake of the recommended number of food servings. These practices can be promoted by dentists and implemented by the pregnant women themselves and their reinforcement by all health care professionals is recommended.

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