

REVIEW ARTICLE**ORAL HEALTH CARE IN PREGNANCY: A REVIEW**Varun Suri¹, Rimpi Singla², Vanita Suri³

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ABSTRACT:

Pregnancy results in physiological changes in almost all the organs including oral cavity. Most commonly it is associated with gingivitis. Sometimes these changes may become pathological and result in severe gingivitis and periodontitis that needs specialist's attention. Not only do these oral diseases result in caries and tooth loss, they may incite systemic inflammatory response, resulting in adverse pregnancy outcome. Ironically, despite the availability of evidence for this association, dental attendance among the pregnant women remains low. We reviewed the literature pertaining to this issue and the available studies addressing dental care and treatment in pregnancy. We found that there is uniformly lack of awareness of oral care and denial for oral treatment both by pregnant women and their care providers, as reported by most of the studies. Out of all the factors, we found lack of health education or awareness in the main reason for this. This is the major factor that has precipitated the "one tooth for one pregnancy" norm. Hence, there is urgent need to spread awareness about importance of dental care and safety of treatment in pregnancy to overcome the myths.

Keywords: pregnancy, oral health, periodontal disease, knowledge, beliefs.

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INTRODUCTION

Pregnancy is a unique physiological state that affects almost all the organs because of the changes in hormonal milieu meant to support pregnancy. These changes, generally reversible after delivery, are sometimes not without adverse effects. One such alteration that has, till recently, been ignored is the effect of pregnancy on oral health. Periodontal diseases are common in pregnancy [1] as physiological changes make periodontal tissues more prone to infection and inflammation. Recent upsurge in interest in periodontal diseases in pregnancy is attributed to their association with adverse pregnancy outcome [2,3,4]. Several studies have shown an increased risk of preterm birth and low birth weight with periodontal disease [2,5,6,7]. High prevalence of periodontitis and isolation of oral pathogens from placentas of women with preeclampsia its suggest role in pathogenesis of preeclampsia [8,9]. Preliminary investigations suggested that treatment of periodontitis may prevent preterm birth

and low birth weight [10,11]. However, recent RCTs found no benefit of treatment of maternal periodontal conditions in reducing these adverse outcomes but at the same time it was highlighted that there was no harm to the mother or fetus [12-15]. It is important to understand that results of studies on association between periodontal disease and pregnancy outcome may be conflicting but evidence for physiological changes in oral tissues during pregnancy is confirmed. What are these physiological changes? 'One tooth for one pregnancy' norm can surely not be a physiological change. What converts these physiological changes into pathological? Despite availability of preventive measures, why this pathological conversion still happens? What are the knowledge beliefs and actual practices pertaining to oral health and treatment of oral diseases among pregnant women and their care providers? With an objective to address these issues, we reviewed the available literature.

METHODOLOGY

The databases MEDLINE, EBSCOhost, Google Scholar were searched. The search terms included 'pregnancy', 'oral health', 'gingivitis', 'periodontal disease', 'knowledge, attitudes, practices'. Inclusion criteria included original articles, systematic reviews, meta-analyses, randomized controlled trials, cohort studies, and case-control studies, in any language. Studies addressing oral diseases in pregnancy, oral treatment during pregnancy and knowledge, beliefs and attitude of the pregnant women and clinicians were included. All the studies were screened for relevant title, then the abstract followed by full text article, removing duplicates. Bibliographic search was made to have additional studies of interest. Data were extracted from individual studies and analyzed.

RESULTS

1.1. Physiological changes during pregnancy predisposing to oral diseases

Periodontal diseases refer to the inflammatory conditions of gingiva (gingivitis) and the underlying supporting connective tissue and alveolar bone (periodontitis). Gingivitis is the most common oral disease in pregnancy; reported prevalence being 60- 75% [16]. Pregnant women have higher incidence of gingivitis as compared to non-pregnant women [17,18]. Approximately one half of women with preexisting gingivitis have exacerbation during pregnancy [19]. Increased levels of estrogen and progesterone make the small blood vessels of the gingiva more permeable. This increases the susceptibility to oral infections [20,21] and exaggerate the gingival inflammation in response to dental plaque [21,22,23]. Hormonal changes during puberty and menstruation and use of hormonal preparations have same effect [21]. Another important physiological change of pregnancy exacerbating plaque induced gingivitis is immunosuppression, especially inhibition of neutrophils [24,25]. Changes in oral microbiological environment also contribute to increased risk of periodontal infections [26]. During pregnancy, the proportions of *Bacteroides* species, *Prevotella intermedia* are increased as compared to non-pregnant controls [27]. Mean proportions of *Prevotella intermedia* in subgingival plaque were found to be increased in experimental gingivitis induced at 25th week of pregnancy but not in post-partum [22]. Increased scores of the gingival index and the gingival crevicular fluid flow have been observed in pregnant as compared to the non pregnant women [17]. Good oral hygiene practices have been shown to have minimized gingival inflammation during pregnancy [22,28].

Overall prevalence of periodontitis among women in 30 to 54yrs age group is quite high [29]. Nearly 40% of pregnant women have periodontal infections [30]. The process involves bacterial infection of the periodontium inciting local inflammatory response.

Periodontium is broken down, creating pockets that become further infected. As the gingival inflammation increases, the probing depths also increase [31]. Disturbance in the attachment apparatus and mineral changes in the lamina dura result in generalized tooth mobility seen in pregnancy. Generally loss of clinical attachment during pregnancy is not permanent [28,32] but in some cases the progression of periodontitis can occur [33] and be permanent. Removal of local gingival irritants, treatment of odontogenic infections and therapeutic doses of vitamin C can result in reversal of tooth mobility [34].

Increased intake of sugary foods and frequent snacks increases dental caries during pregnancy. Dietary carbohydrates are fermented by oral bacteria into acidic compounds that demineralize enamel.

"Pregnancy tumor" or "epulis gravidarum" is the result of inflammatory gingivitis or recurrent irritation on tongue, palate or buccal mucosa. These isolated, erythematous and lobulated vascular tumor-like growths occur in up to 5% of pregnancies. Generally, these regress spontaneously after delivery but may need to be excised if they do not resolve, disturb the alignment of teeth or bleed on mastication [35].

Another phenomenon unique to pregnancy and hazardous to enamel is hyperemesis gravidarum in first trimester. Many patients face reflux of gastric contents due to loss of sphincter tone and prolonged gastric emptying time in third trimester. Repeated exposure to acidic gastric contents can cause enamel erosions [16].

1.2. Prevention of oral diseases

Physiological changes of pregnancy are not modifiable and they are per se not the cause of oral diseases. Primary preventive measures include adopting oral hygiene measures including effective brushing and inter-dental cleaning, and use of fluoride and antimicrobial rinses. Secondary prevention involves prompt treatment of even minor ailments and keeping the plaque level low. Periodontal therapy reduces pathogenic bacteriae and signs of inflammation [12,36]. Scaling and root planning should be done as indicated and any acute infection or abscess should be treated promptly, irrespective of gestational age [37,38].

The risk of caries can be reduced by limiting the intake of foods containing fermentable carbohydrates to meal time only, limiting intake of drinks like juice, soda or sports drinks. Xylitol products should be used [38]. Patients with untreated caries and associated complications should undergo definitive treatment. This reduces the maternal oral bacterial load and transmission of bacteria to the neonate [39,40].

Effect of exposure of enamel to acidic gastric contents due to vomiting can be reduced through dietary changes and use of antiemetics and antacids. Management involves mouth-rinses with a tea-spoon of baking soda in a cup of

water after vomiting. Gentle tooth brushing with fluoride toothpaste twice daily prevents damage to demineralized surface of teeth but same should be avoided soon after vomiting as it increases erosion. Definite treatment in the form of fluoride treatment and restorations is required in case of eroded or sensitive teeth to cover the exposed dentin [16].

1.3. Knowledge, beliefs and practices of pregnant women regarding oral health care

Despite high prevalence of oral diseases in pregnancy dental care utilization among pregnant women is low. Less than half (22–50%) of the pregnant women visit dentist [41,42,43]. Even in the event of dental problem, only one half of pregnant women seek care. Data from Pregnancy Risk Assessment Monitoring System (PRAMS) from four states found that only 22.7 to 34.7% women accessed dental care during pregnancy. Out of those who reported dental problems, only 44.7% to 54.9% respectively sought care. [41]. In a questionnaire based study [44], out of 750 respondents, 46.3% of respondents had carious teeth and about 40% felt that their oral health was poor; still only 58.3% visited the dentist, mostly when they developed pain. Similarly, in another study, out of 603 respondents [45], one-third felt that they had periodontal problems and 40% experienced dental pain. Only half of the women (52%) had visited a dentist during their pregnancy, mostly for dental pain. In another study only 27% of the women who perceived gingivitis consulted dentist or intensified the oral hygiene habits [46]. A cross-sectional survey among 2259 pregnant women in China revealed very low (16.7%) routine use of dental care (RUDC) during pregnancy. This was significantly lower among younger women, women with lesser annual income and those not practicing oral hygiene measures [47]. Insurance through public funding and delay in prenatal care are significantly associated with not getting dental care [41]. Many studies have suggested ethnicity as a predictor of knowledge and belief [48,49]. Oral infections are two to three times more prevalent among ethnic minorities who are also more likely to have untreated diseases [29].

Socio-economic factors affect women's awareness and access to oral health care but they are not the only reason. Even in countries where public dental services are free for pregnant (Greece and the UK) or there is dental insurance, the utilization of dental services is very low [50,51]. Lack of knowledge and awareness and fear of dental treatment mounts a significant barrier to access dental care. Many women accept the signs of inflammation as a normal phenomenon; hence, they do not seek dentist's help [52]. In UK, 39% women reported not having dental visit during pregnancy despite being free as either they did not find it necessary or had a fear of dentist [43]. In one study, only 21% of subjects agreed for dental check up even when offered at subsidized price, despite the fact that 47%

believed that pregnancy affects oral health. This was because of erroneous beliefs; 26% of the subjects believed that dental treatment has deleterious effect on pregnancy, 43% were against the use of restorative materials [53]. Despite insurance, high levels of education and knowledge, only 13.7% of Turkish mothers visited a dentist during their pregnancy despite majority (68.7%) having dental problems. Among those who did not visit a dentist, 57.2% expressed concerns regarding local anaesthetics and antibiotics. More than 70% of mothers believed that calcium is drawn out of their teeth by the fetus, and 43% believed in the 'A tooth for a baby' myth [54].

Oral health education is the key to shed off misconceptions surrounding dental treatment. Dental visit is directly related to better education status and previous regular dental visits [55,56]. A survey in Nigeria also showed educational status to be the most important predictor of oral health attitude [57].

Numerous other barriers include lack of access to care, perception of dental experience, lack of counseling, attitude towards dental care-providers and, lapse in providing oral health education by the prenatal care providers [42,58,59]. Very often, women do not receive any information on oral health [59]. More than 70% pregnant women receive no information regarding oral hygiene [43,45]. Dental health is significantly better among the women who have received and followed instructions [45]. Studies have reported gap in women's inclination and ability to access dental care.

Pregnancy is an opportune time to provide health education. One study on 1,224 pregnant women showed a significant increase in number of women with good oral health between enrollment in the study (<26 weeks' gestation) and at 48 hours of delivery. This showed that mere oral examinations can improve oral health in pregnant women [30]. In a survey, pregnant and post partum women who were both educated about good oral health (44%) and encouraged to see a dentist (22%) were six times (OR=6.3) more likely to have paid attention to their oral health and four times more likely to have or planned to have a dental visit [60]. Yet another study showed improvement in knowledge score when exposed to just ten minutes presentation and, women were also able to retain this knowledge [61]. A study examining an innovative idea of promoting awareness and impacts of oral health message among pregnant women by online approach showed favorable results [62].

1.4. Knowledge, Beliefs and Attitude of clinicians about oral health care

While pregnant women are willing to incorporate healthy dental practices once exposed to, the knowledge, attitude and practice of care providers is alarmingly suboptimal. Despite knowing the association between periodontal diseases and adverse pregnancy outcome, only 22%

performed oral examination at initial visit and 48% when a patient reported problem. Nearly half of the obstetricians rarely or never recommend dental examination [63]. In a study from North Carolina, 63% out of 504 health care providers reported conducting oral examination at the initial visit [64]. In a recent study, 52% of physicians believed that fetus withdraws calcium from maternal teeth and 88% advised pregnant women to delay the dental treatment [65]. High prevalence of misconceptions was reported in a study from UAE where 73% practitioners regarded dental radiographs and nearly 60% considered administration of local anesthesia to be unsafe during pregnancy [66]. An online questionnaire based study from India showed that despite having knowledge, Obstetricians were reluctant in converting this into practice. Only 40% recommended dental examination and 47% advised patients about oral care [67]. A correlation between the experience of the obstetricians and referral for dental examinations was observed in one study [68].

Very important facts surfaced from a study from Nigeria. More than half (56.4%) of the dentists expressed concerns about being sued if something goes wrong with pregnancy. 10.7% and 29.5% of the participants opined against single tooth and full mouth radiograph respectively. Endodontic therapy, resin based composite restoration and nitrous oxide sedation was believed to be inappropriate by 8.1%, 1.3% and 32.2% of the participants respectively [69]. These misconceptions seriously impede oral health-care among pregnant women [70]. Care providers must understand that pregnancy should not be the reason to defer preventive dental care and necessary dental treatment [37].

1.5. Precautions during dental treatment in pregnant women.

1.5.1. Specific Precautions related to gestational age

Generally first trimester of the pregnancy is marked by nausea and vomiting and aversion to common odours. This is also the period of organogenesis. Hence elective procedures may be considered to be deferred till second trimester. However, this should not preclude dental treatment if deemed urgent. Small amount of snacks and minimizing the duration of treatment is helpful.

During third trimester, size of gravid uterus, caval compression and risk for aspiration calls for alteration in positioning in dental chair. After 20 weeks gestation, they should be maintained in a semi-seated position or a pillow should be placed underneath the right side of the body. Extensive elective procedures may better be postponed till delivery [71].

1.5.2. Radiographs

Dental X-rays necessary for optimal treatment can be safely performed during pregnancy [37]. Risk of

congenital anomalies does not increase with radiation exposure of up to 5–10cGy; exposure with oral radiographs is much lesser. Even a full-mouth series of dental radiographs results in only 8×10^{-4} cGy [72] but they may be postponed till delivery. A panoramic study causes about one-third the radiation exposure associated with a full-mouth series with E-speed film and a rectangular collimated beam. This can be further reduced by using lead apron over abdomen and thyroid collar.

1.5.3. Analgesic and anaesthetic drugs

Local anaesthetics are relatively safe. Lidocaine and prilocaine are category B drugs, whereas mepivacaine and bupivacaine are category C drugs. Prolonged use of narcotic analgesics in the third trimester can lead to neonatal respiratory depression. Acetaminophen, category B drug in pregnancy, is the safest analgesic for use during pregnancy.

Nitrous oxide/oxygen is a commonly used inhalational anesthetic agent [73]. Nitrous oxide should be used in pregnancy only when local anesthetics are inadequate or patient's fear and anxiety prevents her cooperation with essential treatment. It is important to remember that pregnant women are more prone to develop hypoxia and hypercapnia with decreased ventilation as oxygen consumption is increased and functional lung capacity decreases. Airway management can be difficult in pregnant women due to weight gain and laryngeal edema [74]. Clinically significant depression in ventilation may occur if nitrous oxide is combined with sedatives [73]. Consultation with the perinatal care provider is advisable before using intravenous sedation, nitrous oxide or general anesthesia.

1.5.4. Dental Amalgams

At present, there is no evidence that exposure of the fetus to mercury released from the mother's pre-existing amalgam fillings causes any adverse effect [75,76,77] Mercury vapour (elemental mercury) released during amalgam removal or placement [78] may be inhaled and absorbed into the bloodstream and can cross the placental barrier [77]. This can be minimized by use of a rubber dam and high-speed evacuation (suction) [79]. The elemental mercury found in dental amalgams is different from methylmercury, a form of organic mercury from seafood that affects fetal brain. All health professionals should educate women about the potential harms of untreated dental caries during pregnancy and provide the best treatment options.

Diagnostic radiography, restorative dental prophylaxis, extractions and periodontal treatment are safe in pregnancy and are best performed during the second trimester [38,80,81].

It is important to review obstetric record before initiating dental procedures [37]. Prenatal care provider should be

consulted if the woman has any co-morbid conditions and appropriate precautions should be taken. One should also consult with the perinatal care provider when deferring the treatment. For many women, dental health insurance may be available only during pregnancy [37]. Developing a formal referral system between prenatal care provider and dentists or a written consultation reassures the patient as well as the dentist about acceptability [80,82].

CONCLUSIONS:

Periodontal diseases are highly prevalent among pregnant women. Low socio-economic status and lack of access to dental care are important reasons for this but most important and modifiable factor is low education and lack of knowledge about oral health care. Myths and fears surrounding dental treatment in pregnancy prevent women from approaching dentists. Attitude and knowledge of health care providers is alarming as many of them believe that dental treatment is unsafe in pregnancy and even urge women to postpone such treatment. Need of the hour is to provide consistent and comprehensive oral health education and promote awareness regarding need and safety of preventive and diagnostic interventions and treatment of oral diseases. Oral health education is the key to promote oral health among pregnant women and change the attitude of care providers.

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