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

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**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

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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 outcome, 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 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)

| Knowledge-based questions                                                                 | Preseminar, Postseminar, Three-month follow-up, 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**

| Periodontal disease                                                                 | Preseminar, Postseminar, Three-month follow-up, n (%) |
|------------------------------------------------------------------------------------|-------------------------------------------------------|
| 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

| Belief-based questions                                                                 | Preseminar | Postseminar | Three-month follow-up | P     |
|---------------------------------------------------------------------------------------|------------|-------------|-----------------------|-------|
| 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   | 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   | 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   | 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   | 0.146 |
| 5. Periodontal disease can have an adverse effect on pregnancy                         | 4.0        | 1.0         | 5.0                   | 1.0   | 0.169 |
| 6. Prenatal care should include dental screening                                       | 4.0        | 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         | 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                   | 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.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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