

Pregnancy and Dental Care: An Unsolved Mystery

Yogesh Kumar Shashi*, Dinanath Divakar, Dipanshu Kumar, Subham Kumar, Aditi Singh,
Mona Kumari, Raman Suman, Madhav Kumar

Sarjug Dental College and Hospital, Darbhanga, India

Citation: *Yogesh Kumar Shashi, Dinanath Divakar, Dipanshu Kumar, Subham Kumar, Aditi Singh, Mona Kumari, et al. Pregnancy and Dental Care: An Unsolved Mystery. Int Dent Jour. 2024;1(1):1-8.*

Received Date: 13 September, 2024; **Accepted Date:** 15 September, 2024; **Published Date:** 17 September, 2024

***Corresponding author:** Yogesh Kumar Shashi, BDS Final Year, Sarjug Dental College and Hospital, Darbhanga, India

Copyright: © Yogesh Kumar Shashi, Open Access 2024. This article, published in Int Dent Jour (IDJ) (Attribution 4.0 International), as described by <http://creativecommons.org/licenses/by/4.0/>.

ABSTRACT

The mother's body changes as a result of the hormonal storm that is brought on by pregnancy, and the mouth cavity is no exception. Gingivitis during pregnancy is a recognized condition. Pregnancy can cause changes in the salivary glands, gingivitis, gingival hyperplasia, and pyogenic granuloma. Additionally, there is increased face pigmentation. Pregnant women are more susceptible to gingivitis and gingival hyperplasia due to elevated circulating oestrogen levels, which enhance capillary permeability. Pregnancy gingivitis is linked to pre-existing gingivitis and typically affects the marginal and interdental papilla. Maintaining good dental hygiene can either avoid or lessen the severity of inflammatory mouth changes caused by hormones.

Keywords: Pregnancy; Dental; Body

INTRODUCTION

The mother's body changes as a result of the hormonal storm that is brought on by pregnancy, and the mouth cavity is no exception. For a pregnancy to progress normally, there must be a ten-fold and a thirty-fold increase in the release of the female sex hormones, progesterone and estrogen ^[1-2]. Pregnant women experience many systemic and local physiological and physical changes due to increased hormone release and the growing fetus. The cardiovascular, haematologic, respiratory, renal, gastrointestinal, endocrine, and genitourinary systems experience the most significant systemic alterations. The mouth cavity is one of the various body areas where the local physical changes take place. Pregnant patients may provide a number of issues for dental professionals due to these collective changes. Therefore, managing pregnant and nursing mothers requires a grasp of the physiological changes in their bodies, the effects of dental radiation, and the drugs used in dentistry for these patients as well as for the fetuses ^[3-4].

Physiology

Systemic disorders such as dyspnea, hyperventilation, snoring, an upper ribcage breathing pattern, chest widening, and rhinitis are common in pregnant women. Similarly, haemodynamic alterations occur, with elevated coagulation factors V, VII, VIII, X, and XII and reduced coagulation factors XI and XIII, along with increased fibrinolytic activity to counteract the increased clotting tendency. gastrointestinal changes: a rise in progesterone concentrations during this time causes an inhibition of the production of the motilin peptide hormone, which in turn causes an increase in intragastric pressure and a decrease in lower oesophageal sphincter tone. These changes result in acidity, or heartburn, in 30–70% of pregnant women. A nearly two-fold increase in stomach emptying times relative to non-pregnant women ^[5,6]. Sixty-six percent of pregnant women suffer nausea and vomiting, which peaks eight to twelve weeks following the last menstrual cycle and begins about five weeks after that. In this particular context, pregnant women who have an increased tendency to vomit during their pregnancy or who have renal alterations—an increased renal perfusion, especially in the second half of the pregnancy—should avoid scheduling morning dental appointments as they may result in increased drug excretion in their urine. Therefore, drug dosage modifications are frequently needed for these patients. Hormonal changes are also noted in expectant mothers: forty-five percent of them have gestational diabetes. Conversely, in about 8% of cases, the decubitus hypotension syndrome, also known as the vena cava syndrome, is detected in the last stages of pregnancy due to a problem with the venous return to the heart, which is brought on by the gravid uterus compressing the inferior vena cava. When the patient is in the horizontal position, this ailment presents as a sudden drop in blood pressure, along with nausea, dizziness, and fainting ^[7-8]. Pregnant women should avoid this issue by sitting on the dental chair with their right hips slightly elevated (10–12 cm) or slanted to the left. There can be a higher risk of periodontal disease and dental caries in the oral cavity.

Oral and facial changes

The mother's body changes as a result of the hormonal storm that is brought on by pregnancy, and the mouth cavity is no exception. Gingivitis during pregnancy is a recognized condition. Pregnancy can cause changes in the salivary glands, gingivitis, gingival hyperplasia, and pyogenic granuloma. Additionally, there is increased face pigmentation. Pregnant women are more susceptible to gingivitis and gingival hyperplasia due to elevated circulating oestrogen levels, which enhance capillary permeability ^[9-10]. Pregnancy gingivitis is linked to preexisting gingivitis and typically affects the marginal and interdental papilla. Maintaining good dental hygiene can either avoid or lessen the severity of inflammatory mouth changes caused by hormones.

Although pregnancy does not initiate periodontal disease, it can exacerbate pre-existing conditions ^[11-13]. Pregnancy tumors, or pyogenic granulomas, affect 1% to 5% of expectant mothers. Pyogenic granuloma is thought to be brought on by increased angiogenesis, which is brought on by sex hormones, combined with gingival irritation, which is brought on by local factors such plaque ^[14-16]. It mostly affects the interdental papilla's labial side. Although it can occur at any point during a pregnancy, first and second trimesters are when it is most frequently reported to occur in first-time mothers. It also has the potential to regress once the baby is born. It is recognized that, despite being rare, teeth movement may increase in late pregnancy.

The lamina dura, the attachment system, or the underlying disease that is unrelated to pregnancy are likely the causes of the increased mobility. It is not the consequence of the pregnancy-related secondary decrease of calcium reserves. Postpartum problems usually go away once the tooth mobility increases [12-14]. Early in their pregnancies, morning sickness is a frequent condition that many women experience. There is a correlation between nausea and vomiting during the first trimester and elevated gonadotropin levels. A central-acting mechanism causes increased progesterone levels to impede stomach emptying. The enamel on the inner surface of teeth, usually the front teeth, is eroded by the stomach acids seen in emesis.

This only becomes an issue when vomiting occurs frequently, as in the situations of bulimics and those with hyperemesis gravidum [10-15]. Enamel erosion can be readily prevented by instructing patients to thoroughly rinse their mouths with a sodium bicarbonate solution after vomiting. Sodium bicarbonate stops the damage that is brought on by residue left on teeth by neutralizing the acids. A case report described erosion of the teeth on the lingual and palatal surfaces of the incisors; however, to our knowledge, no clinical investigation has been conducted to corroborate this result [16-19].

The woman "loses a tooth for every baby," so the saying goes. This assertion has no medical literature to back it up. A pregnant woman's loss of a tooth most usually signifies that her existing dental health will persist. Pregnancy gingivitis may irritate the gums to the point where brushing and other regular dental care become difficult, which could accelerate tooth decay. The majority of patients do not experience this tooth decay [15-17]. The primary changes in saliva during pregnancy include changes in pH, composition, flow, and hormone levels. Pregnant women's entire stimulated salivary flow rate is lowered, according to cross-sectional research.

The composition of the saliva has changed, with potassium, protein, and estrogen levels rising and sodium concentration and pH falling. It has been proposed that measuring salivary oestrogen levels can serve as a screening tool for premature labor risk [14-16]. Compared to women who give birth to healthy, term children, those who are destined to have preterm babies have greater salivary oestrogen levels. Salivary oestrogen stimulates the subgingival crevicular fluid levels as well as the proliferation and desquamation of the oral mucosa. Because the desquamating cells supply nourishment, they create an ideal habitat for bacterial growth, which puts pregnant women at risk for dental caries [18].

The term "melasma" or the "mask of pregnancy" refers to an increase in facial pigmentation that manifests as bilateral brown spots in the midface. Up to 73% of pregnant women experience these face changes, which start during the first trimester of pregnancy. Although the exact cause of this disorder is uncertain, elevated serum levels of progesterone and estrogen are thought to be a contributing factor. After childbirth, the melasma normally goes away [19-21]. Recent research has indicated a possible connection between preterm low birth weight and periodontal disease. A study including 400 women with gingivitis and periodontal disease revealed a positive association between low birth weight and periodontal disease.

Both periodontal therapy and good dental hygiene did not appear to be related to the periodontal disease. Several animal and human case-control studies have not established a causal explanation for the positive link that has been reported between low birth weight and periodontal disorders [22-24].

Dental management guidelines during pregnancy

For the first trimester (1-12 weeks)

It is advised that patients be booked for examinations during the first trimester to evaluate their existing oral health, advise them of the changes they should anticipate during their pregnancies, and talk about ways to prevent dental issues for mothers that may result from these changes. It is not advised that the treatments be carried out right now. There are two reasons to be concerned when doing procedures in the first trimester. First, during organogenesis, teratogens represent the highest risk to the developing child. Secondly, up to one in five pregnancies are known to end spontaneously in the first trimester. Dental operations carried out in close proximity to a spontaneous abortion may be seen as the reason, raising questions about whether the procedure might have been prevented for the patient as well as the practitioner ^[21-24].

The current recommendations are

1. To inform the patients about the oral changes that pregnant women experience.
2. To highlight the need for stringent dental hygiene practices and, consequently, plaque control.
3. To restrict dental care to urgent care and periodontal prophylaxis solely.
4. Steer clear of standard radiography. They ought to be applied sparingly and only when absolutely necessary.

For the second trimester (13-24 weeks)

The organogenesis is finished by the second trimester, and the foetus is not at great risk. Additionally, the fetus has not grown to an uncomfortable size that would make it impossible for the mother to stay still for extended periods of time, and the mother has had time to acclimate to her pregnancy. Pregnant patients should be positioned carefully, especially in the third trimester. The inferior vena cava, the femoral vessels, and the aorta are all right above the uterus as it grows with the developing fetus and placenta.

Supine hypotension is a condition that can occur if the mother is positioned supine during the procedures, as the weight of the gravid uterus may exert sufficient pressure to obstruct blood flow via these major veins. Due to the restricted blood flow in this state, the blood pressure falls and either an asyncope or near-syncope episode occurs. In order to prevent compression of the major blood vessels, this scenario can be simply corrected by placing the patient correctly on her left side and raising the head of the chair. If there are any doubts regarding the safety of a procedure, the dental professional should not be afraid to speak with the patient's obstetrician, especially if there are any unique circumstances related to the pregnancy ^[12-15].

The current recommendations are:

1. Plaque control, guidance, and oral hygiene.
2. If necessary, scaling, polishing, and curetting can be done.
3. The management of any current oral health conditions.
4. Dental work that is elective is safe.
5. Steer clear of regular radiography. Use them sparingly and only when necessary.

For the third trimester (25-40 weeks)

The focus of the current worry is the risk to the impending delivery process as well as the safety and comfort of the expectant mother (e.g., chair positioning and avoiding medicines that impact the bleeding time). The foetal growth is still ongoing. Early in the third trimester, standard dental procedures can be safely carried out; however, from the middle of the trimester on, routine dental procedures should be avoided.

The current recommendations are:

1. Plaque control, guidance, and oral hygiene
2. If necessary, scaling, polishing, and curetting can be done.
3. Refrain from scheduling an elective dental procedure in the second half of the pregnancy.
4. Steer clear of regular radiography. Use them sparingly and only when necessary.

Radiographs, pregnancy and the foetus

One kind of electromagnetic radiation that can ionize the substance it passes through is X-ray radiation. Living things that have been ionized suffer damage to their DNA or cells. Miscarriages, birth abnormalities, or mental disability might arise from damage to the fetal cells, depending on the radiation dose and stage of pregnancy. Nonetheless, the fetus's exposure to oral radiation is minimal [16-18]. Due to their greater radiosensitivity compared to adults, embryos and fetuses are vulnerable to negative consequences from radiation exposure. The patient might not even be aware that she is pregnant within the first two weeks following conception, thus it is wise for the doctor to find out when she last had her period.

For all women in their childbearing years, a lead shielding should be utilized, as general inquiry does not provide a definitive diagnosis on pregnancy status. Adverse effects and mutation frequency are strongly correlated with dose, and exposure is increased when higher-than-necessary radiation exposures are utilized to offset subpar processing quality. Moreover, the exposure can be raised based on the picture that is taken. Both the primary beam and the scatter/radiation from the maxillary anterior views have the potential to penetrate the abdominal region with radiation from those views. A comparable exposure may also happen with the posterior views, depending on the head posture [13-18].

When radiography is necessary, there are a number of steps that can be performed to minimize the exposure of the fetus. The fetal exposure can be decreased by covering the patient's abdomen with a lead shield, using a high-speed film, and utilizing a beam that is appropriately collimated. The age of the fetus and the radiation dose determine how teratogenic the radiation is. The first 10 days following conception are when the fetus is most at danger of teratogenicity and mortality. The most crucial time for fetal development is from four to eighteen weeks following conception.

The National Commission for Radiation Protection (NCRP) advises against exposing fetuses to radiation for more than 0.20 Gy cumulatively since this can result in mental impairment and microcephaly [19-21].

When it comes to locating infections that are deeply ingrained, computed tomography (CT) is the preferred technique for observing lateral pharyngeal infections. Compared to normal film radiographs, the interior anatomy is better defined, and the bony changes are clearly seen. The CT dosages are less than the many slices for polytomography, but they are still higher than those for plain radiography. The type of scanner, scanning

method, exposure parameters, number of slices, and thickness of the slices are some of the variables that affect the CT dosages.

The National Commission for Radiation Protection (NCRP) advises against exposing fetuses to radiation for more than 0.20 Gy cumulatively since this can result in mental impairment and microcephaly [22]. When it comes to locating infections that are deeply ingrained, computed tomography (CT) is the preferred technique for observing lateral pharyngeal infections. Compared to normal film radiographs, the interior anatomy is better defined, and the bony changes are clearly seen. The CT dosages are less than the many slices for polytomography, but they are still higher than those for plain radiography. The type of scanner, scanning method, exposure parameters, number of slices, and thickness of the slices are some of the variables that affect the CT dosages. MRI produces images without ionizing radiation by using a nuclear alignment aided by a magnetic field.

Teratogenesis

Any substance that, when exposed to a fetus, results in long-term changes to the form or function of the progeny is considered a teratogen. Alcohol, aminopterin, androgens, angiotensin converting enzyme inhibitors, busulfan, carbamazepine, chlorobiphenyls, coumarin, cyclophosphamide, danazol, diethylstilbesterol, etretinate, isotretinoin, lithium, methimazole, pencillamine, phenytoin, tetracycline, trimethadione, and valproic acid are just a few of the numerous identified and most likely unidentified teratogens to the fetus [26]. The notion that organs or structures that form during exposure are susceptible to injury is a key concept in teratology.

For practical purposes, a pregnancy can be divided into three periods:

1. The ovum, from conception until placement.
2. The embryonic phase, which spans the second to the eighth week.
3. The fetal phase occurs following the eighth week of the term.

Since organogenesis occurs throughout the embryonic stage, this is the most critical period for teratogenesis. Changes are typically not caused by a teratogenic exposure that occurs after the development of the sensitive structures.

The Medications which are Considered Safe During Pregnancy

Because the serum concentration for drug binding is lower in pregnant women than in non-pregnant women, drugs are more easily absorbed during pregnancy. Moreover, there is a greater drug distribution volume, a lower maximum plasma concentration, a shorter plasma half-life, a greater solubility in lipids, and a greater drug clearance. These elements all facilitate the simple passage of an unbound medication via the placenta, exposing the fetus to the medication [25]. A few medications have been linked to teratogenicity, low birth weight, and miscarriages. Consequently, care should be used while prescribing medication to a pregnant patient. The majority of medicines are eliminated through breast milk, which exposes the infant to the drugs. The chemical characteristics, dosage, frequency, length of drug exposure, and quantity of milk taken all affect how harmful a drug is to a newborn.

CONCLUSION

A new life's development and genesis are supported by a variety of physiological changes that occur throughout pregnancy, making it a special time. It is imperative that all expectant mothers receive medical and dental

treatment during their pregnancy, as neglecting to address developing health issues can have negative effects on the health of both the mother and the fetus. Dental professionals need to have a fundamental understanding of the physiological changes that underlie pregnancy, the factors associated with medication usage during gestation, and the ways in which these factors may interact with the provision of dental care. This knowledge assists in creating the treatment plan, providing the required medical, nutritional, and dental care, and equips the medical staff to counsel their expectant patients.

REFERENCES

1. Teratology Society Public Affairs Committee. FDA classification of drugs for teratogenic risk. Teratology. 1994;49: 446–447.
2. Hashim R. Self reported oral health, oral hygiene habits and dental service utilization among pregnant women in United Arab Emirates. Int J Dent Hyg. 2012;10(2): 142–146.
3. Patcas R, Schmidlin PR, Zimmermann R, Gnoinski W. Dental care in pregnancy. Schweiz Monatsschr Zahnmed. 2012;122(9):729–739.
4. Grahame-smith D.G., Aronson J.K. Oxford Textbook of Clinical Pharmacology and Drug Therapy. 3rd edition. 2006. pp. 131–139.
5. ADA Council of Dental Affairs. J Am Dent Assoc. 2001;132:234–238.
6. Silk H, Douglass AB, Douglass JM, Silk L. Oral health during pregnancy. AM Fam physician. 2008;77:1139–1144.
7. Soory M. Hormonal factors in periodontal disease. Dent Update. 2000;27:380–383.
8. Gajendra S, Kumar JV. Oral health and pregnancy: A review. N Y State. Dent J. 2004;70:40–44.
9. Yuan K, Wing LY, Lin MT. Pathogenetic roles of angiogenic factors in pyogenic granulomas in pregnancy are modulated by female sex hormones. J Periodontol. 2002;73:701–708.
10. Flynn TR, Susarla SM. Oral and maxillofacial surgery for the pregnant patient. Oral Maxillofac Surg Clin North Am. 2007;19:207–221.
11. Sherman P, Flaxman SM. Nausea and vomiting of pregnancy in an evolutionary perspective. Am J Obstet Gynecol. 2002;185:190–197.
12. Koch KL. Gastrointestinal factors in nausea and vomiting of pregnancy. Gastroenterol Clin N Am. 2003;32:201–234.
13. Richter JE. Gastroesophageal reflux disease during pregnancy. Gastroenterol Clin N Am. 2003;32:235–261.
14. Muherjee PM, Almas K. Orthodontic considerations for gingival health during pregnancy:a review. Int J Dent Hyg. 2010;8:3–9.
15. Agueda A, Echeverria A, Manau C. Association between periodontitis in pregnancy and preterm or low birth weight. Review of the literature. 2008;13:E609–615.
16. Chaveli Lopez B, Sarrion Perez MG, Jimenez Soriano Y. Dental considerations in pregnancy and menopause. J Clin Exp Dent. 2011;3(2):e135–144.
17. Kandan PM, Menaga V, Kumar RR. Oral health in pregnancy (guidelines to gynaecologists, general physicians and oral health care providers. J Pak Med Assoc. 2011;61(10):1009–1114.

18. Sacco G, Carmagnola D, Abati S, Luglio PF, et al. Periodotal disease and preterm birth relationship. Minerva Stomatol. 2008;57:233–46. 246–250.
19. Nayak AG, Denny C, Veena KM. Oral health care considerations for the pregnant woman. Dent update. 2012;39(1):51–54.
20. Singh M. The pregnant dental patient. J Mass Dent Soc. 2012;60(4):32–34.
21. Richards AG. Dental X-ray protection. Dent Clin North Am. 1968:631–641.
22. ADA Council of Scientific Affairs. An update on radiographic practices: information and recommendations. J Am Dent Assoc. 2001;132:234–238.
23. Capasso F, La Penna C, Carcione P, Vestri A, Polimeni A, Ottolenghi L. Oral health and pregnancy. Ann Lg. 2011;23(2):137–145.
24. Dellinger Tracy M, Livingston H, Mark. Pregnancy: Physiological changes and considerations for dental patients. Dent Clin N Am. 2006;50:677–697.
25. Lakshman Suresh, Radfar Lida. Pregnancy and lactation. Oral Surg Oral Med Oral Pathol. Oral Radiol Endod. 2004;97:672–682.
26. American Academy on Pediatric Dentistry Council on Clinical Affairs Committee on the adolescent. Guidelines on oral health care for the pregnant adolescent. Pediatr Dent. 2008-2009;30:102–106.
27. Turner M, Aziz SR. Management of the pregnant oral and maxillofacial surgery patient. J Oral Maxillofac Surg. 2002;60:1479–1488.
28. Suresh L, Radfar L. Pregnancy and lactation. Oral Surg Oral Med Oral Pathol. Oral Radiol Endod. 2004;97:672–682.