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Survey of medical doctors' attitudes and knowledge of the association between oral health and pregnancy outcomes

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Abstract: *Objectives:* The study was designed to assess the views and knowledge of healthcare providers in general medicine and other specialties on the association between oral health and pregnancy outcomes. *Material and Methods:* Two hundred and fifty physicians practicing in northern Jordan hospitals and healthcare centers were asked to complete a questionnaire. Completed questionnaires with the answers were returned completed by 197 participants (response rate was 79%). *Results:* The majority of the physicians (81%) agreed that pregnancy increases the tendency to have gingival inflammation. However, 88% of doctors advised delay dental treatment until after pregnancy. Only half (54%) thought that tooth and gums problem can affect the outcomes of pregnancy. Moreover, approximately 50% agreed with the possible association between oral health and pregnancy outcomes. Altogether, 52% agreed with the statement 'a tooth for a baby' and 57% believed that calcium will be drawn by the developing baby. If asked to advise patient to visit dentist during pregnancy, 50% said they would do so. Moreover, the majority (68%) did not advise women planning to become pregnant to include a periodontal evaluation as part of their prenatal care. About 32% felt that periodontal disease can be treated safely during pregnancy with a procedure called scaling and root planning. Reading the information in a book, magazine or pamphlet was useful and reliable information about preterm births and periodontal disease. Physicians do not routinely advise their patient to seek dental care during pregnancy. General practitioners were less informed about oral health practices on pregnant women. Issues on training need to be addressed. A public health campaign is required to educate healthcare providers to encourage pregnant women on the

need for a regular dental check-up during and prior to attempting pregnancy. *Conclusion:* There is a need to educate healthcare personnel further about oral health and pregnancy outcomes.

Key words: Jordan; oral health; periodontal disease; pregnancy

Introduction

The continuing problem of preterm low-birth weight (PLBW) pregnancy outcomes is of great concern. They account for 75% of perinatal deaths and nearly half of all long-term neurological complications. Almost 10% of the births in the United States occur before 37 weeks of gestation, and the rate of premature delivery has increased during the past 15 years (1). Interestingly, about half the mothers delivering preterm infants have no known risk factors (2). Preterm delivery is defined as a gestational age of less than 37 weeks (3) and low-birth weight less than 2500 g (4).

A growing body of research supports an association between periodontal disease (inflammatory gum disease) and unfavourable birth outcomes associated with PLBW as well as pre-eclampsia (5). Case–control studies (6, 7) and cohort studies (8–10) have shown an association between periodontal disease and preterm low-birth weight babies.

To date, in humans, no causal link has been established between periodontitis and premature or low birth weight (11, 12). Conflicting results about periodontal treatment and premature birth rate have been reported. Data from three single-centre clinical trials suggest that periodontal treatment during pregnancy may reduce the rate of preterm births (10, 13, 14). However, in variance with findings of the previous studies, the findings of Michalowicz *et al.* published in the New England Journal of Medicine did not support the provision of periodontal treatment in pregnancy for the purpose of reducing preterm birth (12.0% in the treatment group and 12.8% in the control group, $P = 0.70$) (15) .

Although there has been great interest in general health education of women during pregnancy, to our knowledge, no study has been published that assessed the extent of healthcare providers' knowledge regarding the association between oral health and pregnancy outcomes. The purpose of this study was to address some of these deficiencies by specifically assessing extent of physicians' knowledge regarding the association between pregnancy and oral health.

Cross-sectional data were collected by a structured questionnaire. Survey assessed knowledge, behaviour and attitudes of healthcare providers toward dental care during pregnancy. Based on the results of this study and additional studies; hopefully, there will be an improved understanding of the importance of maintaining optimal maternal oral health during pregnancy.

The clinical implication of our findings is that physicians and other healthcare providers should recommend that pregnant women need to see a dentist during pregnancy. Several studies of dental care-seeking behaviour during pregnancy have been conducted. Most studies have shown that at most half (35–50%) the women visited the dentist during their pregnancy (16–21).

Indeed, according to the 2004 Idaho Pregnancy Risk Assessment Tracking System, 61% of Idaho mothers did not receive dental care during pregnancy. In fact, 59% reported that their healthcare provider did not tell them the importance of getting regular dental care during pregnancy (http://www.healthandwelfare.idaho.gov/Portals/_Rainbow/Documents/health/DentalCareFactSheet.pdf).

Al-Habashneh *et al.* reported limited knowledge of the possible relationships between oral health and pregnancy outcomes in a fairly homogeneous population of women who were in relatively high socio-economic standing in Johnson County (Iowa, IA, USA) (21).

Although there is an interest in general health education of women during pregnancy, to our knowledge, no study has been published that has addressed the extent of physicians' knowledge regarding the associations between oral health and pregnancy outcomes. Therefore, it seems important to explore whether healthcare providers are knowledgeable about the relationships between periodontal diseases and pregnancy outcomes, and modify their interactions and treatment for this group of patients.

Material and Methods

This was carried out by cross-sectional survey using self-administered, structured questionnaires distributed at hospitals, comprehensive centres and maternity care centres in Irbid City. The questionnaire was designed by the authors and included 15 multiple choice questions. Questions addressed: (1) physicians' perceptions of the relationships between pregnancy and oral health; (2) physicians' personal factors such as demographic data and (3) sources of information about pregnancy and oral health. The questionnaire was pilot tested. A group of employees in our dental building were asked to read the cover letter, complete the questionnaire and discuss their impressions of the questionnaire. The majority reported that questions were easily understood. All physicians entered the study voluntarily, following an explanation of its purpose and objectives. The questionnaires were distributed by the researchers who were visiting these centres. The self administered, structured questionnaires were completed from Jan 2007 to May 2007. It took the majority of the participants 5–10 min to complete the questionnaire. The questionnaires data were analysed by means of computerized SPSS statistical package (SPSS Inc., Chicago, IL, USA). Frequency distributions were used together with Chi-squared tests at $P < 0.05$.

Results

Of the 250 questionnaires distributed, 197 completed questionnaires were sent back, with a response rate 79%. About one-half of the participants were general practitioners (49%); younger than 30 years of age (52%), males (55%) and had less than 10 years of practice (52%) (Table 1).

Table 1. **Geographic distribution of the physicians invited to participate**

Age groups	Percentage (%)
≤30	52
31	27
41	13
≥50	8
Gender	
Male	55
Female	41
Level of specialty	
General practitioner	49
Gynecologist	22
Other specialty	28
Years in practice	
<10	52
10–20	27
21–30	15
>31	05

Table 2. **Advising patient to visit the dentist during pregnancy**

Advising visiting the dentist during pregnancy	Number	Percentage (%)
Yes	98	49.7
No	99	50.3

Table 3. **Advising patient to delay dental visit until after pregnancy**

Advising delaying dental visit until after pregnancy	Number	Percentage (%)
Yes	175	88.8
No	22	11.2

Table 4. **Advising patient to include periodontal evaluation as part of their prenatal care**

Advising including periodontal evaluation	Number	Percentage (%)
Yes	61	32
No	135	68

Advising dental visits during pregnancy

Of the 197 respondents, half (49%) reported advising their pregnant patient to visit the dentist during their pregnancy (Table 2). Unfortunately, the majority of the physicians (88%) was advising patients to delay treatment until after pregnancy (Table 3).

Physicians' health knowledge

Table 7 presents results concerning physicians' knowledge of the possible association between pregnancy outcomes and oral health. Fifty per cent reported having heard about the possible connection between pregnancy and oral health. Fifty nine per cent believed that the statement 'a tooth for a baby', is true. In addition, half (50%) of the respondents thought that there was a possible connection between the health of the teeth and gums and pregnancy. The greatest proportion of the respondents (85%) stated that books and magazines were the most useful in learning about oral health and pregnancy, followed by 'I saw it in the internet' (72%) (Table 6).

This study revealed that almost two-third (68%) of the participants did not believe that teeth can be treated safely by scaling and root planning (Table 7). Among doctors who advised their patients to visit their dentist during pregnancy,

Table 5. **Types of dental treatment participants advised to be received during pregnancy**

Treatment	Yes (%)	No (%)
Examination	67	33
Routine cleaning	84	15
Periodontal (gum) treatment	58	42
Fillings/Crowns	25	75
Other	57	42

Table 6. **Sources of information about the relationship between pregnancy and oral health**

Source of learning	Yes (%)	No (%)
I read it in a book, magazine or pamphlet.	85	15
It was mentioned in the medical journal.	64	36
It was mentioned in the medical curriculum	53	46
Clinical experience	54	46
I saw it on TV	69	31
I saw it on the Internet	71	28
Others	65	35

the main types of treatment they thought their pregnant patient could receive were routine cleaning and examination (84% and 67%, respectively) (Table 5).

Table 8 displays the bivariate results for the knowledge-related variables and advising dental visits during pregnancy. Participants who had reported advising a dental visit during pregnancy were more likely to be a gynecologist, older and female gender. However, it should be noted that the difference in advising dental visit during pregnancy was only significant for the level of specialty among different groups.

Results indicated that a greater degree of knowledge for all the knowledge statement analysed (Table 9) was associated with a greater likelihood of advising a dental visit. Specifically, results were statistically significant for these questions 'Do you think tooth and gum problems could affect outcomes of pregnancy?'; 'Do you believe in the statement ''a tooth for a baby''?'; 'Do you believe calcium will be drawn out of your teeth by the developing baby?'; and 'Do you believe that periodontal diseases can be treated safely during pregnancy with a procedure called scaling and root planning?'

Discussion

To our knowledge, this is the first published study assessing the level of physicians' awareness regarding the potential association between oral health and pregnancy outcomes. The present study reflected the awareness and knowledge of healthcare providers practising in Nothern Jordan. Fifty per cent of the subjects responded 'positively' to the question 'Have you heard about the possible connection between oral health and pregnancy?'. Few studies have suggested that treatment of periodontal disease in pregnancy is feasible and may reduce the risk of preterm birth. Notably, respondents who agreed with this statement were significantly more likely to advise their patients to visit their dentists during pregnancy. These findings suggest that better knowledge and awareness play an important role in understanding the benefit of utilizing dental services during pregnancy. Moreover, a statewide effort is underway to encourage expectant Colorado mothers and their healthcare providers to be alert for signs of gum disease, which can result in premature and low-birth weight babies (http://www.beasmartmouth.com/). It must be noted, nonetheless, that in spite of the potential differences in the characteristics (access to and utilization of healthcare services, behaviours, and socio-economic status) of the two populations (Jordan and Colorado), both countries required to launch an effort to inform healthcare providers and pregnant women about the link between gum disease in expectant mothers and adverse pregnancy outcomes. Pregnant patients should be informed that through preventive oral health practices, most dental diseases associated with pregnancy can be minimized or avoided. As a part of the educational process, the personnel who are involved in prenatal programs need to be better informed. As we believe that the Internet's vast resources offer many options for finding dental health information that can

Table 7. **Response to knowledge statements**

Knowledge statement	Response	
	'Yes' (number, in %)	'No' (number, in %)
Do you think pregnancy increases the tendency for the gums to bleed, swell, or be red?	159 (81)	38 (19)
Do you think tooth and gum problems could affect outcomes of pregnancy?	108 (54)	89 (45)
Do you believe in the statement 'a tooth for a baby'?	104 (53)	93 (47)
Do you believe calcium will be drawn out of your teeth by the developing baby?	112 (57)	85 (43)
Do you think that there is a possible connection between the health of the teeth and gums and pregnancy?	98 (50)	99 (50)
Do you believe that periodontal diseases can be treated safely during pregnancy with a procedure called scaling and root planning	63 (32)	134 (68)

Table 8. **Advising dental visits during pregnancy and personal characteristics of the participants**

Independent Variable	Number of participants	Percentage advised visiting the dentist (%)	Percentage did not advise visiting the dentist (%)	χ^2	*P*-value
Age groups					
≤30	102	48	52	1.2	0.75
31–40	53	47	53		
41–49	26	57	43		
≥50	16	56	44		
Gender					
Male	109	46	54	−88	0.64
Female	82	54	46		
Level of specialty					
General practitioner	96	29	71	7.93	0.018
Gynecologist	43	49	51		
Other specialty	58	21	79		

Table 9. **Advising dental visits during pregnancy and doctors' health knowledge**

Knowledge statement	Number of participants with positive response	Percentage advised visiting the dentist (%)	Percentage did not advise visiting the dentist (%)	χ^2	*P*-value
Do you think pregnancy increases the tendency for the gums to bleed, swell, or be red?	159	51	49	0.58	0.49
Do you think tooth and gum problems could affect outcomes of pregnancy?	108	53	47	2.7	0.005
Do you believe in the statement 'a tooth for a baby'?	104	58	42	2.67	0.006
Do you believe calcium will be drawn out of your teeth by the developing baby?	112	59	41	3.01	0.002
Do you think that there is a possible connection between the health of the teeth and gums and pregnancy?	98	49	51	−0.21	0.47
Do you believe that periodontal diseases can be treated safely during pregnancy with a procedure called scaling and root planning?	63	70	30	57.86	<0.0001

reach everyone easily and save a lot of money, we have to determine if a website is trustworthy and accurate. Just because something is posted on the Internet does not mean the information is true or reliable. Always we need to question scientific results and try to determine if the facts support the conclusions and if any other credible healthcare organization support the findings.

The present study found no association between advising dental visits during pregnancy and physicians' age and gender. This further showed that even in the older age group and among female doctors, no significant increase in advising dental visit during pregnancy was observed. In the present study, level of specialty was strongly associated with advising dental visit during pregnancy. Interestingly, family physicians were the most to advice dental visits when compared with other specialties mentioned in the study (internists, orthopedics, pediatrics and surgeons).

Our results are similar to previous reports which had been reported in another survey conducted to assess knowledge, attitudes and compliance with infection control among medical staff in Birmingham teaching hospitals (22). One-fourth had previously participated in specific training regarding transmission precautions for pathogens conducted by the infection control team. More than half (55.9%) gave correct answers to 10 or more of the 13 knowledge-type questions. For physicians and healthcare workers in a senior position, lack of time and lack of means were significantly less important ($P < 0.0005$). On multivariate linear regression, knowledge was independently associated with exposure to training sessions. Specific training proved to be the major determinant of 'good knowledge'.

Sanchez *et al.* (23) assessed the knowledge, attitudes and beliefs of paediatricians and family practice physicians toward paediatric preventive dental care. Both groups recognized that

they received inadequate information about paediatric preventive dental care during training and almost unanimously advocated increasing their knowledge through medical and specialty training or continuing education. Clearly, family practitioners and other primary healthcare providers must receive additional education before they can assume a larger role in the early detection of oral diseases.

Our results are similar to the ones reported in another survey conducted to evaluate knowledge and attitude of graduating medical students towards infant oral health. Qualitative methods were used to evaluate the program. In conclusion, author noticed that oral health promotion can take place in a primary care practitioner's office, but medical providers often lack relevant training (24).

A potential limitation of this investigation was reliance on self-reported data by the study participants where inaccuracies can be introduced. Although informal pilot testing was carried out to make sure that doctors understood the questions, one cannot rule out the possibility that some doctors misunderstood the questions. Moreover, no data were collected from non-respondents to allow for comparison of characteristics of respondents and non-respondents. In summary, approximately one-half of the participants in this study reported advising, visit to the dentist during pregnancy. Significant explanatory variables for advising a dental visit during pregnancy included being specialist, and being aware of the possible connection between oral health and pregnancy outcomes.

To increase awareness of the importance of utilization of dental services during pregnancy, we propose that dental health education be integrated into prenatal healthcare programs. Prenatal care providers including nurses and physicians should be educated regarding the reported relationships between dental health and pregnancy outcomes and should be encouraged to discuss with their patients of the importance of dental care and refer patients for dental care. In addition, future studies should assess: dental educational interventions and their effects on advising utilization of dental services during pregnancy.

Knowledge and awareness of physicians about gingival conditions and preterm birth are generally poor. Results from this survey showed low awareness of the importance of maternal oral health and its relationship to an infant's general health among the participants. Based on these results, we need to develop appropriate educational materials and workshops to educate healthcare providers about the association between oral health and pregnancy outcomes. We can start by distributing educational packages to all healthcare providers in healthcare centres and maternal health centres. Healthcare providers need to advise expectant mothers to have a dental care visit while pregnant. Other recommendations include advising them to brush and floss at least twice a day. They need to recommend referral of every pregnant patient to an oral healthcare provider if they have not already seen one.

Better education of the importance of dental care before and during pregnancy is needed. Ultimately, the resulting improvement in understanding of oral health during pregnancy should be included as part of the women's oral health agenda. Once they know the information about periodontal disease and preterm births, they will share that information with their patients and ask them if they had seen an oral healthcare provider or if they were planning to see one. Therefore, hopefully, they will refer every pregnant patient to an oral healthcare provider if they have not already seen one. More investigations are still needed to evaluate the effect of dental educational interventions on utilization of dental services during pregnancy.

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