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Original Research

Oral health awareness among pregnant women in Saudi Arabia

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ABSTRACT

Aim: To evaluate knowledge of oral hygiene and relation to pregnancy among pregnant women and to increase the awareness of pregnant women about oral and dental health care.

Materials and Methods: This cross-sectional survey was conducted using a self-designed questionnaire consisting of 15 questions. A total of 450 subjects were approached and sent the questionnaire online. The questionnaire consists of three parts with the first part on the sociodemographic factors, the second part linking oral hygiene practice requirement and dental visit during pregnancy, and the third part was to evaluate the awareness of oral/periodontal signs in pregnancy and vice versa. All the data were calculated and statistically analyzed using SPSS.

Results: The majority of the patients had a bachelor's degree and were well educated. Most of the patients were employed. Over one-third of the patients felt that oral and periodontal tissue is affected by pregnancy and they feel that these changes are due to hormonal changes. Most of the patients were aware of the oral hygiene practice required to maintain oral health during pregnancy since they were brushing their teeth twice daily. There was a need for improving the awareness about periodontal disease as a risk factor for pregnancy outcome with only 4.3% answering positively.

Conclusion: It appears that oral hygiene practice required during pregnancy is well known, similarly to the oral and periodontal changes seen during the pregnancy. However, periodontal disease as a risk factor for the pregnancy outcome needs to be made more aware to this special group of subjects.

Introduction

Oral health in pregnancy is of paramount importance. Changes in the hormonal level during pregnancy brings about change in the health of the periodontium. Gingival changes in pregnancy are the exacerbation of already existing gingival conditions with the increased response to plaque. Localized or generalized gingivitis, localized gingival enlargement (pregnancy granuloma), or generalized gingival enlargement are the most prevalent gingival conditions1.

In addition to this, other oral and facial changes are noted. They are increased facial pigmentation, change in the saliva, and erosion of the lingual surface of anterior teeth. The main salivary changes in pregnancy consisting of a change in the salivary flow, composition, pH, and hormone levels. Facial pigmentation is another aspect commonly seen to be increased during pregnancy, commonly called 'melasma' or the "mask of pregnancy", which appears as bilateral brown patches in the mid-face. These facial pigmentations usually begin during the first trimester and resolve after parturition. Though the etiology of this is still unknown, it is believed to be related to an increase in the serum levels of estrogen and progesterone2.

If these are the direct effect of hormonal changes seen during pregnancy, other effects are seen due to the medications taken during the pregnancy. The most common supplement prescribed during pregnancy is iron. Iron supplements can cause brown to black pigmentation on the teeth. Though teracacidins are not used for pregnant individuals, in case if it is taken for some other purpose like skin infection, it not only leads

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to teeth staining and bone changes in the fetus but also can cause staining of the teeth in the expectant mother3.

If this is one-way relation between the pregnancy and teeth and gingiva, another way which has been researched most in this decade is the effect of periodontal disease on pregnancy outcome or periodontitis considered to be a risk factor the pregnancy outcome. The link between periodontal disease the pregnancy outcome has been explored in detail in many cross-sectional studies and established an association between periodontal disease and preterm low birth weight.

Till today, many studies explored the possible role of changes seen in the oral cavity during pregnancy. They have listed more than one factor affecting oral or periodontal health, such as education, age, hormonal levels, cravings for sugary foods, vomiting, the medication that can cause some discoloration of teeth (tetracycline, iron), and the trimester of that pregnancy4.

Awareness of the dental and periodontal changes during pregnancy among pregnant individuals is more important to prevent the occurrence of the changes during these physiologic processes. Many studies have been done to assess the different aspects/factors related to pregnancy-associated changes and their awareness among pregnant individuals. However, there are only a few studies available at present done in Saudi Arabia5,6.

Moreover, all these studies dealt predominantly with gingival changes plaque and oral hygiene during pregnancy. There are no studies available till today which has been done to find out the teeth staining and its awareness among pregnant individuals. Though some of the stains are related to medications, which is much of esthetic concern, other cases like tetracycline-induced changes in the teeth are not only affecting the expecting mother but also the fetus and thus, it is of greater concern. Hence, the present study is done to evaluate pregnant women's knowledge of the etiology of teeth staining during pregnancy and increase the awareness of the pregnant woman with a low education of oral and dental health care.

Materials and Methods

This cross-sectional questionnaire survey was conducted in the eastern region, Kingdom of Saudi Arabia. The target population of the study is pregnant women in the age group from the early 20s to the late 30s years. An online questionnaire was used to assess the knowledge and awareness about oral health care before pregnancy, during pregnancy, and after pregnancy, and about dental problems and changes that occurred during pregnancy.

The questionnaire comprising of 15 questions was validated and then selective changes were made according to the suggestions provided by the reviewers. The questionnaire consisted of three sections. The first part was designed to record the sociodemographic data. The second section was designed to assess their knowledge regarding the awareness levels about the relationship between periodontal health and maternal health (Oral hygiene practice during pregnancy). The third part aimed to assess the perception towards oral hygiene, dental visits, and dental treatment during pregnancy and the relation between periodontal health and pregnancy outcome (Knowledge of oral health during pregnancy).

Ethical committee approval was taken to conduct the study from the institutional ethical committee. Informed consent was signed by the patient before participation in this survey. Data was collected and analyzed using Statistical Package for Social Sciences (SPSS), (IBM-SPSS, version 25 Armonk, NY, USA). All the findings were measured using frequency and percentage. Two-way cross-tabulation and Chi-Square/Fisher's Exact

tests were used to determine the association between the variables. A p-value of ⩽ 0.05 was considered statistically significant.

Table 1. Socio-demographic characteristics

		n	%
Age	*20-29 years*	123	28.1
	30-40 years	315	71.9
Educational level	*Primary*	8	1.8
	Preparatory	17	3.9
	Secondary	93	21.2
	Diploma	63	14.4
	Bachelor	245	55.9
	Master	9	2.1
	Doctorate	3	.7
Occupation	*Student*	52	11.9
	Employed	166	37.9
	Both	13	3.0
	Unemployed	207	47.3
Income level	*Low*	23	5.3
	Average	385	87.9
	High	30	6.8

Table 2. Oral hygiene practice during pregnancy

		n	**%**
Did you follow certain habits to maintain oral and dental health during pregnancy?	*No*	135	30.8
	Yes	191	43.6
	Perhaps	112	25.6
How often do you brush your teeth during pregnancy?	*1 time/day*	160	36.5
	≥ 2 times/day	269	61.4
	I don't know	9	2.1
Did you use dental floss during pregnancy?	*Always*	43	9.8
	Sometimes	207	47.3
	Never	188	42.9
Did you use miswak during pregnancy?	*Always*	12	2.7
	Sometimes	85	19.4
	Never	341	77.9

During pregnancy, most of the participants followed certain habits to maintain oral and dental health (n=191, 43.6%), brushed their teeth ≥ 2 times/day (n=269, 61.4%), use dental floss sometimes (n=207, 47.3%), and never used miswak (n=341, 77.9%) (Table 2). Responses on their visit to the dentist during pregnancy are shown in figure 1.

Table 3. Knowledge of oral health during pregnancy

		n	%
Do you think that oral health is affected by pregnancy?	*Yes*	305	69.6
	No	42	9.6
	Perhaps	91	20.8
Do you think that oral health affects pregnancy?	*Yes*	163	37.2
	No	121	27.6
	Probably	154	35.2
Do you think that dental treatment during pregnancy will negatively affect the fetus?	*Yes*	122	27.9
	No	159	36.3
	Probably	157	35.8
Do you think there is a relationship between oral and dental health and the educational level of a pregnant woman?	*Yes*	162	37.0
	No	193	44.1
	I don't know	83	18.9
Do you think there is that changing hormones during pregnancy negatively affect oral and dental health?	*Yes*	301	68.7
	No	48	11.0
	I don't know	89	20.3
Do you think that frequent visits to the dentist during pregnancy reduce the incidence of oral and dental problems?	*Yes*	222	50.7
	No	45	10.3
	Probably	171	39.0
Do you think that oral and dental problems lead to premature birth?	*Yes*	19	4.3
	No	259	59.1
	I don't know	160	36.5

Most of the participants reported that oral health is affected by pregnancy (n=305, 69.6%), that changing hormones during pregnancy negatively affects oral and dental health (n=301, 69.7%), frequent visits to the dentist during pregnancy reduce the incidence of oral and dental problems (n=222, 50.7%), and oral and dental problems do not lead to premature birth (n=259, 59.1%) (Table 3). Most of the participants reported that dentists' influencers on social media as the source of information about oral and dental health (Figure 2).

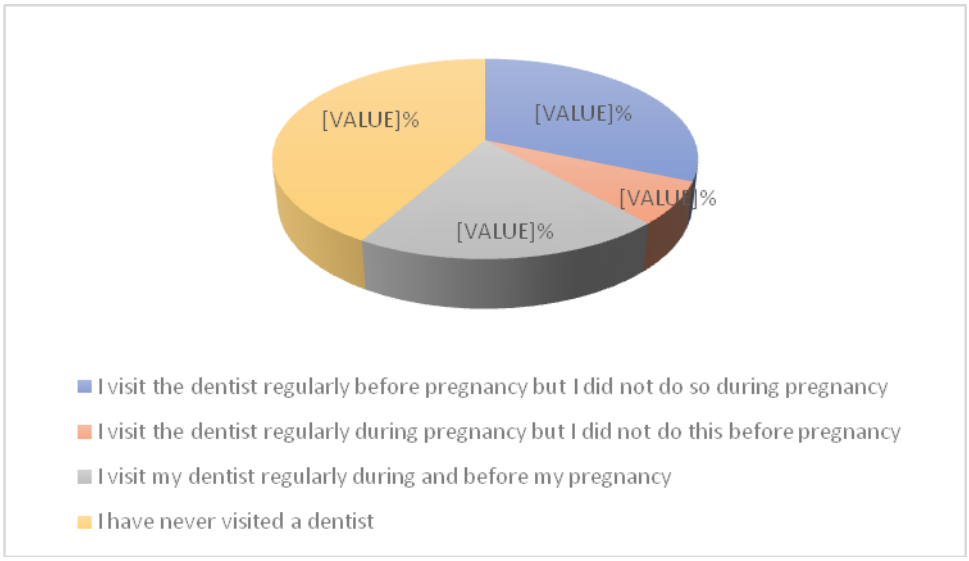

Figure 1. Responses on a visit to the dentist during pregnancy

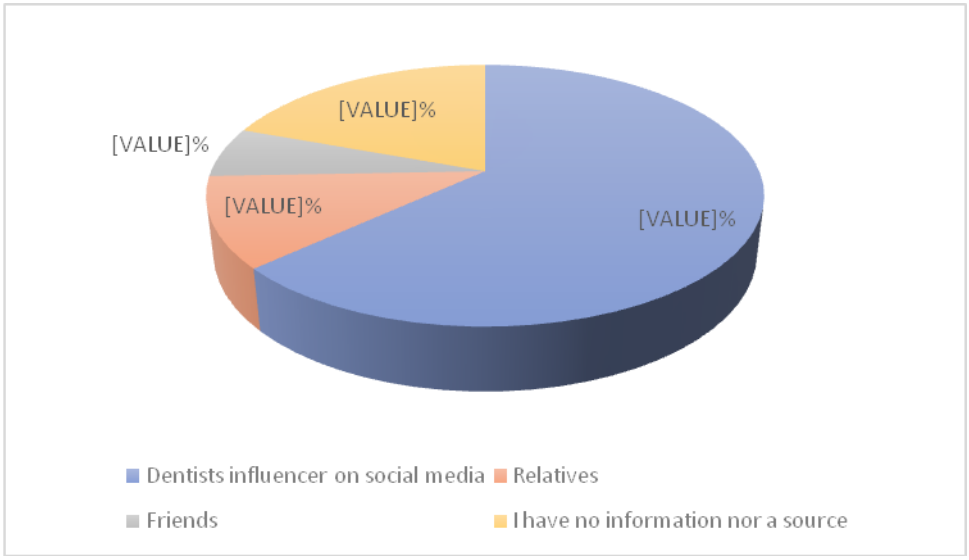

Figure 2. Source of information about oral and dental health

Two-way cross-tabulation showed that 30-40 years are more likely to visit the dentist during pregnancy ($p<0.05$) and those employed are more likely to use dental floss during pregnancy ($p<0.05$) (Table 4).

Table 4. Association between oral hygiene practice during pregnancy and socio-demographics

	p-value			
	Age	*Educational level*	*Occupation*	*Income level*
Did you follow certain habits to maintain oral and dental health during pregnancy?	.326	na	.092	.401
How often do you brush your teeth during pregnancy?	.097	na	na	na
Did you use dental floss during pregnancy?	.356	na	.000*	na
Did you visit the dentist during pregnancy?	.028*	na	na	na
Did you use miswak during pregnancy?	.142	na	na	na

** indicates statistically significant*
na indicates not applicable as conditions of Chi-Square test was not met

Table 5. Association between knowledge of oral health during pregnancy and socio-demographics

	p-value			
	Age	*Educational level*	*Occupation*	*Income level*
Do you think that oral health is affected by pregnancy?	.001*	na	na	na
Do you think that oral health affects pregnancy?	.354	na	na	.485
Do you think that dental treatment during pregnancy will negatively affect the fetus?	.267	na	na	.053
What is your source of information about oral and dental health?	.006*	na	na	na
Do you think there is a relationship between oral and dental health and the educational level of a pregnant woman?	.408	na	.092	.038*
Do you think there is that changing hormones during pregnancy negatively affect oral and dental health?	.012*	na	.799	na
Do you think that frequent visits to the dentist during pregnancy reduce the incidence of oral and dental problems?	.852	na	.398	na
Do you think that oral and dental problems lead to premature birth?	.684	na	na	na

** indicates statistically significant*
na indicates not applicable as conditions of Chi-Square test was not met

Results

A total of 450 subjects were approached online, among them 438 subjects responded to the survey (response rate of 97.3%). Table 1 shows that most of the participants were between 30-40 years old (n=315, 71.9%), bachelor level of education (n=245, 55.9%), unemployed (n=207, 47.3%), and average income level (n=385, 87.9%). The mean (sd) number of pregnancies was 3.3 (2.1).

Two-way cross-tabulation showed that 30-40 years are more likely to think that oral health is affected by pregnancy ($p<0.05$), dentists influencer on social media as a source of information about oral and dental health ($p<0.05$), and think there is that changing hormones during pregnancy negatively affect oral and dental health ($p<0.05$). Participants with an average level of income think there is a relationship between oral and dental health and the educational level of a pregnant woman ($p<0.05$) (Table 5).

Discussion

Pregnancy is a physiological process with a change in the hormonal level, which can bring about several changes in the systemic well-being of women. Though all hormonal changes occur because of preventing the early parturition and holding the fetus for the required

period, this brings about several unwanted changes in the many organs of the individual and the oral cavity is not exceptional to this1.

The oral cavity being the gateway for the many organs or parts of the body, maintaining oral health is of utmost importance. Oral health and periodontal health are influenced by the systemic condition and disease, and systemic disease and condition are affected by the periodontal disease. Thus, maintaining both the status quo of normalcy is necessary to maintain general health7.

Due to the hormonal changes, periodontal tissue responds to the existing plaque differently with the exaggerated response. This results in generalized gingivitis, gingival enlargement either localized or generalized. Often these changes in the oral cavity affect the status of the general health of the patient due to difficulty in eating. Patients tend to avoid the food or eat selective foods, which may lead to nutritional deficiency. Thus, oral healthcare and periodontal healthcare is an important aspect during pregnancy3.

One of the primary steps in the prevention of periodontal disease is creating awareness about oral and periodontal disease and how it affects the pregnancy. Many studies and systematic reviews have been carried out regarding the same in a different part of the world with conflicting results. Since many factors influence the knowledge and awareness moreover fast progressing social media and the ready content available on the internet should change the behavior and oral health knowledge during the pregnancy. Though there are many studies done, the change in the knowledge may be possible due to the ready content available on the net for the readers8.

The present study was done to assess the knowledge and awareness among pregnant women in Saudi Arabia. This study was much needed because there are no data available in the eastern region, Kingdom of Saudi Arabia. Though one study was done in the eastern province, it was 6 years ago. Several changes would have happened and that may have changed the pattern of understanding of the link between oral health and systemic health6.

The present study included an age group of 20 to 40 years and the majority of them were between 30 to 40 years, which was like the previous studies. It may be

important because experience over the previous pregnancy in older individuals should help to understand them better with the oral changes occurring during the pregnancy and precautions to be taken to prevent the occurrence. Few studies have quoted the number of pregnancies and awareness about oral health care and changes in the pregnancy. Another factor that influences awareness is educational and socioeconomic status. As the individual is better educated, awareness about these factors is considered to be increased. In the present study, the majority of our participants were bachelors, which is supposed to positively affect the outcome of the study. Similarly, the economic status of the individual6,9,10.

As expected, the subjects in our group appeared to follow stringent oral hygiene practices. Many of them were brushing twice daily and with the use of additional oral hygiene aids. Twice a day of brushing with the use of dental floss at least once in a while seems to be the practice of many individuals, though appears to be in contrast to some reported previous studies5,11. A close look at the data reveals that this is not an odd result, since many of our subjects were well educated and employed, they were aware of the consequences of the poor oral hygiene and its effect on the periodontal health, thus they tend to maintain good oral hygiene, which is also reflected in their answers6. It is to be noted that in a systematic review where they have compared the educational level and socioeconomic status they have found that better awareness and good oral hygiene practice was significantly related4.

Contrary to many reported previous studies, in our study, oral health knowledge and its relation to pregnancy were seen much better appreciated. The majority of the participants felt that oral health is affected by pregnancy and it is related to the hormonal changes seen during the pregnancy. It is well established in the many cross-sectional studies, hormonal changes are the important factor in the periodontal disease, and a many-fold increase in the hormonal level during pregnancy is considered to alter the ecologic equilibrium of dental biofilm, changes in the endothelial function, and alteration in the host response. Eventually results in gingival changes seen which are generalized gingival enlargement, increased gingival inflammation, and sometimes as localized tumor-like enlargement. One of the previous studies done in the eastern province6 also projected similar results with many of the participants aware of the changes in the oral cavity and periodontal changes. However, in contrast, a study done by Moawed et al. in Saudi Arabia showed poor knowledge among the participants5. The contrast reports seen among these studies may be due to many factors such as age, the number of deliveries, educational level, and socioeconomic status4.

There is a myth prevailing that, dental treatment may harm the fetus. Strictly speaking, there are no such contraindications to do the dental treatment during pregnancy9. Though it is being followed that it is better to avoid the dental treatment in the first or third trimester, due to the fact during the first trimester there is organogenesis and due to the emesis or feeling of vomiting, the treatment is relatively contraindicated. In the third trimester, because of the difficulty to sit in the supine position and because of a load of the fetus. However, translating the same to the common belief of not undergoing dental treatment is not correct. Many previous studies have shown similar results to the present study that dental treatment should not be undergone, or dental treatment may have an adverse effect. This may avoid the necessary treatment required for the pregnant woman and also it may harm the general health of the

patient, including the possibility of preterm low birth weight12.

Periodontal medicine is a new branch of periodontics and a topic widely studied in the last two decades. Though the concept was presented 100 years ago, the scientific basis for the same was explained in this decade with the many cross-sectional studies. Many microbiological-related etiologies and host responses rightly explain the underlying mechanism. Since the concept is new, awareness is not there among the common people, it is the same with the health care professional. In the present study, it was found that many of the subjects did not know about the relation between the periodontal disease and pregnancy outcome or preterm low birth weight, similar reports were also noted in the previous studies7.

The result of the present study though depicts a good response with regards to knowledge and awareness about the periodontal health and systemic health, few of the aspects require or shows the need of educating the patient regarding a certain aspect of the link between periodontal diseases as a risk factor the pre-term low birth weight is evident. Till today many studies are being done and recommendations are given, however translating this recommendation to the actual benefit is not been studied to date. Follow-up and probably implementation of the findings to be taken seriously which is going to benefit the patient and probably it may reduce the prevalence of preterm low birth weight and at the same time reduce the prevalence of gingivitis in these special group of subjects.

However, there are certain limitations in the study. We have not considered the number of pregnancies, the trimester of pregnancy, and their exposure to dental advice or gynecologist advice. Thus, future studies should involve all these factors when they are evaluating the knowledge and awareness of oral health and pregnancy.

Conclusions

Within the limitations of the study, the following conclusion can be drawn:

1. The majority of the patients had good awareness about oral and periodontal health during pregnancy
2. Oral hygiene practice awareness during the pregnancy among the subjects was good
3. Patient awareness about periodontal disease as a risk factor for pregnancy outcome needs to be improved
4. Awareness program for this special group of patients will help to achieve good oral and systemic health

Conflict of interest

The authors declare that there is no conflict of interest.

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