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Review Article

Oral health care in pregnancy: Emphasizing Gynecologist's role in maternal oral health counselling and referrals for dental care

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Abstract

It is a well-established scientific fact that our general well-being is influenced positively by dental health. However, not everyone knows the importance of maintaining dental health for a smooth and uncomplicated pregnancy. Pregnancy is a very dynamic physiologic state in a woman's life. The dietary and hormonal changes affect both the hard and soft tissues of the oral cavity. The scientific evidence suggests that there is an association between poor periodontal health and adverse pregnancy outcomes, but the underlying mechanisms are not well understood. This review outlines the various orofacial changes during pregnancy and several considerations while managing a pregnant patient. We highlight the significance of oral health referrals during prenatal oral healthcare for the well-being of the mother and child.

Keywords: Oral health, Periodontitis, Pregnancy, Pregnancy gingivitis.

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1. Introduction

Pregnancy is a unique physiological phase in a woman's life lasting approximately about 40 weeks, from the first day of the last menstrual cycle to the estimated delivery date. The body undergoes various physiological, metabolic, and hormonal changes to nourish and protect the growing foetus. Estrogen and progesterone are the predominant hormones that play a significant roles during pregnancy. Progesterone levels increase up to 100ng/ml, which is ten times the peak luteal phase of menses, and estrogen levels can rise to 30 times higher than those during the reproductive cycle.[1] During pregnancy, there are systemic changes affecting various organs on the human body, including cardiovascular, respiratory, digestive, hematologic, endocrine, renal, skeletal and genitourinary; to adapt, nourish and protect the growing foetus.[2] Significant changes also occur in the oral cavity. Both hard and soft dental structures are affected due to dietary, physiological changes and hormonal influences.

2. Oro-Facial Changes in Pregnancy

The surge of hormones during pregnancy impacts the mother's entire body, including the oral cavity. The following are some of the oro-facial changes observed during pregnancy.[3,4]

1. There is increased facial pigmentation known as 'melasma'; presents as bilateral brown pigmented patch in the midfacial region. It typically appears during the first trimester and resolves or reduces after parturition.
2. Elevated levels of estrogen increase capillary permeability, making pregnant women more susceptible to gingivitis, particularly affecting marginal and interdental gingiva in the presence of local factors. Pregnancy gingivitis affects 60% -75% of pregnant women. Pregnancy itself does not cause gingivitis, but it exacerbates pre-existing conditions. It is also suggested that pregnancy gingivitis does not

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necessarily predispose individuals to or progress into periodontitis.[5]

3. Pregnancy does not directly cause periodontal disease, but it can worsens the pre-existing condition. According to a meta-analysis, the prevalence of periodontitis among pregnant women was approximately 40%.[6]
4. *Pregnancy tumour* also known as pregnancy epulis/ pyogenic granuloma/ granuloma gravidarum, is a benign, inflammatory, tumour-like growth in nature, appears as a localized, red, soft, tender, vascular, hyperplastic gingival lesion, with an incidence of 0.2-9.6%. The likely cause is increased angiogenesis due to elevated levels of sex hormones in the presence of plaque. It usually develops during the second and third month of the pregnancy and resolves spontaneously after parturition. Due to its vascularity and association with poor oral hygiene, patients may experience bleeding with minimal or no stimulation. If the lesion becomes large enough to interfere with mastication or cause discomfort, surgical excision may be necessary.
5. Seldom, during late pregnancy, tooth mobility may increase due to changes in the lamina dura and the attachment apparatus, this typically resolves postpartum. Elevated levels of estrogen and progesterone shifts the oral microbiology balance, increasing the ratio of anaerobic to aerobic bacteria. This inturn stimulates inflammatory mediators that can contribute to disturbances in the lamina dura and mobility.[7]
6. Morning sickness are common complaint of pregnant women during the first trimester. The subsequent vomiting can lead to dental erosion due to acid exposure.
7. There are changes in the flow and composition of the saliva during pregnancy. There is a decrease in salivary pH and sodium concentration and an increase in the potassium, protein and estrogen levels. The salivary estrogen levels increase the proliferation and desquamation of oral mucosa and the subgingival crevicular fluid levels. Desquamated cells act as the nutrition source for bacterial growth, predisposing pregnant women to dental caries.
8. Pregnant women are more prone to develop dental caries due to multiple factors. These include increased food cravings for sweet food items and cariogenic diet, increased incidence of vomiting and reflux making the oral environment acidic, promoting demineralization, increased nausea and heightened gag reflex deter the patient from performing routine daily oral hygiene practices and overall lethargy predispose pregnant women to develop dental caries. Studies have shown that there is vertical transmission of cariogenic bacteria (Streptococcus mutans) from the mother to the child. Promoting early oral health care in pregnant women can significantly improve oral health in children.[8]

3. Adverse Pregnancy Outcomes and Their Association with Periodontal Disease

Periodontitis in pregnant women has been associated with several adverse pregnancy outcomes including delivery of preterm or low birth weight babies, pre-eclampsia, and gestational diabetes.[9] In 1996, Offenbacher was the first to propose that periodontal disease was one of the risk factors for premature low birthweight.[10] Numerous studies have confirmed that periodontal pathogens and their metabolites can cause adverse pregnancy outcomes by direct or indirect pathways. However, the strength of this association between the two and the underlying mechanisms are not entirely clear. The association remains controversial due to variability in sample sizes, age groups, races, socio-economic status, living standards, varied definitions of periodontitis and adverse pregnancy outcomes.

3.1. The direct pathway

Two primary biological pathways have been proposed to explain the association between adverse pregnancy outcomes and periodontal disease.[11] The direct pathway suggests that the periodontal pathogens (Porphyromonas gingivalis, Fusobacterium nucleatum, Aggregatibacter actinomycetemcomitans, Campylobacter rectus, Treponema denticola, Prevotella intermedia, Tannerella forsythia) along with their toxins may translocate from the subgingival biofilm and spread via the hematogenous route to colonize the fetoplacental membranes and fluids and cause inflammatory and immune responses. This infection becomes the principal risk factor for preterm birth by causing uterine contractility and ripening, leading to early membrane rupture.[12]

3.2. The indirect pathway

Elevated levels of inflammatory mediators including tumour necrosis factor alpha (TNF-α), interleukin-1β (IL-1β), and IL-6 in the serum, saliva and gingival crevicular fluid have been associated with the severity of periodontitis.[11] It is believed that advanced levels of these pro-inflammatory mediators circulate from periodontal tissues and reach the fetoplacental unit, causing premature rupture of membranes and uterine contractions, leading to premature birth or spontaneous abortions.[13] Another indirect pathway involves these mediators along with microbial components may reach the liver, stimulating the production of cytokines (IL-6) and acute phase proteins like (C-reactive proteins), parting detrimental effects on the fetoplacental unit leading to adverse pregnancy outcomes.

4. Dental Management Guidelines for Pregnant Women

Oral health management should be an integral part of the overall health and well-being for both the pregnant woman

and her child. The US Department of Health and Human Services Surgeons General's report has emphasized its importance and suggested changing the attitudes of healthcare professionals and patients towards oral health.[14]

In the first trimester of pregnancy, dentists should focus on motivating and educating patients about maintaining good oral hygiene. Dentists should avoid any dental procedures unless emergency or for pain management as organogenesis happens during this phase. The developing fetus is highly susceptible to teratogen, and the chances of spontaneous abortion are highest during this phase. Patient should be educated about the physiological changes due to the hormonal influences over oral tissues and encouraged to maintain good oral hygiene to prevent pregnancy gingivitis and exacerbation of periodontal diseases.

During the second trimester, the organogenesis is complete, and the risk to the mother is low. The size of the foetus is not big enough to cause discomfort to the mother to sit for long periods making this the safest period to perform routine and elective dental procedures with minimal stress.

During the third trimester, the size of the foetus becomes such that it puts pressure on the inferior vena cava, aorta and femoral vessels, leading to supine hypotension and near syncopal episodes in pregnant women during supine posture. Any stress may have an adverse effect on the safety and comfort of the mother. Routine dental procedures may be performed during the early third trimester, but avoid elective dental procedures. The posture during the treatment should be modified on the dental chair. The patient may be positioned slightly on her left, the right hip can be elevated 10-15 cm, or the patient can be asked to tilt 5-15% on her left side, and the head of the chair can be a little upright, to avoid compression over the large blood vessels.

General recommendations for maintaining optimum oral health and guidelines about dental treatment during pregnancy:

1. Reinforce the obstetrician's advice for a balanced diet rich in cereals, milk and dairy products, meat, fish, eggs, fruits and green vegetables to ensure adequate intake of vitamins A, C, D, calcium, etc. . Pregnant ladies should avoid refined sugars.
2. Regular dental check-ups and referrals should be an integral aspect of the obstetrician protocol. A pregnant woman should be regularly examined and counselled during the course of pregnancy to put emphasis on maintaining good oral health.
3. A pregnant woman should be guided and educated about the importance of good oral health and the adverse outcomes that can happen in the case of poor oral health.
4. The treatment needs of the pregnant patient should be comprehensively evaluated and planned.
5. Maintenance of good oral hygiene is the goal. Regular twice-daily toothbrushing should be reinforced. The use of dental floss should be encouraged.
6. Fluoridated toothpaste and mouth rinse can be advised to prevent dental caries.
7. Warm saline rinses can be recommended to ease gingival irritation.
8. The patient can undergo routine oral prophylaxis and root planning anytime during the pregnancy. The dentist restricts long appointments during the third trimester for their comfort.
9. Dental examination and treatment cause no harm to the fetus during the second and the third trimester in contrast to if left untreated. Treating obstetrician can be consulted when planning a treatment for the patient.
10. Active oral diseases should be controlled at all times.
11. Recommendations related to radiographs during pregnancy: X-rays are ionizing electromagnetic radiations and can cause birth defects, miscarriages and retardation in the fetus. The following points should be kept in mind when advising radiograph for a woman:

    a. Although dental radiographs cause negligible radiation exposure to the embryo, women should always be asked about their last menstrual cycle.
    b. Women in their childbearing age must always be shielded with lead aprons during scans.
    c. Unless direly needed, avoid radiographs.
    d. Measures such as lead aprons, thyroid collars, properly collimated beams, and high-speed films reduce foetal exposure and should be used.
    e. According to the National Commission for Radiation Protection (NCRP), the radiation should not exceed more than 0.20 Gy.[15]

12. Drugs during pregnancy: Dental treatment may causes contractions and undue stress to the developing fetus. So, measures should be taken to prevent dental pain, but if required analgesics should be prescribed under guidance. The embryonic phase (from the 2nd through the 8th week of pregnancy), is most sensitive to teratogenesis. During pregnancy, drugs are absorbed readily as the serum concentration of drug binding is low, with a lower maximum plasma concentration, lower plasma half-life, higher lipid solubility and higher drug clearance. It allows easy and higher transfer of unbound drugs through the placenta to the foetus.

    a. Thus, caution should be exercised while prescribing any drug to the pregnant patient, assessing the drug's safety profile according to the Food and Drug Administration (FDA), USA risk categories and their potential risk factors.[16]
    b. Drugs should not be prescribed during the first trimester.

c. Acetaminophen is the most commonly recommended and safest analgesic during pregnancy.
d. Ibuprofen is another analgesic that can be prescribed during pregnancy but is not recommended during the third trimester.
e. Most of the antibiotics recommended for orofacial infection and pain management (Amoxicillin, Cephalexin, Clindamycin, Erythromycin, Metronidazole, and Penicillin) are safe during pregnancy except Gentamycin which causes fetal ototoxicity and tetracycline and its derivatives cause staining of teeth and has detrimental effects on developing bones. Metronidazole is prohibited during the first trimester due to teratogenic effects.
f. Local anesthetics (Lidocaine, prilocaine) when used properly in the correct dosage and proper aspiration techniques are considered safe during pregnancy. Mepivacaine and bupivacaine should be used with caution as they cause fetal bradycardia.

The concentration of epinephrine in local anesthetics used in dentistry is considered safe when proper aspiration and dosage are followed. The use of nitrous oxide is not listed in the FDA as its use is still controversial during pregnancy.

5. Discussion

According to the WHO Global Oral Health Status Report (2022), oral diseases affect approximately about 3.5 billion people worldwide.[17] The importance of maintaining good oral health is well established, and there is scientific evidence highlighting the hormonal influences over oral tissues. However, the association between poor periodontal health and adverse pregnancy outcomes is still not completely established. Some observational studies have indicated a positive association between the two, but randomized controlled trials have failed to establish a causal link.[11]

When a woman conceives, she typically consults a gynecologist and an obstetrician and follows their advice on nutrition, prenatal and antenatal care and follow-ups, physical health, vaccinations and every minor suggestion. However, this is not a norm in the rural setups. However, with the government's efforts to establish primary health check-up centers and various social work organizations, access to healthcare organizations for maternal care has improved with time, even in rural areas. Unless there are some oral symptoms, dental referrals are still not a norm and an integral part of maternal health care and referral by the treating practitioner.

There is scientific evidence that many gynecologists understands the significance of maintaining good oral health of the mother, but this varies across different geographic and socio-economic status.[18,21-23] In a study by Popli et al., 76.7% of gynecologists were aware of the impact of poor periodontal health on the maternal and child health. About 78.3% of the gynecologists had a positive attitude toward referring their patients to a dentist.[22] This has varied from 24.3%[21] to 93.9%[19] across various studies. In a study by Morgan et al. which assessed how gynecologists address oral health during pregnancy, most (73%) seldom ask their patients if they have visited a dentist recently or provide information about oral care (69%).[23]

Pregnant females are particularly vulnerable to a variety of dental issues that could endanger both their unborn child's health and their own. There are a lot of misconceptions regarding oral hygiene practices during pregnancy, especially in a country like India. Pregnant women are less likely visit a dentist than non-pregnant women. A pregnant woman who prioritise the health and well-being of her unborn child is more likely to maintain her own health if she is properly counseled. It requires improved training about the importance of oral health, recognizing oral concerns and knowledge about the procedure safety without posing any risk to the fetus by consulting gynecologists. There can be an incorporation of oral care consultations with the pre-birth medical services framework to lay out rules for better pre-birth care. Also, this is an era post the COVID-19 pandemic, and many patients feel apprehensive while visiting a dentist. Even if teledentistry hasn't yet been fully integrated into India's dental healthcare framework, COVID-19 has at least forced dentists to embrace and use technology as a substitute for traditional dental services. Teledentistry can be helpful in such cases since it is a safe alternative to consultation and avoids congested dental office waiting rooms.[24]

6. Conclusion

This narrative review is an effort to highlight the value and significance of regular dental care for expectant mothers. Just as a treating obstetrician plans a hematologic, sonographic, radio-diagnostic and nutritional workup during various phases of pregnancy, it's the need of the hour that a thorough oral examination should be a part of the treatment protocol during pregnancy. Any emergent and routine care can be planned during pregnancy considering the advisable and safe periods. Dentists should be well equipped to treat such patients and be sensitive about their physiologic state.

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None.

8. Conflict of Interest

The authors declare no conflict of interest, financial or otherwise.

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