

Effectiveness of an Oral Health Education Program for Obstetrician/Gynecologist Residents at Tufts Medical Center

Devina Shah¹, Lily Parsi², Sara Bagher³, Matthew Finkelman⁴, Cheen Loo⁵

¹Pediatric Dentist at a Private Practice in East Brunswick, NJ, ²Pediatric Dentist at a Private Practice in Revere, MA, USA, ³Associate Professor, Department of Pediatric Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia, ⁴Associate Professor, Tufts University School of Dental Medicine, ⁵Professor, Postdoctoral Program Director and Chair, Department of Pediatric Dentistry, Tufts University School of Dental Medicine, Boston, MA, USA

Received : 30-05-17.

Accepted : 09-10-17.

Published : 30-10-17.

INTRODUCTION

Pregnancy is a unique period of women's life, in which unique hormonal and eating habit changes take place. Therefore, pregnant women have a higher incidence of periodontal disease, tooth mobility, tooth erosion, and dental decay.^[1-3] Although the association between periodontal diseases during pregnancy and adverse pregnancy outcomes, including preterm birth, intrauterine growth restriction, preeclampsia, and delivery of low birth weight infants, has been reported in several studies,^[4-9] additional randomized clinical trials are required to confirm the association.

Prenatal oral health education for pregnant mothers has shown a great impact on improving a mother's

ABSTRACT
Aim and Objectives: To assess Tufts Medical Center obstetrician/gynecologist (OB/GYN) residents' knowledge, beliefs, and previous training in oral health and to assess the effect of an oral health educational seminar on their knowledge and beliefs.

Materials and Methods: A preseminar questionnaire was distributed to the residents. The same questionnaire was distributed immediately after the seminar and 3 months later. SPSS Version 21 was used for the data analysis.

Results: Convenience sample of 25 residents were included in the study. The mean (standard deviation) age of participants was 29.08 (2.47) years. Only 1 (4%) participant reported receiving >8 h previous training in oral health and 7 (28%) reported receiving <1 h of training. The nonparametric Friedman test showed a statistically significant difference between administrations in terms of total score on knowledge-based questions ($P < 0.001$) and some of the belief-based questions. The *post hoc* Wilcoxon signed-rank test with Bonferroni correction showed statistically significant improvement in the knowledge-based questions between pre- and post-seminar questionnaire ($P = 0.002$) and between preseminar and 3-month follow-up ($P = 0.003$).

Conclusions: OB/GYN residents at Tufts Medical Center received limited training in oral health. Their knowledge improved significantly following the oral health educational seminar. Similar training modules can be brought to other OB/GYN residencies and OB/GYNs in an effort to enhance the symbiotic relationship between medical and dental professionals.

KEYWORDS: Beliefs, education, gynecologist, oral health, oral health knowledge

oral health and enhancing a positive attitude to their infant's oral health later on.^[10] However, in a study including four states, most mothers reported that they did not receive dental care during their pregnancy, and among those who reported having dental problems, half of them did not get the dental care they needed.^[11] For many women, obstetrician/gynecologists (OB/GYN) are the most frequently accessed healthcare professional. Unfortunately, a national consensus statement

Address for correspondence: Dr. Sara Bagher, Department of Pediatric Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia.
E-mail: sbagher@kau.edu.sa

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Shah D, Parsi L, Bagher S, Finkelman M, Loo C. Effectiveness of an oral health education program for obstetrician/gynecologist residents at Tufts Medical Center. J Int Soc Prevent Communit Dent 2017;7:S107-12.

Access this article online	
Quick Response Code: 	Website: www.jispcd.org
	DOI: 10.4103/jispcd.JISPCD_195_17

with the American College of Obstetricians and Gynecologists (ACOG) Committee Opinion and the American Dental Association (ADA) reported that many times, neither the pregnant women nor OB/GYN professionals understand that oral health care is an essential component of a healthy pregnancy.^[12] In another study done by Curtis *et al.*, in 2013, most of the deans and dental program directors reported limited clinical exposure to prenatal oral health during residency.^[13]

Limited data are available on the OB/GYNs' knowledge, attitude, practice, and training regarding oral health care during pregnancy and the association between oral health and pregnancy outcomes. In a study conducted to evaluate OB/GYNs and dentists' knowledge regarding prenatal dental care, 34% of the OB/GYNs did not know the potential association between periodontal disease and the delivery of preterm low birth weight babies.^[14] Morgan *et al.* in 2009^[15] and Wilder *et al.* in 2007^[16] reported that most OB/GYNs recognized the importance of maintaining proper oral hygiene during pregnancy and believed that the treatment of periodontal disease during pregnancy can have positive impact on pregnancy, but limited incorporation of dental care during their prenatal care of pregnant women was reported.

With the hope to start a collaborative effort among pediatric dentists and OB/GYNs for the management of oral health of their pregnant patients and to improve the OB/GYNs' oral health knowledge, the aim of our study was to assess Tufts Medical Center OB/GYN residents' knowledge, beliefs, and previous training in oral health. In addition, the study aimed to evaluate the effect of a PowerPoint oral health educational seminar on their knowledge and beliefs immediately after the educational seminar and at a 3-month follow-up.

MATERIALS AND METHODS

This study was approved by the Institutional Review Board (IRB) at Tufts Medical Center and Tufts University Health Sciences Campus (IRB # 10709). Before the scheduled oral health educational seminar, a 24-item baseline preseminar questionnaire was distributed among OB/GYN residents at Tufts Medical Center after informed consent form explaining the aim of the study was signed by each participating OB/GYN resident. The preseminar questionnaire aimed to assess the residents' knowledge, beliefs, and previous training in oral health. The questionnaire included 16 knowledge-based and eight belief-based multiple-choice questions. Knowledge-based questions were in a true/false format and aimed to evaluate the OB/GYN resident's knowledge in oral health during pregnancy. Each correct answer received a +1 score and each wrong answer received a zero score. A total was

calculated for each participant and for each question. The total number and percentage of OB/GYN residents who correctly answered each knowledge-based question were calculated at before and after the educational seminar and at the 3-month follow-up. A five-point scale ranging from strongly disagree (1) to strongly agree (5) was used for the belief-based questions. Data regarding the age, gender, race, years in OB/GYN residency and the amount of previous training received in oral health were also collected. The questionnaire was developed with the aid of previous studies and from the ACOG and ADA guidelines on oral health during pregnancy.^[17]

Then, a PowerPoint oral health educational seminar was provided by a trained pediatric dentist resident and followed by 15-min discussion. The oral health educational seminar discussed pregnant women and infant oral health, with emphasis on oral health care, prevention, and diet during pregnancy, while promoting the concept of establishing oral hygiene regimens for the baby once the baby's first tooth erupts.

Immediately following the seminar, the same postseminar questionnaire was administered to assess the effect of the oral health educational seminar on the resident's oral health knowledge and beliefs. Three months later, the same questionnaire was administered to the same residents. All participants completed the pre/post-seminar and the 3-month follow-up questionnaire. For participating in the study, each resident received a \$10 gift card. The study period was from July 2013 to February 2015.

SPSS version 21 (IBM SPSS Statistics 21.0) was used for the data analysis. The Friedman test was used to compare pretest, posttest, and 3-month follow-up results regarding answers to the belief-based questions as well as total score on the knowledge-based questions. The Wilcoxon signed-rank test with Bonferroni correction was used for *post hoc* comparisons. Statistics regarding the residents' gender, age, residency year, and previous oral health training were also calculated.

RESULTS

DEMOGRAPHIC DATA OF THE PARTICIPANTS

A convenience sample of 25 residents participated in the study. Of the 25 participants, 23 (92%) were female and 2 (8%) were male. The mean (standard deviation) age of the participants was 29.08 (2.48) years. The plurality of participants was 1st-year residents 10 (40%). When the participants were asked about their previous training in oral health during medical school years and residency, only 1 (4%) participant reported receiving >8 h training in oral health. Six (24%) reported receiving no training and another 7 (28%) reported receiving <1-h training [Table 1].

RESPONSE TO KNOWLEDGE-BASED QUESTIONS

The participants scored the lowest on the question regarding the association between preeclampsia and periodontal disease during pregnancy; the question was answered correctly by only 6 (24%) of the participants. Only 11 (44%) of the participants knew that young children can acquire caries-causing bacteria from their mother’s saliva and that intrauterine uterine growth restriction can be associated with periodontal disease

Table 1: Demographics Characteristics of the Participants (N=25)

Variables	Mean	SD
Age (Yrs)	29.08	2.48
	Number	Percentage
Gender		
Female	23	92.0
Male	2	8.0
Year in Residency		
First year	10	40.0
Second year	6	24.0
Third year	3	12.0
Fourth year	6	24.0
Previous oral health training		
None	6	24.0
Less than 1 hour of training	7	28.0
1-3 hours of training	6	24.0
4-7 hours of training	5	20.0
More than 8 hours	1	4.0

during pregnancy. Twenty-four (96%) of the participants correctly answered the questions regarding dental decay being one of the most common diseases of childhood and that it is important to establish oral hygiene regimens for the baby once the baby’s first tooth erupts correctly [Table 2].

The median (interquartile range [IQR]) of the preseminar, postseminar, and 3-month follow-up for correctly answered knowledge-based questions was 9 (4), 11 (2), and 11 (3), respectively. The nonparametric Friedman test showed a statistically significant difference in the total score of knowledge-based questions between the pre- and post-educational seminar and 3-month follow-up ($P < 0.001$). Furthermore, Wilcoxon signed-rank test with Bonferroni correction showed statistically significant improvement in the knowledge-based questions total score between pre- and post-oral health educational seminar questionnaire ($P = 0.002$) and between preoral health educational seminar and the 3-month follow-up ($P = 0.001$). The difference in the total scores between postoral health educational seminar and 3-month follow-up was not statistically significant ($P = 0.270$).

RESPONSE TO BELIEF-BASED QUESTIONS

At the preseminar, participants strongly agreed that it is important to receive routine dental care during pregnancy (median 5.0, IQR 1.0). At the 3-month follow-up, participants strongly agreed (median 5.0)

Table 2: Total number and frequency of correct answers for knowledge-based questions (n=25)

Knowledge-based questions	Preseminar, Postseminar, Three-month follow-up, n (%)		
	n (%)	n (%)	n (%)
1. Young children can acquire caries-causing bacteria from their mother’s saliva (true)	11 (44)	25 (100)	23 (92)
2. Dental decay is one of the most common diseases of childhood (true)	24 (96)	25 (100)	25 (100)
3. Hormonal changes during pregnancy can increase a woman’s risk for developing gingivitis (true)	22 (88)	25 (100)	25 (100)
4. Pregnant women are at higher risk of tooth decay (true)	19 (76)	24 (96)	25 (100)
5. To reduce damage to teeth from vomiting, pregnant mothers should be advised to brush immediately afterward (false)	10 (40)	15 (60)	15 (60)
6. It is important for a mother to begin an oral hygiene regimen for her baby once her baby’s first tooth erupts (true)	24 (96)	25 (100)	24 (96)
7. The amount of sugar affects susceptibility of tooth decay, not frequency of exposures (false)	15 (60)	13 (52)	14 (56)
8. Dental procedures performed during pregnancy should be performed during the third trimester (false)	17 (68)	21 (84)	19 (76)
9. During pregnancy, periodontal health usually worsens (false)	18 (72)	25 (100)	23 (92)
Periodontal disease has been associated with the following adverse outcomes			
10. Stillbirth (true)	14 (56)	16 (64)	17 (68)
11. Preterm delivery (true)	21 (84)	22 (88)	25 (100)
12. Low Apgar scores (true)	14 (56)	9 (36)	14 (56)
13. Spontaneous abortion/miscarriage (true)	13 (52)	16 (64)	19 (76)
14. Intrauterine growth restriction (true)	11 (44)	19 (76)	18 (72)
15. Preeclampsia (true)	6 (24)	19 (76)	11 (44)
16. Low birth weight (true)	15 (60)	19 (76)	19 (76)

Total number and frequency of correct answers for Knowledge-Based Questions (N=25). The total score on knowledge-based questions exhibited a statistically significant difference between time points ($P < 0.001$)

when they were asked about their beliefs in the importance of routine dental care during pregnancy; periodontal disease's adverse effect on pregnancy; and including dental screening in prenatal care. The Friedman test showed a statistically significant difference in the belief-based questions regarding conducting an examination of the oral cavity during pregnancy being outside the routine practice of an OB/GYN, including dental screening as part of parental care provided for pregnant mothers, being up to date on the topic of oral health and pregnancy, and receiving adequate training concerning screening and assessment of oral health issues during medical school and residency [Table 3].

Post hoc Wilcoxon signed-rank test with Bonferroni correction showed a statistically significant difference in the question regarding participants' belief in conducting an examination of the oral cavity during pregnancy being outside the routine practice of an OB/GYN between the pre- and post-educational seminar ($P = 0.008$) and the preeducational seminar and the 3-month follow-up ($P = 0.011$). The question about including dental screening as part of parental care provided for pregnant mothers was statistically significant between the pre- and post-educational seminar ($P = 0.034$) and the preeducational seminar and 3-month follow-up ($P = 0.0067$). Statistically significant differences between pre- and post-educational seminar ($P < 0.001$) and preeducational seminar and 3-month follow-up ($P < 0.001$) were observed when participants were asked about their beliefs in being up to date on the topic of oral health and pregnancy and receiving adequate training concerning screening and assessment of oral health issues during medical school and residency.

DISCUSSION

The aim of our study was to assess Tufts Medical Center OB/GYN residents' knowledge, beliefs, and previous training in oral health, as well as to assess the effect of a PowerPoint oral health educational seminar on their knowledge and beliefs immediately after the educational seminar and at a 3-month follow-up.

At the baseline preseminar questionnaire, OB/GYN residents showed adequate knowledge about oral health during pregnancy. Most of the OB/GYN residents (84%) at Tufts Medical Center knew that periodontal disease during pregnancy is associated with preterm birth. Similar results were reported in the previous studies done by Suri *et al.*, 2015^[18] and Zanata *et al.*, 2008.^[14] Suri *et al.* in 2015 reported that 85.4% of OBs identified the association between periodontal disease during pregnancy and preterm delivery,^[18] compared to 65.8% of the OB/GYNs in the study reported by Zanata *et al.*, in 2008.^[14]

On the other hand, our study showed that 76% of the OB/GYN residents at Tufts Medical Center failed to answer the question regarding the association between periodontal disease during pregnancy and preeclampsia as compared to 62% of the OB/GYNs in a study done by Suri *et al.* in 2015 to evaluate OBs' knowledge, attitude, and practice in oral health and pregnancy.^[18] Furthermore, a study conducted by Roche *et al.*, in 2011 reported that 80 % of the participated OBG identified periodontal disease as a risk factor for preterm birth and low birth weight.^[19]

Although previous studies reported that OB/GYNs had adequate knowledge about oral health during pregnancy, most of the OB/GYNs did not apply their knowledge in their practice.^[16,17,19] Suri *et al.*, 2015 reported that only

Table 3: Participant's responses to belief-based questions (n=25)

Belief-based questions	Preseminar		Postseminar		Three-month follow-up		P
	Median	IQR	Median	IQR	Median	IQR	
1. Asking pregnant patients about their oral health is outside the routine practice of an OB/GYN	2.0	3.0	2.0	2.0	2.0	2.0	0.422
2. Conducting an examination of the oral cavity during pregnancy is outside the routine practice of an OB/GYN	4.0	2.0	3.0	2.0	2.0	2.0	0.007*
3. There is not sufficient time to address oral health during an obstetric care visit	3.0	2.0	3.0	2.0	3.0	2.0	0.232
4. It is important for a pregnant woman to receive routine dental care during her pregnancy	5.0	1.0	5.0	0.0	5.0	0.0	0.146
5. Periodontal disease can have an adverse effect on pregnancy	4.0	1.0	5.0	1.0	5.0	1.0	0.169
6. Prenatal care should include dental screening	4.0	1.0	5.0	1.0	5.0	1.0	0.008*
7. I am up to date on the topic of oral health and pregnancy	2.0	1.0	4.0	1.0	3.0	1.0	<0.001*
8. My medical school and residency training concerning screening and assessment of oral health issues are adequate	2.0	1.0	3.0	1.0	3.0	2.0	<0.001*

Scores range from 1 to 5=strongly disagree to strongly agree, respectively. *Statistically significant difference. $P < 0.05$. OB=Obstetrician, GYN=Gynecologist, IQR=Interquartile range

40% of the OB/GYNs included in the study advised routine dental visits during pregnancy and only 47% advised their patients about maintaining oral hygiene during pregnancy.^[18] Wilder *et al.* in 2007 reported that up to 49% of the practicing OB/GYNs rarely or never recommended a dental examination for their pregnant patients.^[16] In our study, while the knowledge and beliefs of the participating residents were evaluated before the educational seminar and immediately after the seminar and at a 3-month follow-up, the practical implications of the acquired knowledge were not evaluated.

Most of the OB/GYN participating residents were 1st-year residents and most of them reported limited previous training in oral health. Similar results were reported by a previous national survey done by Ferullo *et al.*, 2011 who assessed the extent of oral health education among United States medical schools. The majority of the United States medical schools reported that they offer very little oral health education to their students.^[20] Another study by Morgan *et al.* in 2015 assessed how OB/GYNs in the United States addressed oral health during pregnancy and reported that most of the OB/GYNs responding to the mail questionnaire reported nonexistent (52%) or inadequate (33%) training in oral health during medical school and residency.^[15] This emphasizes the importance of providing more oral health education to the OB/GYN residents during their education years.

To our knowledge, this is the first study to evaluate the effect of an oral health educational seminar on OB/GYN residents' knowledge and beliefs after the educational seminar and at a 3-month follow-up. Although a significant improvement in the OB/GYN residents' knowledge was reported at the postseminar and at the 3-month follow-up, the long-term retention of the information and the practical implications of the acquired knowledge are unknown. Therefore, further studies, including those with a larger sample size and with long-term follow up, are recommended.

Limitations of the study include the method of sampling: A convenience sample of Tufts Medical Center OB/GYNs was taken. The questionnaire was self-report, and belief-based questions may be subject to response bias. The questionnaire was not validated, and due to limited numbers of OB/GYN residents at Tufts Medical Center, the questionnaire was not pilot tested.

CONCLUSIONS

Within the limitations of the study, OB/GYN residents received limited training in oral health. Their knowledge improved and their beliefs changed significantly following the oral health educational seminar immediately and at 3-month follow-up. Thus, similar training modules can be

brought to other OB/GYN residencies and OB/GYNs in an effort to enhance the symbiotic relationship between medical and dental professionals.

FINANCIAL SUPPORT AND SPONSORSHIP

This work was supported in part by the U.S. Department of Health and Human Services Health Resources and Services Administration Grant ##D84HP19955.

CONFLICTS OF INTEREST

There are no conflicts of interest.

REFERENCES

- Romero BC, Chiquito CS, Elejalde LE, Bernardoni CB. Relationship between periodontal disease in pregnant women and the nutritional condition of their newborns. *J Periodontol* 2002;73:1177-83.
- Lachat MF, Solnik AL, Nana AD, Citron TL. Periodontal disease in pregnancy: Review of the evidence and prevention strategies. *J Perinat Neonatal Nurs* 2011;25:312-9.
- Lieff S, Boggess KA, Murtha AP, Jared H, Madianos PN, Moss K, *et al.* The oral conditions and pregnancy study: Periodontal status of a cohort of pregnant women. *J Periodontol* 2004;75:116-26.
- Jeffcoat MK, Geurs NC, Reddy MS, Cliver SP, Goldenberg RL, Hauth JC, *et al.* Periodontal infection and preterm birth: Results of a prospective study. *J Am Dent Assoc* 2001;132:875-80.
- Goepfert AR, Jeffcoat MK, Andrews WW, Faye-Petersen O, Cliver SP, Goldenberg RL, *et al.* Periodontal disease and upper genital tract inflammation in early spontaneous preterm birth. *Obstet Gynecol* 2004;104:777-83.
- Khader YS, Ta'ani Q. Periodontal diseases and the risk of preterm birth and low birth weight: A meta-analysis. *J Periodontol* 2005;76:161-5.
- Tucker R. Periodontitis and pregnancy. *J R Soc Promot Health* 2006;126:24-7.
- Offenbacher S, Lieff S, Boggess KA, Murtha AP, Madianos PN, Champagne CM, *et al.* Maternal periodontitis and prematurity. Part I: Obstetric outcome of prematurity and growth restriction. *Ann Periodontol* 2001;6:164-74.
- Xiong X, Buekens P, Fraser WD, Beck J, Offenbacher S. Periodontal disease and adverse pregnancy outcomes: A systematic review. *BJOG* 2006;113:135-43.
- Chacko V, Shenoy R, Prasy HE, Agarwal S. Self-reported awareness of oral health and infant oral health among pregnant women in Mangalore, India - A prenatal survey. *Int J Health Rehabil Sci* 2013;2:109-15.
- Gaffield ML, Gilbert BJ, Malvitz DM, Romaguera R. Oral health during pregnancy: An analysis of information collected by the pregnancy risk assessment monitoring system. *J Am Dent Assoc* 2001;132:1009-16.
- Oral Health Care during Pregnancy Expert Workgroup. Oral Health Care during Pregnancy: A National Consensus Statement; 2012. Via the Internet. Available from: <http://www.mchoralhealth.org/PDFs/OralHealthPregnancyConsensus.pdf>. [Last accessed on 2015 Nov 20].
- Curtis M, Silk H, Savageau J. Prenatal oral health education

- in U.S. dental schools and obstetrics and gynecology residencies. *J Dent Educ* 2013;77:1461-8.
14. Zanata RL, Fernandes KB, Navarro PS. Prenatal dental care: Evaluation of professional knowledge of obstetricians and dentists in the cities of Londrina/PR and Bauru/SP, Brazil, 2004. *J Appl Oral Sci* 2008;16:194-200.
 15. Morgan MA, Crall J, Goldenberg RL, Schulkin J. Oral health during pregnancy. *J Matern Fetal Neonatal Med* 2009;22:733-9.
 16. Wilder R, Robinson C, Jared HL, Lieff S, Boggess K. Obstetricians' knowledge and practice behaviors concerning periodontal health and preterm delivery and low birth weight. *J Dent Hyg* 2007;81:81.
 17. American College of Obstetricians and Gynecologists Women's Health Care Physicians, Committee on Health Care for Underserved Women. Committee opinion no 569: Oral health care during pregnancy and through the lifespan. *Obstet Gynecol* 2013;122:417-22.
 18. Suri V, Rao NC, Aggarwal N. A study of obstetricians' knowledge, attitudes and practices in oral health and pregnancy. *Educ Health (Abingdon)* 2014;27:51-4.
 19. Rocha JM, Chaves VR, Urbanetz AA, Baldissera Rdos S, Rösing CK. Obstetricians' knowledge of periodontal disease as a potential risk factor for preterm delivery and low birth weight. *Braz Oral Res* 2011;25:248-54.
 20. Ferullo A, Silk H, Savageau J. Teaching oral health education in U.S. medical and osteopathic schools: Results of a national survey. *Acad Med* 2011;86:226-30.