

The effect of socio-demographic factors on the oral health knowledge, attitude and behavior in a female population

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الهدف من هذه الدراسة هو اختبار تأثير المتغيرات الديموغرافية والتدخين على معرفة وموقف وسلوكيات الأمهات تجاه صحة الفم وعلاقته بالحمل. أجريت الدراسة باستخدام الاستبيان الفردي على ٥٢٨ أم. أظهرت النتائج أن ٨٠,٦% من الأمهات يعتقدن أن الحمل يؤثر على صحة أسنانهن ولثتهن. أكثر من ثلثهن يعتقدن بفقدان سن مع كل حمل، الاعتقاد الأخير كان سائدا لدى المجموعات الأكبر سنا والموظفات و الأكثر تعليما و أطفال وحملًا. حوالي ٧٢% من الأمهات يعتقدن أن الحمل يأخذ الكالسيوم من أسنانهن وكان اعتقادا سائدا بين السعوديات ذات الطبقة الاجتماعية العالية. ثلثي المستجيبات يعرفن أن صحة الفم أثناء الحمل يمكن أن تؤثر على صحة ونمو الأجنة، لكن أكثر من نصفهن وخاصة الأقل تعليما لا يعرفن بأن تناول التيتراسايكلن يمكن أن يؤثر على أسنان موليدهن، أيضا أكثر من النصف يعتقدن أن زيارة طبيب الأسنان أثناء الحمل تكون مع وجود الأم و ١٧,٣% لا يرون ضرورة من هذه الزيارة وخاصة الأقل تعليما والأكثر أطفالا وحملًا. بالنسبة لسلوكيات الأمهات أثناء الحمل ٦٥.٦% تناولن الحليب والكالسيوم و ٦٥,٨% لم يغيرن طريقة تنظيف أسنانهن. الخلاصة أن معظم الأمهات يعتقدن بوجود آثار سلبية للحمل على صحة الفم لكن لم يمارسن الطرق الوقائية المجدية و الكافية والمواقف الايجابية اتجاه زيارة طبيب الأسنان.

OBJECTIVES: The aim of this study was to examine the effect of socio-demographic variables and smoking habits on oral health knowledge, attitude and behavior in a female population. **MATERIALS and METHODS:** Five hundred twenty-eight mothers responded to a self-administered questionnaire. **RESULTS:** The results showed that 80.6 % of the mothers believed that pregnancy had an effect on their teeth and gums, and more than one-third believed that they lost a tooth for every pregnancy. Working women of older age group and higher education, as well as larger parity and gravidity, indicated the latter attitude more frequently. About 72 % of the women believed that pregnancy removed calcium from their teeth and this was a common belief among Saudi women with higher socio-economic status. Two-thirds of the respondents were aware that during pregnancy, their oral health could affect the fetal health and growth, but more than half did not know that tetracycline could affect their baby's teeth particularly among women with low education. In addition, more than half believed that dental visit was needed only when in pain, while 17.3% considered such visit not a necessity particularly those with low education but high parity and gravidity. Relative to mothers' behavior, 65.6% of the respondents took calcium and milk and 65.8% did not change their oral hygiene habits during pregnancy. **CONCLUSION:** Most of the women believed that there were "negative effects" of pregnancy on their oral health but nevertheless did not demonstrate adequate and proper concomitant oral hygiene practice and positive attitudes toward dental visits.

INTRODUCTION

Pregnancy and pregnant mothers pose a unique challenge to dentists, not only because of some oral changes as consequences of the physiological changes that occur during pregnancy, but also because the general and oral health of their growing fetus do become a matter of concern.¹ Emerging evidence has shown that periodontal disease may be associated with pre-term low birth weight,² growth retardation,³ and pre-eclampsia.⁴ In a USA study, only 43%

of the females reported their awareness of the potential association between oral health and pregnancy outcomes.⁵ Therefore, it has been recommended that dental care needs should be an integral part of the pre-natal care. All team members who provide mother and child healthcare should get continuing education regarding the relationship between dental health and pregnancy outcome and should reinforce the importance of regular dental care during pregnancy.

In Saudi Arabia, the ante-natal care is now widely available and it has been

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reported that antenatal services are utilized by a high proportion (96.6%) of Saudi women living in the capital city, Riyadh.⁶ Important contributory factors to the utilization of such services apart from its availability and accessibility are the socio-demographic characteristics of the mothers.⁷ However, the association between the use of dental services during pregnancy and demographic characteristics was less clear. There are conflicting results regarding the association of age, race, education and household incomes with the likelihood of dental visit during pregnancy.^{5,8,9} Furthermore, healthier lifestyle behaviors were associated with greater likelihood of having had a dental visit during pregnancy, e.g. mothers who reported smoking before and after pregnancy were less likely to report of dental visits during pregnancy.⁵ In Saudi Arabia, there is a published study that investigated the extent of dental awareness among mothers in antenatal clinics in Al Jubail area.¹⁰ Results showed that poor standards were evident in relation to the knowledge of basic aspects of dental health among the respondents and the most significant deficiency was failure to seek regular dental care during pregnancy. The above information encouraged us to conduct this study with the aim of examining the impact of the mothers' socio-demographic variables and smoking habits on their oral health knowledge, attitude and behavior in relation to pregnancy. The results of such research could provide basic information for the planning and implementing of antenatal oral health education programs during pregnancy, and to highlight the reasons of and the barriers to attaining good oral health knowledge and assuming, positive attitudes and satisfactory behaviors during pregnancy.

MATERIALS AND METHODS

The survey study included a convenient sample of 528 females, resident in Jeddah, the second largest city in the Kingdom of Saudi Arabia. The sample was selected from the female population present in the reception areas and waiting rooms of the major governmental and private hospitals of the city, and who were either accompanying the patients or attending to their own care. The surveyed subjects were all women whether pregnant or not, above 16 years of age and who were able to understand and answer a self-administered Arabic questionnaire. The sample subjects were stratified by age, socio-economic status and further classified by smoking habits. The questionnaire was adapted from questionnaires used in other published studies and was peer-reviewed by colleagues and experts in survey research at King Abdul Aziz University, Faculty of Dentistry, Jeddah. Furthermore, a pilot pretest study was conducted on 50 subjects and modification was done based upon their responses. The questionnaire included demographic data and smoking habits as well as several other questions to assess the mothers' oral health knowledge, attitude and behavior related to pregnancy (Tables 1-4). The demographic information included maternal race, age, marital status, work status, educational level, family income, gravidity (number of pregnancies), parity (number of children) and smoking habits. Answers to the last variable were dichotomized as "yes or no". The questionnaire was self-administered but some clarification of the questions was allowed in case of mother's inquiries. However, no suggestions or further discussions were given. After obtaining a verbal consent, an average

respondent needed approximately 10 – 15 minutes to complete the questionnaire. All questionnaires were collected and the received data statistically analyzed.

Table 1. Demographic characteristics and smoking habits of the survey respondents (N = 528)

Variable	Number	Percent
Nationality		
Saudi	347	66.0 %
Non Saudi	179	34.0 %
Age (Years)		
≤ 19	12	2.3 %
20 – 29	185	35.5 %
30 – 39	204	39.2 %
≥ 40	120	23.0 %
Marital status		
Married	499	95.0 %
Divorced	16	3.0 %
Widow	10	1.9 %
Working status		
Yes	114	21.8 %
No	409	78.2 %
Educational level		
Illiterate	39	7.4 %
Primary & Middle School	177	33.5 %
High School	128	24.3 %
Diploma & University	173	32.8 %
Post Graduate	10	1.9 %
Family income (SR / month)		
<1500	94	18.3 %
1500 3000 –	134	26.0 %
3000 6000 –	135	26.2 %
6000 10000 –	82	15.9 %
>10000	70	13.6 %
Numbers of children		
0	52	10.5 %
1 – 3	208	41.9 %
4 – 6	187	37.7 %
≥ 7	49	9.9 %
Numbers of pregnancy		
0	29	6.1 %
1 – 3	173	36.4 %
4 – 6	188	39.6 %
≥ 7	85	17.9 %
Smoking habits		
Yes	39	7.5 %
No	482	92.5 %
Smoking types		
Cigarettes	19	48.7 %
Shisha & Muasel	20	51.3 %

Table 2. Response to oral health questions in the survey

Question	Number	Percent
1. Does pregnancy affect the teeth and gums health?		
- Teeth only	106	20.3%
- Gums only	10	1.9%
- Teeth and gums	305	58.4%
- No effect	40	7.7%
- Don't know	61	11.7%
2. How does pregnancy affect the teeth?		
- Take calcium from the teeth	381	72.4%
- Accelerates caries progression	59	11.2%
- Has no effect	25	4.8%
- Don't know	61	11.6%
3. Does the oral health of the pregnant mother affect the health and the growth of her fetus?		
- Yes	348	69.7%
- No	57	11.4%
- Don't know	94	18.8%
4. Taking antibiotics such as tetracycline during pregnancy, can it affect your baby's teeth?		
- Yes	201	40.3%
- No	39	7.8%
- Don't know	259	51.9%
5. Have you received advice on caring for your coming baby's teeth during pregnancy?		
- Yes	336	67.1%
- No	165	32.9%
6. What are the sources of your oral health information's?*		
- Television	278	27.4%
- Radio	64	6.3%
- Physician	25	2.5%
- Dentist	221	21.8%
- Books & Journals	223	22.01%
- Schools & Colleges	58	5.7%
- Mothers & Previous experiences	69	6.8%
- Primary care centers	35	3.5%
- I have no oral health information	40	3.9%

* More than one answer is allowed

The survey results were analyzed for all the socio-demographic data and smoking habits, however, only the statistically significant results will be mentioned in the results' text without tables.

Table 3. Response to questions on oral health attitude

Question	Number	Percent
1. Do you think that you lose a tooth for every pregnancy?		
- agree	162	32.1%
- disagree	228	45.2%
- neutral	114	22.6%
2. Do you think that your diet and nutrition during pregnancy will affect your baby's teeth?		
- agree	416	82.2%
- disagree	49	9.7%
- neutral	41	8.1%
3. Do you think you need to visit the dentist during pregnancy?		
- Only with pain	299	57.6%
- For check up & prophylaxis	76	14.6%
- For follow up & routine treatment	54	10.4%
- Not necessary	90	17.3%

Table 4. Response to oral health behavior questions

Question	Number	Percent
1. During pregnancy did you take any of the following? *		
- Calcium and milks	400	65.6%
- Vitamins and proteins	190	31.1%
- Fluoride supplements	11	1.8%
- Others	9	1.5%
2. During pregnancy did you change your way of taking care of your teeth?		
- Yes	143	31.1%
- No	302	65.8%
- Don't know	14	3.1%
a- How if it is improved?		
• Increase brushing times	112	66.67%
• Use of dental floss	15	8.93%
• Use of miswak	36	21.43%
• Others	5	2.97%
b- What are the reasons if it is worse?		
• No time	14	11.0%
• Weakness & tired	64	50.4%
• Bad taste of the cleansers	40	31.5%
• Others	9	7.1%

* More than one answer is allowed.

STATISTICS

The data analysis was performed by means of SPSS program version 12 and the frequency distributions were computed. The Chi-square test was used to detect differences between various populations considering the socio-demographic data and smoking habits. The P value was set at <0.05 for significance throughout the study.

RESULTS

The demographic profiles of the survey respondents as well as their smoking habits are shown in Table 1. Most of the women were younger than 40 years of age ($\bar{x} + SD=32.78 \pm 8.93$), married and housewives of relatively moderate socioeconomic status as judged by household income and educational levels. Only 7.5% of the respondents were smokers for an average 10 years ($\bar{x} \pm SD = 10.68 \pm 9.27$ yrs.) and the predominant smoking forms among the group were shisha or muasel (51.3%). Data regarding maternal knowledge, attitude and behavior are presented in Tables 2, 3 and 4 respectively.

KNOWLEDGE AND ATTITUDE

Most women (80.6%) believed that pregnancy had an effect on their oral health. However, their responses varied on determining the exact affected tissues, though the majority chose teeth and gums, particularly Saudi women that had high educational level and salary income, ($P < .05$). On the other hand, women with lower socioeconomic status, represented in non-working position and lower educational level more commonly reported "no effect" answers ($P = .000$). More than one third of respondents believed that they lost a tooth for every pregnancy and 22.6% were uncertain. This belief was commonly reported among women who were of older

age group and working mothers with higher education and large numbers of children and frequent pregnancies. ($P = .000$). To explain the mechanism of the effect, the majority (72.4%) answered that pregnancy removed calcium from their teeth, but few (11.2%) answered that it accelerated caries progression. Removal of calcium from the teeth was the more common answer among Saudi respondents and those of higher socioeconomic status represented by the work position with higher educational level and higher income, ($P < .05$).

Two-thirds of the respondents (69.7%) were aware of the fact that, oral health during pregnancy could affect the health and the growth of the coming fetus, but the remaining third responded incorrectly or were uncertain (11.4% and 18.8%, respectively). The correct answers were more common among smokers and mothers of multiple children, as well as lower income ($P < .05$).

A slight majority, 59.7% of the participants, did not know that taking tetracycline antibiotic during pregnancy could affect a growing baby's teeth. On the other hand, statistical analysis showed that the correct information regarding this item was more common among mothers that had higher education as well as working mothers ($P < .05$). About one-third (32.9%) of the respondents had not received an advice during pregnancy on the care of their baby's teeth. Smokers as well as those having jobs and higher education reported, getting the advice more than others ($P < .05$) do. The majority of the surveyed women (82.2%) believed that their diet and nutrition during pregnancy could affect their baby's teeth, although some did not believe and others did not have that attitude. Overall, mothers of higher income reported this attitude more frequently ($P = .039$).

Regarding the sources of the oral health information, most respondents

had multiple sources. Watching television programs was the main source of the information, followed by books and journals as well as dentists in descending order (Table 2). Statistical results showed that, reading books and journals was the major source of oral health information among Saudi mothers with higher socioeconomic status (employee with higher education and income) but less parity and gravidity ($P < .05$). However, dentists were the major source among mothers' group of higher education, ($P = .008$).

Regarding attitude to the dental visits, pain (57.6%), prophylaxis and check up (14.6%) and routine treatment (10.4%) were the reasons given for visiting the dentist by the respondents. Meanwhile, 17.3% of the respondents considered dental visits during pregnancy as not necessary (Table 3). Women with low education but multiple numbers of children and pregnancies ($P < .05$) indicated the latter attitude more frequently.

ORAL HEALTH BEHAVIOR DURING PREGNANCY

Relative to general and oral health behavior, participants of the survey reported multiple answers regarding taking nutritional supplements as an effort to improve their baby's dentitions. Calcium and milk were the most reported supplements taken by the group (65.6%). Fluoride supplementation was reported by 1.8% of the respondents (Table 4). Statistical analysis indicated that female demographic variables had no effect on the fluoride supplements uptake. However, females with higher education and higher income more frequently ($P < .05$) agreed upon calcium and milk.

Regarding oral hygiene habits during pregnancy, 65.8% women in the survey had not change their oral hygiene

patterns in pregnancy. Increasing the brushing frequency was found to be the predominant way used to improve the hygiene pattern by 66.7% of the respondents followed by the use of miswak (21.4%) and the dental floss (8.9%.) On the other hand, the group who reported changes in their hygiene habits for the worse habits claimed several factors including in descending orders: tiredness, bad taste of the oral cleansers and lack of time. Tiredness and weakness were the most commonly reported factors by non-Saudi women as well as women with low income ($P < .05$).

DISCUSSION

The purpose of the current study was twofold, first to examine women's oral health knowledge, attitudes and behavior related to pregnancy and secondly to relate the findings to the female socio-demographic data and smoking habits. Data from the study could be used to increase public awareness of the importance of oral health preventive measures during pregnancy. Overall, there seemed to be insufficient knowledge among this group of mothers, represented by high proportions of incorrect as well as do-not-know answers. Most of the women believed that pregnancy had an effect on their oral tissues and the old wife's tale "the loss of a tooth for every pregnancy" was still widely accepted, as well as the belief that softening (decalcification) of the teeth occurs during pregnancy to supply minerals to the growing fetus. This was not a first time finding among Saudi community. In Al Jubail area, 47.9% of the surveyed antenatal women thought that pregnancy caused teeth to go bad.¹⁰ Interestingly, in Finland, also 47% of the women thought that pregnancy as such was detrimental to their dental health and that opinion was more common among women who were pregnant for

the third or more times than those having their first gestation.¹¹ Similarly, the current results showed that mothers who had many children and multiple pregnancies, believed more on the loss of a tooth for every pregnancy than those with less children and pregnancies. This belief has no histological, biochemicals or roentgenographic evidence to support it.¹²⁻¹⁵ The present findings revealed that the impact of the socio-demographic status represented by the working status, higher education level and higher income, correlated negatively with mothers' awareness in this regards, which emphasizes the need for informed action for better public general and oral health education.

Most of the mothers (69.7%) knew that their oral health during pregnancy could affect the health and growth of their coming baby; and more than 80% of them realized that poor diet or nutrition during pregnancy may affect fetal dentition. Such high awareness may be attributed to the combined efforts made by the medical and dental professions and the media in the field of prenatal health education. In USA, only 39% of the questioned women thought that tooth and gum problems could affect pregnancy outcomes.⁵ Recently, it has been reported that knowledge and awareness of the pregnant Jordanian women about their teeth and gingival conditions were generally poor and only 5.1% believed that there might be a relationship between gum disease and premature labor.¹⁶

However, only 40% of the mothers knew that tetracycline drugs could affect fetus dentition, which is a low percentage in comparison to other reports.^{17,18} This was common among groups that were working and had higher education level. The other groups could benefit from public health education on such important oral health topics. Similarly, it has reported that a significant information deficit existed

among the obstetric patients in Riyadh city regarding drugs and pregnancy, with only 30% of the interviewed patients knowing that drugs and medication could affect the health of the fetus.¹⁹

Another disappointing finding of this study was that one-third of the women were never advised on caring for their baby's teeth during pregnancy, although pregnancy is a phase of increased motivational sensitivity, where mothers become motivated and receptive to receiving and learning new information.¹⁷ Interestingly, our data showed that smoking habits has a significant positive impact on the mother's responses in two ways. The first was an awareness regarding the effect of the oral health on the pregnancy outcomes and the second was in getting advice regarding the baby's dentition. Smokers may be aware of the known effects of smoking on general health.

The survey participants, indicated multi-sources for their oral health information, but TV was the main source. Physicians' role appeared low which might be due to their own attitude for education or insufficient time for education. Since physicians have more contact with mothers during pregnancy and nursing periods, they should provide more contribution in this regard. The dentist, who is supposed to be the professional source, also appeared to have little contribution in public education. Books and journals constituted the next source of information for women in getting medical and dental health information through reading. Our finding is in agreement with an earlier local study which reported that Jeddah population claimed that television was the main source of their oral health information followed by information from dentists.²⁰

The studied group showed negative attitude regarding regular dental visits in pregnancy, where more than half of the

respondent visited the dentist only when in pain and 17.3% of them considered such visit as unnecessary especially women with low education and multiple gravidity and parity. These findings agreed with those of two local surveys: in Al Jubail area where 67% of the antenatal women visited their dentists only when they had problems and 91% had never been advised to do that and in Riyadh city where only 9% of the obstetrics patients visited their dentists during pregnancy.^{10,19} Perceptive need for dental treatment during pregnancy was also related to socio-demographic and medical characteristics in several studies.^{5,8,21,22} In Egypt, with increased age and gravidity, there were less perception for dental treatment needs.²² The explanation was that older mothers with multiple pregnancies tended to neglect more their oral condition or considered the oral manifestations associated with pregnancy as a normal event or situation which would resolve after delivery.

Most of the women in this study, took nutritional supplements during pregnancy to improve their baby's teeth. Pregnant patients normally receive nutritional guidance from their obstetricians, which should also be reinforced by the regular dental advice and check up. Regarding the prenatal fluoride supplement, it was reported by 1.5% of the respondents although it has been an area of controversy.²³ The American Academy of Pediatric dentition stated in its 1994 - 1995 Reference Manual that the efficiency of prenatal fluoride was regarded as equivocal, although its use in fluoride-deficient community (less than .3 ppm) was considered to be safe for both mother and fetus.²⁴ There is a report that in Jeddah, caries prevalence among children was the highest in comparison to the other surrounding cities, due mainly to the low level of fluoride in the city drinking water.²⁵ In Saudi Arabia,

generally, there is a low usage of both professionally and commercially available fluoride products.²⁶

Regarding the oral hygiene habits, most of the women did not change their habits during pregnancy. This finding compares with a report from Jordan, where 56% of the pregnant women did not believe that frequency of tooth brushing should increase during pregnancy.¹⁶ Causal home care practices that may have no immediate adverse consequences in the women, who are not pregnant, may be a problem for the same one during pregnancy. Pregnant mothers need extra care that match their eating habits and the physiological changes that made them at risk of dental disease. In addition, it has been found that mother's socio-economic status had an impact on the mother's oral hygiene practice during pregnancy as was reported in Kuwait, where pregnant women with higher education brushed more frequently than others, the younger than the older do and homemakers less often than working wives do. However, number of children (parity) was not associated with tooth brushing.²⁷ In the current survey, mothers who improved their oral hygiene practice during pregnancy indicated that they increased the frequency of brushing and the use of miswak. This is similar to a report from Ghana, which indicated that the second common method of oral hygiene practices among pregnant women was chewing stick alone compared to tooth brush with paste in non-pregnant women. However, the most common method of oral hygiene practice reported by both groups pregnant and non-pregnant was a combination of the use of chewing stick and toothbrush.²⁸

Our study is not without limitations. Firstly, because it relied on self-reported data, the study could be subjected to the biases inherited in this method; secondly, there was a limitation imposed by the

convenience sampling. Our findings cannot therefore be generalized to other women in the country because people seeking care in the hospitals tend to differ significantly. Despite these limitations to our knowledge, this study was the first Saudi one that investigated the level of the mother's awareness regarding the potential association between the oral health and the pregnancy outcomes. In addition, it investigated the impact of the mothers socio-demographic and smoking habits in this regard. Such results may be useful in developing new program or evaluating existing ones or help policy maker in designing interventions that could improve the general and oral health of pregnant women and coming generations.

CONCLUSION

The need for oral health education of this group of mothers was confirmed by the present results. First, the survey showed a clear discrepancy between dental knowledge, attitude and behavior. On the one hand, most of the mothers knew about the effects of pregnancy on their oral health. Nevertheless, the proper preventive measures were inadequate as demonstrated by unsatisfactory oral hygiene regime and negative attitude to dental visits during pregnancy. There is a need to establish regular dental education and preventive programs for pregnant mothers in Saudi Arabia as evidenced by their shortage of knowledge in many areas.

Health care providers during pregnancy, eg. obstetricians, primary care physicians and dentists need more education on the current issues regarding oral health and should develop a positive referral system to assure that expectant mothers receive early dental examination, preventive dental counseling for themselves and the future child as well as the necessary treatment.

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