Original Article

Periodontal health awareness among gynecologists in Riyadh, Saudi Arabia

Ghousia Rahman, Farah Asa'ad[1], Mohammad Abdul Baseer[2]

Department of Preventive Dental Sciences, Division of Periodontics and Dental Hygiene, [2]Department of Preventive Dental Sciences, Division of Community Dentistry, Riyadh Colleges of Dentistry and Pharmacy, Riyadh, Saudi Arabia, [1]Department of Preventive Dentistry, Jordan University of Science and Technology, Irbid, Jordan

Corresponding author (email: <basheer.dr@gmail.com>)
Dr. Mohammad Abdul Baseer, Department of Preventive Dental Sciences, Division of Community Dentistry, Annamuthajiya Campus, Riyadh Colleges of Dentistry and Pharmacy, P. Box: 84891, Riyadh - 11681. Saudi Arabia.

Abstract

Objective: To determine the knowledge of periodontal disease and pregnancy outcomes among the gynecologists practicing in Riyadh, Saudi Arabia. **Materials and Methods:** A cross-sectional survey of 200 randomly chosen gynecologists from Riyadh was carried out by using a structured, self-administered, closed-ended questionnaire. Knowledge of periodontal disease and possible ways of prevention; knowledge of periodontal disease and pregnancy outcomes; and oral self-care attitudes among gynecologists were assessed. **Results:** One-quarter of the gynecologists knew the meaning of dental plaque. Almost 57.5% believed that the frequency of toothbrushing should be increased during pregnancy. Eighty percent of gynecologists were aware of the serious effects of smoking on the pregnant woman and her child. Less than half (44.5%) believed that there is a relationship between gum disease and premature labor. Gynecologists working in the government sector were significantly more aware about the causes of inflamed gum in pregnancy, gum disease and its prevention, and negative effects of smoking on pregnancy. A significantly higher percentage of male and senior gynecologists aged between 50 and 54 years answered that gum disease would lead to the delivery of a preterm or low-birth-weight infant. **Conclusion:** Gynecologists considered in the present study showed an acceptable level of knowledge and awareness toward periodontal health and the association between periodontal disease and adverse pregnancy outcomes.

Key words: *Awareness, gynecologists, low birth weight, periodontal health, pregnancy, preterm birth*

INTRODUCTION

Periodontal diseases, including gingivitis and periodontitis, are a group of infectious diseases caused predominantly by different types of gram-negative anaerobic and micro-aerophilic bacteria that colonize the subgingival area resulting in long-term local and systemic elevation of pro-inflammatory prostaglandins and cytokines.[1,2] Several bacterial species such as *Porphyromonas gingivalis*, *Prevotella intermedia*, *Prevotella nigrescens*, *Tannerella forsythia*, *Treponema denticola*, *Fusobacterium nucleatum*, *Aggregatibacter actinomycetemcomitans*, and *Campylobacter rectus* have been identified in the subgingival biofilm of periodontal disease patients.[3] A recent report suggested that high levels of *A. actinomycetemcomitans*, *F. nucleatum*, and *P. intermedia* were observed in the subgingival biofilm during the second and third trimesters of pregnancy, with increased susceptibility for gingivitis.[4]

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Periodontitis may affect pregnancy outcomes. On the other hand, pregnancy itself may alter the progression of periodontal diseases. Changes in the physiological process during pregnancy can alter the inflammatory response by intensifying the gingival inflammation. Pregnancy gingivitis affects 36–100% of pregnant women.[5] Clinical parameters such as bleeding on probing and pocket depth may increase during pregnancy, without associated increase in plaque index score, which reduces

after parturition.[6] This increased severity of periodontal disease is related to increased vascular permeability, reduced immune responses, and shifts in the composition of supra and subgingival microbial flora during the gestational period.[5] Hence, a bidirectional relation can be observed between periodontal disease and pregnancy.

It has been reported that the levels of *A. actinomycetemcomitans* and red complex bacterial species started to increase from 22nd week of pregnancy in mothers of premature babies, while these bacterial levels remained stable in mothers at term delivery. Moreover, after delivery, a 2.42-fold increase in the *A. actinomycetemcomitans* species was observed among mothers of premature babies, as compared to the mothers with term delivery.[7]

Meta-analyses of reported studies have revealed a significant risk of preterm delivery and low birth weight among pregnant women with periodontitis.[8,9] The odds ratio for preterm birth in mothers with periodontitis varied from 1.7 to 2.73, for low birth weight from 1.5 to 2.11, and for preterm birth and low weight from 2.35 to 3.57. About 25% of preterm low birth weight cases occur without even a suspected risk factor, but estimates suggest that 18.2% of all cases may be attributable to periodontal disease.[10] It has also been reported that subjects with generalized periodontitis have a fivefold increased risk of preterm birth before 35 weeks of gestation and a sevenfold increased risk of delivery before 32 weeks of gestation.[11] In addition, a significant association between preeclampsia and periodontal disease has been reported in the literature.[12,13] Hence, all meta-analyses have demonstrated that the periodontal disease could promote adverse pregnancy outcomes.[14]

Studies have reported high prevalence of periodontal disease among pregnant women and a prevalence of preterm low birth weight babies of around 11.3% in Saudi Arabia. In addition, the risk of preterm low birth weight remained high despite controlling the other risk factors, suggesting possible correlation between periodontal disease and preterm low birth weight.[15]

Traditionally, gynecologist's training in oral health has been limited. All the previously mentioned associations between periodontal disease and adverse pregnancy outcomes and universal presence of periodontal disease provide strong rationale for gynecologists to enquire their patients about oral and periodontal health.

Gynecologists are the first-line healthcare professionals to come in contact with pregnant women. Their awareness regarding association between periodontal disease and adverse pregnancy outcomes is extremely important in recognizing modifiable periodontal disease risk factors associated with pregnancy. Also, incorporation of the periodontal care into gynecologic management may improve pregnancy outcomes, if early intervention is sought to reduce microbiologic load on oral tissues during pregnancy. Until now, awareness of periodontal health and disease among practicing gynecologists remains undisclosed with lack of published literature from Riyadh. Hence, the present study was undertaken with an objective to determine knowledge of periodontal disease and pregnancy outcomes among the gynecologists practicing in Riyadh, Saudi Arabia.

MATERIALS AND METHODS

Participants

This was a cross-sectional survey of a sample of gynecologists from Riyadh, capital city of Saudi Arabia. Sample size was determined by using G-power statistical power analysis program 3.1.1.[16] Sample size was calculated by considering the effect size of (Chi - Square tests) 0.3, alpha error probability of 0.05, and power of the study 0.94, with four degrees of freedom. It resulted in a sample size of 198, which was adjusted to the nearest number of 200.

A list of all the government and private hospitals and polyclinics providing gynecologic/obstetric care was obtained from the directory of hospitals in Riyadh. Few government and private hospitals were selected from the list. A total of 200 gynecologists working in these hospitals were then selected by employing simple random sampling technique. This study was approved by the research center of Riyadh Colleges of Dentistry and Pharmacy (RCsDP), Riyadh.

A structured, self-administered, closed-ended questionnaire with a letter mentioning the purpose of the study was distributed to the gynecologists during their consultation hours. Informed written consent for their participation was obtained and confidentiality of responses was assured. Dental hygiene interns personally contacted the gynecologists and distributed the questionnaire. All the 200 gynecologists answered the questionnaire and returned it to the interns. It took 5–7 min to answer the questionnaire. Thus, a 100% response rate was obtained. Data collection took place during February–March 2012.

Instrument utilized in the present study was developed based on literature reviews of relevant published

articles. A pilot study was conducted among a sample of 50 gynecologists by using modified version of the questionnaire in English language to ensure comprehensibility and reliability. A Cronbach's alpha of 0.87 was found, which meets the purpose of this study. The 50 questionnaires utilized in the pilot study were excluded from the final study sample.

Survey instrument

The questionnaire consisted of four sections with 12 closed-ended questions. Section I included questions on age, gender, number of years in clinical practice, and practice sector (government or private); section II included five questions on knowledge of periodontal disease and possible ways of prevention; section III included four questions on knowledge of periodontal disease and pregnancy outcomes; and section IV included three questions on oral self-care attitudes among gynecologists.

Statistical analysis

Questionnaire responses were coded and entered into a statistical package for social sciences (IBM-SPSS version 19) software for analysis. Normality distribution of the data was checked by using Shapiro–Wilk's test, skewness and kurtosis. Frequency distribution tables and graphs were obtained for descriptive data. Chi-square test was applied to assess the differences in responses between different age groups, duration of practice, gender, and sector. Level of significance was $P < 0.05$. All data were analyzed by using SPSS 19.

RESULTS

Sample characteristics

A Shapiro–Wilk's test ($P > 0.05$) showed that the mean knowledge scores were normally distributed among the gynecologists working in the government sector [skewness − 0.121 (SE = 0.314) and kurtosis 0.312 (SE = 0.314)]; belonging to the age groups of 25–29 years [skewness − 0.632 (SE = 0.456) and kurtosis 0.147 (SE = 0.887)], 30–34 years [skewness − 0.423 (SE = 0.369) and kurtosis 0.165 (SE = 0.724)], 45–49 years [skewness − 0.176 (SE = 0.409) and kurtosis − 0.523 (SE = 0.798)]; and having an experience of 21–25 years [skewness − 0.124 (SE = 0.501) and kurtosis − 0.429 (SE = 0.972)]. However, Shapiro–Wilk's test ($P < 0.05$) showed that the mean knowledge scores were not normally distributed for both male and female gynecologists, with a skewness of − 0.400 (SE = 0.246) and kurtosis of 0.041 (SE = 0.488) for males and a skewness of − 0.685 (SE = 0.237) and kurtosis of 0.127 (SE 0.469) for female gynecologists. Similarly, knowledge score was not normally distributed among gynecologists belonging to the age groups of 35–39 years, 40–44 years, and 50–54 years and experience groups of 1–5 years, 6–10 years, 11–15 years, and 16–20 years, as shown by Shapiro–Wilk's test ($P < 0.05$) with different skewness and kurtosis values.

A total of 200 gynecologists belonging to different age groups, gender, duration of practice, and sector participated in the study. Almost 21% of the gynecologists were in the age group of 30–34 years. More than half (52%) of the gynecologists were females. Seventy-one percent of the gynecologists were private practitioners, with majority (35.5%) of them having an experience of 1–5 years, as shown in Table 1.

Figure 1 displays the responses of the gynecologists to the questions aimed at the assessment of the knowledge of periodontal disease. It is clear that only one-quarter (26%) of the gynecologists were able to define dental plaque correctly, while less than half (44%) of them knew that dental plaque is the cause of gum disease. High percentages (69%) of gynecologists were aware that bleeding gum indicates the presence

Table 1: Demographic data of the study participants

	n	%
Age (years)		
25-29	26	13.0
30-34	41	21
35-39	25	12.5
40-44	34	17.0
45-49	33	16.5
50-54	41	20.0
Total	200	100.0
Gender		
Male	96	48.0
Female	104	52.0
Total	200	100.0
Duration of practice (years)		
1-5	71	35.5
6-10	34	17.0
11-15	42	21.0
16-20	32	16.0
21-25	21	10.5
Total	200	100.0
Sector		
Government	58	29.0
Private	142	71.0
Total	200	100.0

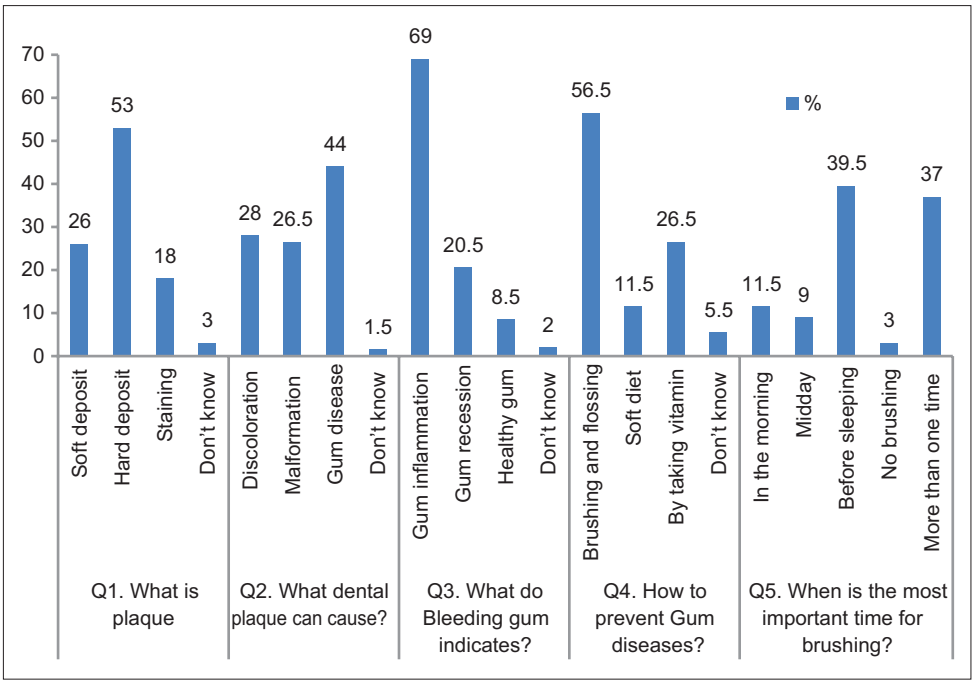

Figure 1: Awareness of dental plaque and gum diseases among gynecologists

of gum inflammation. More than half (56.5%) of the gynecologists agreed that periodontal disease can be prevented by brushing and interdental cleaning. Also, 39.5% gynecologists considered nighttime before going to bed is the most important time for toothbrushing.

When participants were enquired about the knowledge of periodontal disease and pregnancy outcomes, more than half of the respondents (54.5%) said that plaque and negligence of toothbrushing were the main cause of gum disease during pregnancy. Almost 57.5% gynecologists believed that the frequency of toothbrushing should be increased during pregnancy. Very high percentage (80%) of the respondents knew the serious effect of smoking on pregnancy and child birth. However, less than half (44.5%) of the gynecologists believed that there is a relationship between gum disease and premature labor [Table 2].

Table 3 demonstrates the oral self-care attitudes of gynecologists. About 70% of them said that they use soft bristled toothbrush to remove dental plaque. More than half (54%) of the gynecologists visited their dentist on a regular basis. When asked about the reason for not visiting dentist regularly, 37% expressed fear, 23% mentioned the expensive nature of dental care, and 39.5% mentioned that they were not in need of dental care.

A significantly high percentage of female gynecologists and those working in the government sector were more aware of bleeding gum and prevention of gum disease by brushing and flossing, as compared to their counter parts ($P < 0.05$). Similarly, a significantly high percentage of gynecologists working in private sector were aware of the timing of toothbrushing ($P < 0.05$) [Table 4].

Table 5 shows the oral health related pregnancy outcomes among gynecologists. A significantly high percentage of male gynecologists and senior gynecologists aged 50–54 years answered that gum disease would lead to the delivery of a preterm or low-birth-weight infant ($P < 0.05$). Likewise, a significantly high percentage of gynecologists working in the government sector knew about the negligence of toothbrushing and negative effects of smoking on the pregnant woman and her child ($P < 0.05$).

DISCUSSION

Recent research in periodontal medicine has shown the link between periodontal disease and poor pregnancy outcomes. Gynecologists, as women's healthcare specialists, can play an important role in oral health care, especially during pregnancy and child birth. Therefore, their awareness regarding periodontal health is important to identify the modifiable oral risk factors to prevent adverse pregnancy outcomes.

In general, the present study assessed gynecologists' understanding of various pregnancy-related oral

Table 2: Knowledge of periodontal disease and pregnancy outcomes among study participants

	n	%
Q6. What causes inflamed gum in pregnant women?		
Dental plaque	72	36.0
Hormonal changes	75	37.5
Neglecting toothbrushing	34	18.5
Don't know	16	8.0
Total	200	100.0
Q7. Do you think toothbrushing should be increased during pregnancy?		
Yes	115	57.5
No	67	33.5
Don't know	18	9.0
Total	200	100.0
Q8. Do you think that gum disease would lead to the delivery of a preterm or low-birth-weight infant?		
Yes	89	44.5
No	83	41.5
Don't know	28	14.0
Total	200	100.0
Q9. Do you think that smoking has a negative effect on the pregnant woman and her child?		
Yes	160	80.0
No	33	16.5
Don't know	7	3.5
Total	200	100.0

Table 3: Oral self-care attitudes among study participants

	n	%
Q10. Which type of toothbrush bristles do you use?		
Soft	141	70.5
Hard	42	21.0
Don't know	17	8.5
Total	200	100.0
Q11. Do you visit your dentist regularly?		
Yes	108	54.0
No	92	46.0
Total	200	100.0
Q12. What are the reasons for not visiting dentist?		
Fear	75	37.5
No need	79	39.5
Expensive	46	23.0
Total	200	100.0

Table 4: Pearson Chi-Square test for dental plaque related oral diseases among study participants

	Age	Duration of practice	Gender	Sector
Q1. What is plaque?				
Chi-square	8.465	9.682	6.279	3.384
df	15	12	3	3
Sig.	0.904	0.644	0.099	0.336
Q2. What can dental plaque cause?				
Chi-square	8.888	18.833	3.061	2.985
df	15	12	3	3
Sig.	0.883	0.093	0.382	0.394
Q3. What does bleeding gum indicate?				
Chi-square	16.457	18.483	10.253	4.932
df	15	12	3	3
Sig.	0.352	0.102	0.017*	0.177
Q4. How to prevent gum diseases?				
Chi-square	17.110	11.806	1.932	17.743
df	15	12	3	3
Sig.	0.312	0.461	0.587	0.000*
Q5. When is the most important time for brushing teeth?				
Chi-square	15.694	8.275	0.843	11.234
df	20	16	4	4
Sig.	0.735	0.940	0.933	0.024*

health issues along with their oral self-care attitudes. Although the overall periodontal health knowledge and awareness was acceptable in this study, there still exist some lacunae in the knowledge in recognizing deposits on the tooth surface. In this study, 53% gynecologists answered that plaque was a hard deposit and only 26% were able to recognize plaque as a soft deposit. This clearly indicates some confusion between soft and hard deposits among gynecologists. Poor oral hygiene resulting from the accumulation of plaque and presence of local irritants has been associated with gingival changes leading to gingivitis. In the present study, 69% of the participants agreed that bleeding gum indicates gingival inflammation. This result is lower than that reported in the study conducted in United Arab Emirates.[17] In addition, 56.5% of the gynecologists agreed that gum disease can be prevented by regular brushing and flossing.

Hormonal and vascular changes that accompany pregnancy often exaggerate the inflammatory response to local deposits.[18] In the present study, about 37.5%, 36%, and 17% of the study participants said that hormonal changes, poor oral hygiene, and plaque, respectively, cause inflamed gums among pregnant women. In contrast, 98.3% of Indian gynecologists agreed that hormonal changes during pregnancy could cause inflamed gums[19] and 89.5% of the medical doctors in Tanzania believed poor oral hygiene was the main cause of periodontal disease.[20]

It has been suggested that optimal oral health during pregnancy may have a beneficial impact on the

Table 5: Pearson Chi-square test of oral health related pregnancy outcomes among study participants

	Age	Duration of practice	Gender	Sector
Q6. What causes inflamed gum in pregnant women?				
Chi-square	22.207	19.725	5.034	11.875
df	20	16	4	4
Sig.	0.329	0.233	0.284	0.018*
Q7. Do you think toothbrushing should be increased during pregnancy?				
Chi-square	11.522	2.781	0.899	5.732
df	10	8	2	2
Sig.	0.318	0.947	0.638	0.057
Q8. Do you think that gum disease would lead to the delivery of a preterm or low-birth-weight infant?				
Chi-square	20.665	11.625	6.784	3.727
df	10	8	2	2
Sig.	0.024*	0.169	0.034*	0.155
Q9. Do you think that smoking has a negative effect on the pregnant woman and her child?				
Chi-square	2.431	1.265	3.356	6.624
df	10	8	2	2
Sig.	0.992	0.996	0.187	0.036*

personal health of the pregnant woman as well as that of her offspring.[21] Daily oral hygiene practices such as toothbrushing and flossing, which aid in preventing the accumulation of bacterial plaque, should be encouraged during pregnancy and after child birth. In the present study, 57.5% of participants believed that toothbrushing should be increased during pregnancy.

Prevalence studies have suggested that 20–50% of women from developed countries report smoking at the beginning of pregnancy. Immediate effects of smoking on pregnancy outcomes may be miscarriage, low birth weight, preterm birth, and perinatal death.[22] Among the study participants, 80% were aware of the negative effects of smoking on pregnant women and their infants' health.

In the present study, 44.5% of the gynecologists believed that gum disease would lead to the delivery of a preterm or low-birth-weight infant. This result is lower than that reported in other studies[17,19,23,24] and higher than that reported by some other studies.[20,25]

Female gynecologists and those working in the government sector had better periodontal health knowledge than those working in the private sector. This was statistically significant ($P < 0.05$) for two knowledge questions, "What do bleeding gums indicate?" and "How can you prevent gum disease?" However, the question "When is the most important time for brushing?" was responded by a significantly high percentage of gynecologists working in the private sector ($P < 0.05$). This indicates that gynecologists working in the government sector are more likely to have access to correct and relevant oral health information, as compared to the private sector gynecologists.

Male gynecologists, those working in the government sector, and those belonging to older age groups had better knowledge of periodontal disease and pregnancy outcomes. This was statistically significant ($P < 0.05$) for three questions: "Do you think that gum disease would lead to the delivery of a preterm or low-birth-weight infant?" "What causes gum disease in pregnant women?" and "Do you think smoking has a bad effect on the pregnant woman and her child?" This could be attributed to the cumulative knowledge of oral health and pregnancy outcomes gained over a period of time, with better access to information and resources provided in the government sector.

All the above-mentioned lower responses by gynecologists could be due to the lack of knowledge regarding outcomes of poor oral health, limited access to oral healthcare professionals, lack of time for prenatal oral health counseling and referral, and inadequate oral health training received during the previous years of medical education.

With regards to the oral self-care attitudes among gynecologists, almost 71% stated that they use toothbrushes with soft bristles, while 8.5% of the gynecologists did not know the type of bristles of their toothbrushes. About half of the gynecologists declared that they visit their dentist on a regular basis. Most of the participants who mentioned that they did not visit their dentist regularly (39.5%) believed that there was no need to visit their dentist periodically, while 37.5% stated fear as the main reason behind not visiting the dentist. Almost 23% mentioned that the expensive cost of dental treatment is the reason that prevented them from visiting their dentist. This suggests the gap in the oral self-care attitudes among gynecologists considered in the present study. These responses by gynecologists are suggestive of lacunae in oral self-care attitudes.

Our study has some limitations. Although oral self-care attitudes were anonymous, the responses might be biased to what the participants believed was ideal. The results presented indicate the opinions of a small sample of gynecologists in Riyadh. This study does not enable broad generalizations regarding the potential impact of these findings. Caution must be taken in interpreting the applicability of the current data until these findings can be confirmed by larger, prospective investigations.

CONCLUSION

Gynecologists considered in the present study showed an acceptable level of knowledge and awareness toward periodontal health and the association between periodontal disease and adverse pregnancy outcomes. Inter-professional cooperation between gynecologists and dental healthcare professionals is required to bridge knowledge gap. Also, educational programs on periodontal health targeted toward gynecologists are needed to improve the periodontal health awareness, in order to reduce the incidence of preterm low-birth-weight babies.

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