

The Importance of Oral Health during Pregnancy: A review

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ABSTRACT

Pregnancy is a transient physiological state which brings about different hormonal changes in a woman's body. These effects are generalized and there are various oral changes as well. There are a number of especially important alterations in the periodontal conditions within the oral cavity. These changes have important implications as they have been known to cause adverse pregnancy outcomes. Better knowledge about these scenarios among health care professionals and women would go a long way toward avoiding or minimizing these adverse outcomes. Health education is an important tool in creating awareness among pregnant women regarding improvement of their oral health. Awareness among the health professionals and good inter-departmental collaboration would help toward a more efficient treatment of these pregnancy related conditions.

KEYWORDS: oral health, oral health education, pregnancy.

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INTRODUCTION

Oral health was recently re-defined by the Fédération Dentaire Internationale (FDI) as being a multi-faceted condition including the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and without pain, discomfort or disease of the craniofacial complex. The definition further states that oral health is a component of health, including physical and mental well-being.¹ Oral health can be achieved by maintaining good oral hygiene. The importance of maintaining good oral hygiene is not just restricted to preventing dental caries and periodontal problems, but improving the overall general health status of an individual.² Various studies have shown that there is a direct correlation between oral health and general systemic health of an individual.^{3,4,5}

Oral health awareness goes a long way toward improving the oral health status of an individual. Maintaining proper oral hygiene and promoting swift treatment of various oral conditions have a positive impact in this regard.⁶ However, special consideration is required in terms of oral health in women. The presence of different physiological states such as puberty, pregnancy and menopause should be given added consideration, because these conditions are known to modify the overall health status in women.⁷ The importance of oral health in pregnant women is of paramount significance, since it not only has a direct effect on the expecting mother but also on the future of the child.⁸ This review focuses on the importance of oral health in pregnant women.

METHODS & RESULTS

A literature search was conducted over the past 20 years in PubMed and Google using the terms "oral health", "oral health education" and "pregnancy". Over

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one hundred articles were downloaded based on the search criteria; out of these, 46 articles were primarily selected based on relevance, availability of full text and non-overlapping entries. These articles were reviewed and data extracted. Fifteen articles which showed the prevalence and risk assessment of dental caries in pregnant women were finally selected for discussion. Most of the studies evaluated the Dental-Missing-Filled-Teeth (DMFT) scores in pregnant women; a few evaluated the cariogenic bacterial load and others studied the salivary flow rate. The findings of these articles were summarized in a draft tabular form.

■ DISCUSSION

Pregnancy is a transient physiological state which begins following fertilization and lasts roughly around nine months, which can be further divided into trimesters. Pregnancy causes a variety of generalized changes in a woman's body due to the progressive cycle of hormonal influences.⁹ The increased hormonal secretion may result in different signs and symptoms which can alter the person's overall health and perceptions. These would then cause systemic changes including the cardiovascular, hematologic, respiratory, renal, gastro-intestinal, endocrine and genitourinary systems.¹⁰ Various localized effects are also seen involving the oral cavity. The effects on the hard and soft tissues of the oral cavity during pregnancy have been well documented.^{9,10,11} The most common are the conditions affecting periodontal health and include gingivitis and periodontitis.⁸ A reactive growth called 'pregnancy tumor' is commonly seen in the gingiva during pregnancy.¹² The incidence of dental caries also increases due to changes in dietary habits; also common are erosion of teeth due to frequent episodes of nausea and vomiting during pregnancy.⁸ Overall, there is an increased incidence of infectious diseases which could have deleterious effects. It should be kept in mind that the pregnancy related effects have a negative impact not only on the mother, but also on the infant if not handled properly.¹³

Pregnancy and periodontal health. Periodontal status is one of the most important aspects of oral health to be considered in a pregnant woman. According to a report given by the American Dental Association, around 60% to 75% of pregnant women have gingivitis.¹⁴ It has been found that pregnancy as such does not cause gingivitis but aggravates it. Pregnancy gingivitis is usually seen in the marginal gingiva and in interdental papillae. Gingivitis is aggravated by increased capillary permeability which is a predisposing factor, because of increased levels of circulating estrogen levels.⁸ It has also been observed that levels of *Bacteroides*, *Prevotella* or *Porphyromonas* increase during pregnancy.¹⁵ Bleeding, swelling and tenderness are usually encountered from the second trimester onward, with peak levels seen around the eighth month.⁸ The signs

are aggravated by poor oral hygiene. The gingival condition can be controlled by effective oral hygiene measures.^{8,9}

Similarly, the increased circulating hormonal levels exacerbate the pre-existing periodontal conditions. According to different reports it has been found that the prevalence of pregnant women suffering from periodontal diseases ranged from 30% to 100%.⁹ Various studies conducted worldwide have shown that there is an association between periodontitis and adverse pregnancy outcomes.¹⁶ One of the earliest reports suggested periodontitis to be a potential risk factor for pre-term birth.¹⁷ An association of pregnancy with low birth weight has also been made.¹⁶ A systematic review has suggested that a woman's chance of having a preterm birth is significantly reduced by scaling and root planing during pregnancy.¹⁸ These findings were further affirmed by a meta-analysis conducted on seven randomized control trials.¹⁹ However, a case-control study evaluating the relationship of periodontal disease and preterm birth weight suggested that there was no association between them.²⁰ Other adverse pregnancy outcomes related to periodontitis include stillbirth, miscarriage, intra-uterine growth retardation and pre-eclampsia. These findings have been described comprehensively in the Oral Conditions and Pregnancy (OCAP) cohort study conducted in the United States.⁸ A case of perinatal death in relation to periodontitis has been described in a report from Australia.²¹

Two theories have been put forward to explain the association of adverse pregnancy outcomes with dental problems. The first suggests that periodontal diseases causes abnormal immunologic changes which result in various complications during pregnancy. The second hypothesis suggests that oral bacteria colonize the placenta which leads to an inflammatory response, hence resulting in the adverse outcomes related to pregnancy. It was also found that this oral-uterine transmission of bacteria was related to periodontal pathogens as well as normal commensals of the oral cavity.²²

The relationship of periodontitis with various systemic diseases has already been established and is based on various studies.^{4,5,6} The association of dental diseases with pulmonary infections had been described as early as the sixties.²³ Periodontitis has been found to show significant association with cardiovascular diseases, diabetes mellitus, respiratory conditions and osteoporosis. These systemic diseases have been primarily attributed to the various pathogens seen in periodontitis.⁵ A relative risk of cardiovascular disease in individuals with periodontitis was described in a meta-analysis.²⁴

Tooth mobility has been observed during pregnancy. This is related to the periodontal status of pregnant women. The change in the microflora from aerobic to anaerobic seems to trigger inflammatory mediators which cause disturbances in the lamina dura resulting in tooth mobility.⁸

Another lesion commonly encountered during pregnancy is a form of pyogenic granuloma known as “pregnancy tumor”. This is a reactive tumor-like growth which arises in response to local irritation factors such as plaques. The hormonal influences resulting in increased angiogenesis leads to the development of these lesions. They are generally encountered during the first and second trimester of pregnancy and may regress after parturition.¹²

Pregnancy and dentition. Pregnant women are predisposed to the development of dental caries. Various factors have been suggested to explain this occurrence. It has been observed that there is an increase in appetite in pregnant women with frequent consumption of cariogenic foods.¹³ As evidenced by the Miller’s experiments, this leads to the fall of oral pH below the critical value leading to the development of caries. The incidence of caries is further enhanced by the occurrence of morning sickness which causes vomiting and reflux leading to erosion of the dental surfaces.²⁵ The experience of nausea may also deter routine oral hygiene practices. Another factor which has been

suggested is that the hormonal influences causes dryness in the mouth leading to poor washing/buffering effect of the saliva. Consequently, the overall incidence of caries in pregnant women is higher than in normal instances.⁸

Dental caries during pregnancy should not be just treated as an infection of the teeth. It has been found that good oral hygiene in an expectant mother can go a long way in preventing early childhood caries in children.²⁶ Studies have shown that there is vertical transmission of cariogenic bacteria from the mother to the child. The maternally derived *Streptococcus Mutans* is a well-known cariogenic bacteria which highlights this type of transmission. *Streptococcus Mutans* may colonize in an infant’s mouth from birth or may be transferred through the saliva and is responsible for initiation of dental caries in an infant.⁸ Various studies have evaluated the prevalence of caries and associated risk factors in pregnant women. The data showing these findings as observed in different countries around the world has been summarized in Table 1.^{9, 27-40.}

Table 1. Data extracted from various studies showing the prevalence of dental caries/ risk factors in pregnant women.

Author	Country ^{ref}	Objective	Results
Vasiliauskienė et al.	Lithuania ²⁷	Study of oral health status in pregnant women	99.9% (n=1070) of pregnant women had dental caries. Mean DMFT: 12.065
Ji et al.	Japan ²⁸	To analyse relationship between caries risk and presence of cariogenic bacteria among pregnant women.	Positive correlation between <i>S. mutans</i> , and Caries risk (p<0.05) among pregnant women.
Rakchanok et al.	Thailand ²⁹	Identification of common dental problems among a group of pregnant & non-pregnant women.	74% (n=94) of pregnant women had dental caries. Significant difference (p=<0.001) vs. non-pregnant women.
Bressane et al.	Brazil ³⁰	To evaluate oral health condition of pregnant women.	100% (n=50) of pregnant women had dental caries. Mean DMFT: 10.
Molnar-Varlam et al.	Romania ³¹	Risk assessment of caries in pregnancy.	Increase in <i>S mutans</i> & <i>Lactobacilli</i> during 2 nd trimester resulting in high caries risk
Merglova et al.	Czech Republic ³²	Investigation of oral health status in women with high risk pregnancies.	Mean DMF scores in high risk pregnant women: 12.8 Mean DMF scores in low risk pregnant women: 11.5. No significant difference.
Vergnes et al.	France ³³	To determine frequency to tooth decay among pregnant women.	51.6% (n=1094) of the pregnant women had dental caries.
Öztürk et al.	Turkey ³⁴	To investigate the effect of 3 rd trimester of pregnancy & lactation on dental, oral hygiene & salivary parameters.	DMFT significantly increased in pregnant & lactating women. Mean DMFT: Pregnant women: 6.6; Lactating women: 7.9
Rahman et al.	Bangladesh ³⁵	To assess the oral health status of pregnant women.	87.3% (n=102) had caries affected tooth.
Amin & Shetty	India ³⁶	To assess the oral health status of pregnant and non-pregnant women.	No significant difference in frequency of caries (p=659)
Karnik et al.	India ³⁷	To evaluate salivary flow rate, pH and prevalence of dental caries in pregnant & non-pregnant women.	Pregnant women had lower salivary flow rate (0.63ml/min) & (pH 6.56) vs. non-pregnant women.
Azofeifa et al.	USA ³⁸	To assess and compare the prevalence & severity of dental caries among pregnant & non pregnant women.	Prevalence of untreated dental caries among 15-24 year old pregnant women was significantly higher (p=0.001).
Gupta & Acharya	India ⁹	To assess the oral health status and treatment need among pregnant women.	Prevalence of dental caries: 62.7% (n=300)
Kamate et al.	India ³⁹	To assess the severity of dental caries in pregnant women vs non pregnant women.	Significant increase of mean DMFT (p<0.05) in third trimester and post-partum period.
Shaghaghian et al.	Iran ⁴⁰	To evaluate pregnant women’s dental caries status and its associate risk factors.	Mean DMFT = 5.8 ±3.6

Oral health in pregnancy. Oral health is an essential component of maintaining the overall health and well-being of a pregnant woman and her child.⁴¹ The importance of oral health during pregnancy was highlighted in the 2000 Surgeon General's oral health report and recommendations regarding changing the attitudes and beliefs among health care professionals and patients towards oral health.⁴²

The number of pregnant women utilizing dental treatment facilities worldwide is very low. A study based in the United States suggested that nearly 56% of pregnant did not seek dental treatment during pregnancy and only 35% had any form of dental procedure during the first year following child-birth.²⁶ Another multi-state based study indicated that 50% of the pregnant women had dental problems, but neglected them for various reasons.⁴³ According to the pregnancy risk assessment monitoring system, only 23%-43% of pregnant women underwent dental treatment.⁴³ Similar findings were found in studies conducted in India and Iran.^{9,11}

Educating pregnant women regarding general and oral health would go a long way in preventing the adverse outcomes of pregnancy. Present day pregnancy is associated with a change in behavior in women and this provides an excellent opportunity to counsel them regarding the importance of oral health. Pregnant women are receptive to information regarding improvements to their own health as well as the infant's well-being.⁸ Early health care promotion during pregnancy has been shown to improve overall oral health in children. Along with patient education, oral screening is an essential component which could be adhered to during the initial trimester of pregnancy.²² In this regard, the SMILE study and the Midwifery Initiated Oral Health (MIOH) trial are extremely effective interventions in reducing the adverse outcomes of pregnancy. A Maternal Oral Screening (MOS) tool was developed which was found to be highly sensitive in identifying dental problems.^{22,44}

The knowledge and attitudes of the health care professionals towards promoting oral health in pregnant women plays an important role in its achievement. Studies have shown that there is awareness among health care professionals regarding the importance of oral health but lack of judgement on referrals.⁴⁵ The U.S. Department of Health and Human Services, Health Resources and Services, administration (HRSA) stresses the importance of inter-professional oral health care clinical competencies among health care providers.¹⁴ Nurses, nurse-practitioners and nurse-midwives are encouraged to undertake the assessment of oral conditions and referrals whenever necessary as a part of their routine prenatal practice.⁴⁶ Collaboration between the obstetric and dental teams might be an effective way of providing quality oral health care to pregnant women.

Oral health management during pregnancy.

Management of oral health in a pregnant woman is a complex process and requires sound knowledge of the various physiological events occurring during pregnancy. A step-wise approach is required during each trimester of pregnancy. Inter-professional collaboration involving the medical personnel, nursing staff and dental professionals would be effective.⁴¹

The first trimester of pregnancy is the period when embryological development occurs leading to the formation of the fetus. This is a critical time, because any complication can lead to teratogenic effects on the developing fetus. In terms of oral health, it is generally recommended that patients should be assessed for their oral conditions and counselled regarding maintaining oral hygiene.¹⁰ Additional counselling regarding transmission of *Streptococcus Mutans* and dietary considerations should be given. No dental procedures should be performed.²⁶

The second and third trimester are safe for any elective dental procedure. However, it should be noted that the appointments should be short and the patient positioning should be taken into account especially during the third trimester as the increased uterine pressure may cause dizziness, nausea and supine hypotensive syndrome.⁴¹ The elective procedures that can be performed include (a) oral prophylaxis and dental restorations; (b) fluoride application and use of chlorhexidine mouth rinses; (c) use of xylitol as a sweetening agent; (d) judicious use of analgesics and antibiotics.⁴⁶

Our experience at Dhulikhel Hospital, Nepal.

At the Dhulikhel Hospital, Nepal we strive to serve the local communities which have been burdened by health problems primarily due to lack of awareness and accessible health care facilities. The year of 2017 was marked by the opening of a new inter-departmental collaborative effort between the Department of Obstetrics & Gynecology and the Dental Department; the objective is to improve oral health in women. A team of dental doctors routinely visits the wards to educate the pregnant women and instill positive oral hygiene practices. Patients with oral conditions are referred to the Dental Department where elective procedures are performed. Community based dental camps are conducted routinely in the various outreach centers of the hospital where oral hygiene practices are taught to the population.

SUMMARY

Pregnancy is a dynamic state which causes numerous physiological, general and oral alterations. Proper and effective care of mothers is essential not only for her but also for the future of the child to be born. Maintaining good

oral health is paramount for preventing adverse pregnancy outcomes and delivering a healthy child.

■ AUTHOR CONTRIBUTION

Vinay Marla: Conception and design of the study, acquisition of data, literature review, analysis and interpretation of data, drafting of the manuscript, approval of final version of the manuscript.

Ritesh Srii: Acquisition of data, analysis and interpretation of data, drafting of the manuscript, approval of final version of the manuscript.

Deepak Kumar Roy: Literature review, analysis and interpretation of data, drafting of the manuscript, approval of final version of the manuscript.

Hardik Ajmera: Literature review, drafting of the manuscript, approval of final version of the manuscript.

■ CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest towards the publication of this manuscript.

A IMPORTÂNCIA DE SAÚDE ORAL DURANTE A GRAVIDEZ

RESUMO

A gravidez é um estado fisiológico transitório que produz uma série de alterações hormonais no corpo da mulher. Esses efeitos são generalizados e incluem várias alterações orais. Uma destas afeta condições periodontais. Essas mudanças têm implicações importantes, pois sabe-se que causam resultados adversos na gravidez. Um melhor conhecimento sobre esses cenários entre os profissionais de saúde e entre as mulheres seria um passo importante para evitar ou minimizar tais resultados adversos. A educação para a saúde é uma ferramenta importante na conscientização das mulheres grávidas em relação à melhoria da saúde bucal. A consciência entre os profissionais de saúde e a boa colaboração interdisciplinar ajudaria a efetivar tratamento mais eficiente dessas condições relacionadas à gravidez.

PALAVRAS-CHAVE: saúde bucal, educação para a saúde bucal, gravidez

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