Research article
Exploring dental graduates' knowledge and attitudes towards maternal oral health and its relationship to maternal and child health

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(Received: August 2023 Revised: September 2023 Accepted: October 2023)

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ABSTRACT

Introduction and Aim: Pregnancy is a critical period in women’s lives and presents complex physiological changes that can influence oral health and vice versa. Integrating education on maternal oral health into dental curricula can help ensure comprehensive care for both pregnant women and their children by equipping dental graduates with the knowledge and skills to address the unique oral health challenges faced by expectant mothers. In this study, a cross-sectional survey was conducted to assess the knowledge and attitudes of graduating dental students regarding maternal oral health and its impact on both mothers and infants.

Materials and Methods: The study was conducted in a dental college in southern India. 100 graduating dental students completed a structured questionnaire.

Results: 95% of students acknowledged the influence of maternal oral health on both mothers and infants, and 12% displayed a high level of knowledge. However, the average mean score obtained was 63.58% and knowledge gaps were observed in areas such as drug interactions, early childhood caries, and reducing oral bacterial load in expectant mothers. Despite this, 91% believed paediatric dentists should be part of perinatal care teams to promote maternal oral health awareness.

Conclusion: This study emphasizes the importance of education and integrating dental professionals in prenatal and antenatal care for improved oral health outcomes.

Keywords: Maternal health; oral health; periodontitis; pregnancy complications; early childhood caries.

INTRODUCTION

Oral health is a global issue that bears a major burden on the overall well-being of the person. Oral health is known to have a considerable impact on several systemic health conditions including cardiovascular diseases, diabetes, and respiratory conditions (1). It is considered key to overall health and well-being. Pregnancy is a unique period in women characterized by complex physiological changes. The changes occurring during this critical period may adversely affect oral health and vice versa (2).

The first report indicating the relation between pregnancy and oral health linked periodontal disease with preterm birth (3). Since then multiple studies have reported the association between oral health and adverse effects on pregnancy (4, 5). Clinical and epidemiological studies published during the last two decades support the link between mouth diseases, particularly periodontal infections, and pregnancy outcomes (6).

Preterm birth, preterm premature rupture of membranes, preeclampsia, miscarriage, intrauterine growth retardation, low birth weight, stillbirth, and neonatal sepsis are a range of adverse pregnancy outcomes (7, 8). These negative outcomes are thought to be caused by either a direct pathway involving the transmission of oral bacteria to the fetal placenta, membrane, or amniotic fluid (9, 10) or by an indirect pathway involving the circulation of inflammatory mediators produced locally in response to oral infections. Gram-negative anaerobic organisms, bacterial by-products, endotoxins, lipopolysaccharides, and inflammatory mediators (PGE-2 and TNF α) introduced into the circulation may eventually spread via the transplacental hematogenous route to cause intrauterine infection-inflammation. The elevated levels of inflammatory cytokines and C-reactive protein associated with periodontal disease contribute to increased uterine contraction resulting in miscarriage, early delivery, or low birth weight (11, 12).

Furthermore, studies have found a link between maternal Streptococcus mutans count and the development of Early Childhood Caries (ECC), a prevalent dental disorder defined by the progressive loss of tooth structure in children under the age of six. Higher maternal S. mutans levels were linked to an elevated caries risk among three-year-old children, and maternal S. mutans transmission to babies was a significant risk factor for ECC development. Maternal transmission of S. mutans to infants occurs through the sharing of saliva, such as when cleaning pacifiers, or through close contact, like sharing utensils. Maternal S. mutans count serves as an important predictor of the colonization of this bacterium in the oral cavity of infants, increasing their risk of developing ECC. As a
result, measures aimed at improving maternal oral health and lowering *S. mutans* transmission are critical in preventing ECC in young children (13, 14).

While expectant moms are aware of the benefits of eating a well-balanced diet, exercising regularly, and receiving prenatal care, one critical factor is frequently overlooked: maternal oral health. Many individuals are unaware of the significant influence dental health can have on both the mother’s oral health and the child’s development. Therefore maternal oral health forms a vital aspect of comprehensive healthcare that must not be overlooked. Dentists have a unique opportunity to promote awareness and ensure that pregnant moms receive the care they need to maintain optimal dental health during their pregnancy and beyond. The purpose of this article was to analyze the importance of maternal dental health and how it leads to a good pregnancy and the birth of a healthy child.

**MATERIALS AND METHODS**

The study was conducted as a self-reported cross-sectional survey among graduating dental students pursuing internships at AB Shetty Memorial Institute of Dental Sciences, a dental college in southern India. All the participants provided informed consent and the study was conducted as per the Declaration of Helsinki. The data of participants was kept anonymous and confidential.

The validated survey questionnaire contained 15 structured close-ended questions directed towards evaluating the knowledge and attitude of dental graduates regarding maternal oral health and its influence on the general health of the mother and infant.

The questionnaire was divided into domains assessing the knowledge of the importance of maternal oral health, its association with healthy pregnancy, its relation with infant oral health, and precautions to be taken in dental management during pregnancy including drug interactions (12 questions). The opinion of dental graduates regarding paediatric dentists and general dentists as a part of the perinatal care team was also assessed (3 questions).

The sample size was calculated using nMasters software version 2 and a minimum sample size of 97 participants to ensure a confidence level of 95% and a margin of error within ± 5% of the surveyed values was decided. We collected 100 valid responses to the survey. The data obtained was tabulated in an Excel sheet and analyzed with SPSS version 20.0 (Statistical Package for Social Sciences, Chicago, IL, USA) using descriptive statistics and the Chi-square test. The level of significance is set at 5%.

**RESULTS**

95% of dental graduates had the awareness that maternal oral health can influence the mother’s general health as well as infant health whereas 5% of students felt that poor oral health influenced only the mother’s health (Fig. 1). 12% (n=12) of the dental graduates could get more than 80% of the answers right. 89% (n=89) of students could get 50 % of the answers right. The overall average mean score was 63.58% for the 12 knowledge-based questions (Table 1).

![Fig. 1: Results assessing the knowledge on the importance of maternal oral health in percentages of right and wrong answer](image)

**Table 1:** Descriptive statistics showing overall average mean score for knowledge-based questions

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
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<td>100</td>
<td>16.67</td>
<td>91.67</td>
<td>63.583</td>
<td>14.48978</td>
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</tbody>
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DOI: https://doi.org/10.51248/v43i5.3311

Biomedicine- Vol. 43 No. 5: 2023

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About 74% of students answered that all pregnant mothers should undergo oral health check-ups irrespective of having dental problems, 15% of students felt that the oral health check-up should be done only if the mother has a dental problem and 11% of students answered that oral health check-up is need only if the gynaecologist recommends. 41% of students knew all the complications that can be caused by poor oral health during pregnancy.

Concerning dental management during pregnancy, (Fig. 2) 84% of students answered that the 2nd trimester is ideal for elective dental procedures and 61% had knowledge regarding the suitable dental chair position for treatment during pregnancy. Also, 48% of students answered that dental radiographs are not recommended during the first trimester. 63% of students knew the oral conditions associated with pregnancy.

About 67% of students knew the groups of drugs to be avoided during pregnancy. 12% of students knew that metronidazole is not an indicated drug during the first trimester (Fig. 2).

Regarding maternal oral health and ECC, 89% of students had regarding the influence of maternal bacterial load and incidence of dental caries in children and 60% of students had awareness regarding the modes of vertical transmission of bacteria. Furthermore, only 56% of students knew the safe and effective ways to reduce the oral bacterial load in expecting mothers (Fig. 3).

When asked about the suitable health care professional to create awareness about the importance of maternal oral health, 56% of students felt that a dentist is in the most ideal position to deliver the same. 29% of students felt that an obstetrician would be more suitable and 11% thought that a paediatrician would be the best healthcare professional to create awareness about the importance of maternal oral health in expecting mothers. The remaining 4% of students answered that the general physician was more suitable.

When asked if the paediatric dentist is in the best position to guide an expecting mother, about her and her infant's oral health 86% of students agreed, 12% of

Fig. 2: Results assessing the knowledge of dental management during pregnancy in percentages of right and wrong answer

Fig. 3: Results assessing the knowledge regarding the relation between maternal oral health and infant oral health in percentages of right and wrong answer
students were unsure and 2% disagreed. However, 91% of students felt that paediatric dentists should be a part of the prenatal and antenatal care team.

DISCUSSION
The established association between oral health and systemic health has emphasized collaborations among dental, medical, and public health professionals to adequately address both the oral and the general health of society. In developing countries like India, access and awareness regarding oral health including maternal oral health is compromised, especially in rural areas due to socioeconomic, educational, and cultural biases (15, 16).

Although medical professionals are the primary caregivers for expecting mothers, they seem to lack awareness regarding the implications of poor oral health. A recent systematic review found that although most prenatal care practitioners were aware of the importance of oral health during pregnancy there was a gap in translating this knowledge into clinical practice (17).

Dental graduates are uniquely positioned to make significant contributions to public health due to their specialized training in oral healthcare. As oral health experts, they can play an important role in educating expectant mothers about the importance of dental health and the general well-being of themselves and their children. They can spread the word about the links between oral health and pregnancy outcomes, promote a holistic approach to health, and be a part of the pre and postnatal care team. Thus in this study, we assessed the knowledge and attitude of dental graduates regarding maternal oral health and its influence on the general health of the mother and infant.

In this study, the majority of dental graduates (95%) had the awareness that maternal oral health can influence pregnancy as well as infant health. However, the average mean score of the total sample was only 63.58 % indicating insufficient knowledge regarding oral health factors associated with pregnancy and only 12% (n=12) of students scored more than 80% right answers.

Numerous studies have been conducted on the relationship between periodontal diseases and poor pregnancy outcomes in the last decade, and it is currently considered a risk factor for the development of several of the primary causes of infant mortality and morbidity (18, 19). In this study, no consensus about the importance of regular dental check-ups during pregnancy was found among the dental graduates. Most students were unaware of the ill effects and implications of poor oral health on pregnancy such as pre-eclampsia, low birth weight of the infant, and gestational diabetes. Similarly, the knowledge of oral conditions associated with pregnancy was seen to be lacking in dental graduates.

Even though the majority of the graduating dentists had an awareness regarding the link between maternal oral health and infant oral health, the knowledge regarding modes of bacterial transfer to infants and methods to decrease the bacterial load during pregnancy was lacking. This is to the study conducted in 2023, which found that there was a gap in knowledge about infant oral health care across all healthcare professions including dentists (20).

The American Dental Association has emphasized the importance of good oral health during pregnancy. It is suggested that dental treatment procedures including having dental radiographs taken and being given local anaesthesia, are safe at any point during pregnancy. The American College of Obstetricians and Gynecologists (ACOG) agrees that emergency treatments, such as extractions, root canals, or restorations can be safely performed during pregnancy and that delaying treatment may result in more complex problems (21, 22). However, ACOG has a statement regarding postponing elective nonobstetric general surgery and some invasive procedures until after delivery (23) but, oral conditions requiring immediate treatment, such as periodontal or endodontic treatment, extractions, or restoration of untreated caries can be managed at any time during pregnancy (22).

Nevertheless, most of the literature recommends the 2nd trimester as the safest period for elective dental treatment procedures and does not commend dental radiographs during the first trimester (24-26). The majority of the dental graduates answered in consensus with the above regarding dental treatment recommendations during pregnancy.

The survey results indicate that a significant number of dental graduates believe that dentists, especially paediatric dentists, should be included as part of the perinatal care team. This perspective highlights the recognition of the importance of oral health during pregnancy and its potential impact on both maternal and child health.

However, the study also reveals a gap in knowledge and awareness among dental graduates regarding the significance of oral health during pregnancy. This suggests a need for additional training and educational programs for dental students to bridge this gap and better prepare them for their future roles as professional dentists. As internship serves as a critical period for dental graduates to gain hands-on experience and practical skills before becoming licensed professionals, it becomes essential to incorporate relevant educational modules during this phase. Including information about the importance of oral health during pregnancy in internship programs can enhance their understanding and enable them to provide more comprehensive care to pregnant patients in the future.
By addressing this educational need, dental graduates will be better equipped to join the pre-natal and post-natal care teams, contributing positively to overall maternal and child healthcare. This approach not only benefits the patients but also elevates the status of dentistry as an integral part of healthcare during the perinatal period.

CONCLUSION

The study suggests a need for additional training and educational programs for dental students to bridge the gap in knowledge regarding the importance of oral health and better prepare them for their future roles as professional dentists. By understanding the impact of maternal oral health on both mothers and their children, dental professionals can contribute to the well-being of families and communities, fostering a healthier future for generations to come.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

REFERENCES