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ABSTRACT This study assessed the association between oral health knowledge and practices of pregnant Saudi women selected from visitors to a government hospital in Dammam, Saudi Arabia in 2014. Women answered questions on oral health knowledge during pregnancy and knowledge of infant oral health. Most women (> 70%) knew that dental caries in children can be prevented, that pregnancy affects oral health and that dental treatment during pregnancy can negatively affect infants. Most women (> 80%) performed oral hygiene procedures but only 18% regularly visited the dentist. In a regression analysis, oral health knowledge was not significantly associated with reported oral hygiene practices. Women who visited the dentist regularly were more likely to know how to prevent caries in children, and that dental treatment during pregnancy and infant health were associated.

Association entre les connaissances et les pratiques de santé bucco-dentaire des femmes enceintes saoudiennes à Dammam (Arabie saoudite)

RÉSUMÉ La présente étude avait pour objectif d'étudier l'association entre les connaissances et les pratiques en matière de santé bucco-dentaire de femmes enceintes saoudiennes sélectionnées dans un hôpital public à Dammam, Arabie saoudite, en 2014. Les femmes interrogées ont répondu à des questions concernant leurs connaissances sur la santé

bucco-dentaire pendant la grossesse et la santé bucco-dentaire du nourrisson. La plupart des femmes (plus de 70 %) avaient connaissance du fait que les caries dentaires chez l'enfant peuvent être évitées, que la grossesse a une influence sur la santé bucco-dentaire, et que les traitements dentaires pendant la grossesse peuvent avoir un impact négatif sur le nourrisson. La plupart des femmes (plus de 80 %) appliquaient des pratiques d'hygiène buccale, mais seulement 18 % se rendaient régulièrement chez un dentiste. Une analyse de régression a montré que les connaissances en matière de santé bucco-dentaire n'étaient pas associées de façon significative à l'application de pratiques d'hygiène buccale. Les femmes consultant régulièrement un dentiste étaient plus susceptibles de savoir comment prévenir les caries chez l'enfant, et qu'un traitement dentaire pendant la grossesse et la santé du nourrisson étaient corrélées.

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Introduction

Pregnancy is a critical period that involves physiological and psychological changes. These alterations may impose a burden on many women, leading them to neglect their general and oral health. There is a positive association between oral health problems such as periodontitis and adverse pregnancy outcomes such as preterm birth and eclampsia, and good oral health can reduce the risk of these outcomes (1–5). In the same context, several factors are known to be associated with children's oral health status, including maternal oral health knowledge and status, education, occupation and age (6–10).

Saudi Arabia is known for its high prevalence of caries (11,12). Children as young as 71 months have high rates of severe caries (13,14). Caries prevention programmes aim to control promoting factors (15) and reinforce protective factors (16). Oral health education programmes are cost-effective methods that can decrease disease risk through modifying social and dietary factors (17). These programmes aim to improve knowledge of oral health issues, and are based on the assumption that proper oral health practices occur when people have adequate knowledge (17). Many studies have investigated the applicability of this model among pregnant women in several countries with different cultures (18–20), and similar studies have been conducted among pregnant women in some regions of Saudi Arabia (21,22). However, there is inadequate information about whether knowledge of oral health issues leads to adoption of

proper practices by Saudi pregnant women. The present study was conducted to: (1) assess oral health knowledge and reported oral health practices in pregnant Saudi women; and (2) investigate the association between these reported practices and oral health knowledge.

Methods

Study design and setting

A cross-sectional study was designed to collect data from pregnant women visiting a Ministry of Health hospital in Dammam, Saudi Arabia from February to April 2014. Approval for the study was obtained from the Research Ethics Committee of the College of Dentistry, University of Dammam (#EA2014003). The study was conducted in full accordance with the Helsinki Declaration. Responding to the questionnaire was considered an agreement to participate in the study.

Study sample

The estimated sample size was calculated to be 196 women (sample size calculator: http://www.dartmouth.edu/~eugened/power-samplesize.php). The following assumptions were used to estimate sample size: type I error = 5%; type II error = 20%; and odds that proper knowledge (of the relation between dental care during pregnancy and fetal health) is associated with seeking care during pregnancy = 2.5. Correct knowledge of this issue was assumed to be present in 50% of pregnant women, and actual regular seeking of care by visiting the dentist was assumed to be done by 20% of pregnant women.

Consecutive women were selected from those visiting the hospital between October and December 2014 who fulfilled the inclusion criteria that included: Saudi pregnant women; literate or accompanied by a literate companion to read and respond to the questionnaire; and free from systemic diseases as verified from the hospital records. This governmental hospital was selected for recruitment of study participants because of its large and well-equipped obstetrics and gynaecology department, to which pregnant women are referred from several cities in the Eastern Province, with an estimated 100 pregnant women visiting monthly for various reasons. Other hospitals were not included because of their lower patient flow, which would have added only a small number to our sample. In addition, the diversity of patients from the selected hospital had a better chance of representing Saudi pregnant women in the Eastern Province than samples based on small hospitals with limited pools of patients.

Data collection tool

Data were collected using a self-administered, anonymous questionnaire in Arabic. The questionnaire was assessed for content and face validity and pilot tested on 20 women who were not part of the study. Previously published Arabic questionnaires could not be accessed

because we could not reach their authors. Individual questions in the questionnaire were used and reliability was not assessed because there was no calculation of overall scores that expressed concept/status.

The study purpose was explained in an attached covering letter. The questionnaire included 20 close-ended questions that were separated into three sections. The first section was based on demographics and whether the women had children before the current pregnancy and the second section assessed oral health knowledge. In the second section, women answered true, false or do not know to each of 10 statements. They were also asked about their source of oral health information. The third and last section in the questionnaire assessed oral health practices. It included questions about: whether the participant performed any oral hygiene practices; frequency of brushing, flossing and using miswak; and if she had regular dental visits. The questionnaire was distributed to pregnant women attending the prenatal clinic for routine follow-up. Completed questionnaires were collected at the same session. Data were coded and entered into an Excel file.

Statistical analysis

Descriptive statistics were calculated to characterize the sample and assess the level of knowledge and oral health practices of the study sample. Univariate logistic regression models were developed for which the outcomes were: practicing oral hygiene (yes/no); and visiting the dentist regularly before and after pregnancy (yes/no). The independent variables were university education, having children, and knowledge related to each of the two outcomes. For oral hygiene practices, association with knowledge of the following was investigated: oral health relation with pregnancy; oral health relation with pregnancy outcomes; relation between maternal and infant oral health; transmission of cariogenic microorganisms to infant through saliva; and correct methods to prevent caries in children. For regularly visiting the dentist, the following were investigated as independent variables in addition to those listed above: could dental visits be scheduled during pregnancy; effect of dental treatment on infants; and actual practice of oral hygiene. Multivariate regression models were constructed to adjust mutually for all included variables. Odds ratios and confidence intervals were calculated.

Results

Two hundred and seventeen Saudi pregnant women were approached with the questionnaire and 197 (91%) responded. The greatest percentages of participants were in the age groups 21–30 and 31–40 years (47.4% and 42.2% respectively) and had less than university education (69.6%). Two thirds (59.1%) of them already had at least one child (Table 1).

The majority of participants knew that food affects oral health (88.7%), infants should not sleep

while breast or bottle feeding (86.5%), oral health is affected by pregnancy (82.8%), caries in children can be prevented (75.5%) and dental treatment does not negatively affect fetal health (72.9%). Around half the participants knew that dental visits can be scheduled during pregnancy (53.6%) and that pregnancy hormones can affect oral health (44.7%). A minor proportion of participants knew that cariogenic bacteria can be transmitted from mother to child through saliva (28.9%), the correct methods to prevent caries in children (27.7%), and that maternal oral health may affect pregnancy outcomes (22.6%).

Most participants obtained oral health information from dentists or the media (36% and 30.6%, respectively), which together accounted for 66.6% of oral health information sources, followed by family and friends (12.9%) and several different sources (8.1%). Some patients (12.4%) reported no source of health information.

One hundred and sixty-one (81.7%) participants reported performing oral hygiene procedures, with 100 (51.5%) of them brushing at least twice daily, 84 (43.8%) sometimes flossing and 92 (47.7%) sometimes using miswak (Table 2). Only 34 (18.1%) reported regular dental visits before and after pregnancy.

Table 3 shows the association between oral health practices and knowledge in addition to two potential confounders: education and having children. Having children was associated with lower odds of practicing oral hygiene procedures, which remained statistically significant in the multivariate model that included knowledge and education [odds ratio (OR) in the multivariate model = 0.32]. This was the only factor in the model that was significantly associated with performing oral hygiene procedures. Knowledge of the correct methods to prevent caries in children was associated with higher odds of regular visits to the dentist (OR in multivariate regression = 2.76). Correct knowledge of the relation between dental treatment during pregnancy and fetal health was also associated with higher odds of regular dental visits (OR in multivariate model = 5.14). Practicing any form of oral hygiene was not associated with visiting the dentist (OR = 2.60, 95% confidence interval = 0.75–9.08).

Discussion

This study assessed the association between oral health knowledge and practices among Saudi pregnant women. The majority of the participants (>70%) revealed good oral health knowledge related to pregnancy and infancy. This disagrees with some previous studies (19,23) but agrees with many others (9,18,20,22). This reasonable level of knowledge may be related to the fact that one-third of women relied on dentists as a source of oral health information. Some participants had poor knowledge, which may be attributed to their educational level, as only one-third had a university degree. This agrees with Moawed et al., who found that women with

lower education level had a lower score for oral health knowledge, particularly about the relation between periodontitis and preterm birth (22). Similarly, Chacko et al. (24) found that women with higher education expressed more awareness about bacterial transmission from mother to child and about caries preventive methods, although this finding was not statistically significant. The present study also highlighted the role of dentists and mass media in providing oral health information. Chacko et al. (24) found that oral health information was delivered mainly through non-healthcare providers, and those who received information from healthcare workers had better oral health knowledge.

Half the participants reported brushing their teeth twice daily, although another half of them never flossed. These findings were similar to other studies that assessed oral health practices (18–20,22). Having children was negatively associated with performing oral hygiene procedures; most probably because mothers' time was taken up by tending to their children. Some studies have found a significant relation between regular dental visits and oral health knowledge; especially information about complications of bad oral health and bacterial transmission to infants (18,22). This is also similar to our findings. Dentists should therefore allocate time to explain the role of maternal oral health in preventing negative pregnancy outcomes, in addition to the maternal role in controlling transmission of cariogenic bacteria to infants. An emphasis on aspects related to child health may be important in motivating pregnant women to care more for their own health. Preventive programmes using mass media may also be of value in providing correct oral health information, as well as programmes provided by nurses at antenatal clinics, while expectant mothers wait for check-ups.

The importance of oral health in ensuring positive pregnancy outcomes is acknowledged (1–5). Nevertheless, hormonal alterations affecting oral health during pregnancy cannot be prevented. As such, pregnant women need regular dental check-ups as part of their prenatal care. In the present study, only 18.1% visited the dentist before and after pregnancy and 33% stopped their dental visits during pregnancy. This agrees with previous studies that found that women may decrease or stop attending dental check-ups during pregnancy (18,19,22,25,26).

Health practices are assumed to be related to knowledge and a good level of knowledge is followed by adoption of proper practices (19). This was not the case in our study, which showed only a limited relation between oral health knowledge and practices. Our study also showed that adopting one oral health practice does not necessarily mean that others will be followed. We did not find an association between performing oral hygiene and regular dental visits, which disagrees with Moawed et al. (22).

The main limitation of our study was relying on self-reports, in which the desire to give the

correct response may have overestimated oral health practices. Future studies assessing oral hygiene clinically using plaque indices and assessing actual visits from records may avoid this bias. Our study explored some important aspects such as the extent of oral health knowledge among Saudi pregnant woman in and around Dammam and the relation between their oral health knowledge and practices.

In conclusion, Saudi pregnant women had basic oral health knowledge but this knowledge was not strongly associated with reported self-care through performing oral hygiene procedures. Similarly, pregnant women were more likely to visit the dentist during pregnancy if they had proper knowledge about the effect of oral health and dental treatment on children's oral health. Incorporating messages related to infant oral health in the information package delivered to pregnant women may further encourage Saudi pregnant women to visit the dentist regularly.

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