



PERIODONTAL DISEASES IN PREGNANCY – THE UNREMEMBERED CONNECTION

Dental Science

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ABSTRACT

Pregnancy and early childhood are particularly important times to access oral health care. It is because the consequences of poor oral health can have a lifelong impact. Periodontal disease is the inflammation of the gums and supporting structures of teeth. Maternal periodontal disease is a highly prevalent condition that has been studied extensively in relation to adverse pregnancy outcomes, including preterm delivery, preeclampsia, and low birth weight. Investigators speculate that hematogenous transport of bacteria and/or pro-inflammatory mediators from sites of periodontal infection into the placenta, fetal membranes, and amniotic cavity induces pathological processes that lead to these adverse outcomes. This review article emphasize on the prevention of periodontal disease and safety of dental care during pregnancy.

KEYWORDS

Pregnancy, Gingivitis, Periodontitis, Inflammation

INTRODUCTION

When discussing the well-being of the mother, promoting good oral health during pregnancy is important, as it provides an opportunity for dentists to educate women about preventing dental caries in their babies, which in turn may reduce the incidence of adverse pregnancy outcomes.^[1-2] The inclusion of an assessment of oral health in comprehensive prenatal health care is of great significance, but this is often overlooked.^[3] Studies have come to the conclusion that only 22 to 34% of women in the United States consult a dentist during pregnancy. Moreover, it has been understood that only one half of pregnant women attend to it, when an oral problem arises.^[4] This difficulty is compounded by a lack of national clinical guidelines for the management of common oral conditions in pregnancy. The American Dental Association and the American College of Obstetricians and Gynecologists provide only advisory brochures on oral health for pregnant patients, and recently New York became the first state to form an evidence based prenatal oral health consensus document.^[5] Needless to say, in the absence of strict practice guidelines to follow, fear of medicolegal action based on negligent or substandard treatment of oral conditions during pregnancy abounds, even when largely unfounded.^[6] Gingival changes observed during pregnancy have been well documented,^[7] and the increase in both the rate of estrogen metabolism and the synthesis of prostaglandins contribute to this.^[8] Also alterations in progesterone and estrogen levels have been shown to affect the immune system and the rate and pattern of collagen production in the gingiva, thus reducing the body's ability to repair and maintain gingival tissue.^[9-10] Periodontal infections, which can be a reservoir for inflammatory mediators, may pose a potential threat to the placenta and fetus, thereby increasing the likelihood of preterm delivery.^[11] A recent survey of 55 practicing obstetricians from North Carolina concluded that the majority (84%) of respondents considered periodontal disease to be one of the most important risk factors for adverse pregnancy outcomes, but 49% rarely or never examined patients' mouths.^[12] In a 2008 study of obstetricians, only 29% performed an oral exam, though 84% associated poor dental hygiene with preterm delivery.^[13] It is evident that pregnant women are more prone to have compromised oral health due to changes in hormone levels and eating habits^[14] making it an important time to receive oral care. In the light of the growing interest in the relationship between oral conditions, particularly periodontal disease, and pregnancy, it calls for increased collaboration among medical and dental professionals.^[15]

The Diseased Peridontium

Oral infections result in three major clinical conditions: dental caries, gingivitis, and periodontitis. Periodontal disease (PD) is defined as an infection of the gums and bone caused by accumulation of plaque, a sticky film of bacteria that adheres to teeth.^[16] Throughout life, plaque forms on teeth and can gather if not removed through daily brushing, flossing, and regular professional cleaning. The bacteria present in plaque produce toxins that cause tooth decay and gum irritation, and

this condition is referred to as gingivitis, is the early stage of PD, which causes gums to swell, become red, or bleed. Gingivitis is a reversible condition treated by debridement of dental plaque.^[17] If left untreated, the bodily response leads to periodontitis with the gum separating from the tooth and forming pockets, or deepened spaces. As gum disease progresses, the bone and soft tissues supporting the teeth are destroyed, ultimately leading to loose teeth, tooth loss, or dental extraction. Treatment includes deep cleaning such as scaling and root planning, which are procedures that remove tooth plaque and calculus. Common problems include halitosis, unpleasant mouth taste, bleeding upon brushing, and tooth mobility.^[18]

The Evils Of Periodontitis In Women

Periodontitis is observed more commonly in women who show poor oral hygiene, not seeking regular dental care, smoke, have diabetes, and are immunocompromised.^[19] As early as puberty, the hormones estrogen and progesterone exaggerate the mechanism of gum tissue reaction to irritants in plaque, making women easy targets for PD.^[20] The increase in estrogen and progesterone levels just before and during the menstrual cycle make women prone to experience canker sores or swollen and bleeding gums. As the hormonal levels are elevated during pregnancy, they alter gingival connective tissue and its immune response to oral bacteria.^[21] Gingivitis is especially common during the second to eighth month of pregnancy, also known as the period when many women experience red, puffy, or tender gums. A vicious cycle is in place, as once gums swell or become irritated, the very activity designed to prevent PD such as chewing food and brushing teeth can exacerbate the irritation and swelling, in turn increasing bleeding of gums, advancing the disease further.^[22-20] Additional acute gingival irritation may precipitate, thanks to orthodontic appliances such as braces.^[23]

Periodontal Diseases Affecting Pregnancy Gingivitis

In a systematic review by Figuero et al. (2013) it was stated that the relationship between pregnancy and gingivitis indicated 'the presence of a significant increase in gingivitis during pregnancy and between pregnant and postpartum or non-pregnant women.'^[24] In the same year Ehlers et al. compared the dental evaluation and gingival crevicular fluid from 40 pregnant women and 40 non-pregnant control subjects, and concluded that 80% of pregnant women had gingival inflammation compared with 40% of control subjects.^[25] Gogeneni et al. in 2015 found that pregnant women with gingivitis, and pregnant women with gingivitis and gestational diabetes mellitus (GDM) had high levels of systemic C-reactive protein. The above mentioned conclusions and findings point towards gingivitis being a growing issue in pregnant women.^[26]

Periodontitis

Recent studies have shown an increasing association between

periodontitis during pregnancy and low birth weight (LBW), very low birth weight (VLBW), preeclampsia, and gestational diabetes mellitus.^[27-30] In 2012, Guimaraes et al. showed in their cross sectional study of 1,206 postpartum women that “maternal periodontitis was associated with a decrease in mean birth weight, as well as LBW and VLBW”.^[28] Four years later, Corbella et al. happened to conduct a meta-analysis of studies in which researchers controlled for periodontitis as a risk factor associated with negative pregnancy outcomes. A total of 22 out of 422 studies, which included 17,053 subjects were selected and an association between periodontitis and negative consequences in pregnancy was established; however, this association was found to be weak. Xiong et al. in 2009 concluded that periodontitis was associated with GDM (77.4% of pregnant women with GDM had periodontitis) with an adjusted odds ratio of 2.6 and a confidence interval of 95% in their case control study of 53 pregnant women with GDM and 106 without GDM.^[30] Five years later, in 2014 Ha et al. found “a significant relationship between periodontitis and preeclampsia in never smokers” in their prospective cohort study of 283 pregnant women who had never smoked, 67 with periodontitis and 216 without periodontitis.^[29]

The Evils Of Periodontal Disease On Maternal And Infant Health

Discomforts of periodontal disease could interfere with maternal nutritional intake, and it has been found that oral bacterial organisms translocate to placental tissues, affecting the amniotic membranes, amniotic fluid, placenta, fetal lungs, brain, and fetal circulation.^[31] This bacterial challenge results in increased cytokine expression, which ultimately can impact placental function and precipitate preterm labor.^[32] Periodontitis also directly affects the inflammatory system, levels of C-reactive protein in plasma, which are considered markers of systemic inflammation, and it has been concluded that they are higher in women with periodontal disease than in healthy women without periodontal complications.^[33]

Emerging Issues And Future Directions In Oral Health Care For Pregnant Women

In 2004, the American Academy of Periodontology released recommendations that included all women who are pregnant or planning a pregnancy should undergo periodontal examination, and that appropriate preventive or therapeutic services, if indicated, should be provided. In several studies of periodontal treatment during pregnancy, oral health parameters were seen to have improved after therapy. Despite this benefit, periodontal infection in women of childbearing age remains highly prevalent, particularly among low-income women and members of racial and ethnic minority groups. Socioeconomic factors, lack of resources to pay for care, barriers to access to care, and lack of public understanding of the importance of oral health and effective self-care practices all represent reasons cited for observed inadequacies in oral health.^[34] Future oral health study orientations will concentrate on oral health treatment before, during and after delivery.

CONCLUSION

Oral health in pregnancy is a critical and significant component of nursing assessment, and the relation between periodontal disease and adverse pregnancy outcomes has been supported by the majority of clinical research in this field. However, the efficacy of periodontal treatment in preventing adverse pregnancy outcomes is still deemed inconclusive. There is a general agreement that oral screening and oral health education should be maintained as part of every maternal and infant assessment, and nurses should be well positioned to positively impact maternal health by promoting oral health by counseling women on the importance of periodontal health for themselves and their families. Expectant mothers aware of the benefits of oral health for their overall health and the health of their infants shall be more receptive to maintaining proper oral hygiene and dental care, and the opportunity nurses have to positively impact maternal and infant health by influencing public health policy to incorporate preventive dental care within perinatal services can never be overstated.

REFERENCES

- Kumar J, Samelson R, eds. Oral health care during pregnancy and early childhood: practice guidelines. Albany: New York State Department of Health; 2006.
- Xiong X, Buckens P, Fraser WD, Beck J, Offenbacher S. Periodontal disease and adverse pregnancy outcomes: a systematic review. *BJOG* 2006;113:135-143.
- Allston AA. Improving women's health and perinatal outcomes: the impact of oral diseases. Baltimore, Md.: Women's and Children's Health Policy Center, 2002. <http://www.jhsph.edu/wchpc/publications/>. Accessed August 1, 2007.
- Gaffield ML, Gilbert BJ, Malvitz DM, Romaguera R. Oral health during pregnancy: an analysis of information collected by the pregnancy risk assessment monitoring system. *J Am Dent Assoc.* 2001;132(7):1009-1016.

- Kumar J, Samelson R, eds. Oral health care during pregnancy and early childhood: practice guidelines. New York, NY: New York State Department of Health; 2006.
- Stefanac S. How systemic conditions can affect treatment planning: pregnant patients. In: Stefanac SJ, Nesbit SP, eds. *Treatment Planning in Dentistry*. St Louis, Mo.: Mosby; 2001:92-94.
- Mealey BL. Periodontal implications: medically compromised patients. *Ann Periodontol* 1996;1(1):256-321.
- Lee A, McWilliams M, Janchar T. Care of the pregnant patient in the dental office. *Dent Clin North Am* 1999;43(3):485-94.
- Zachariassen RD. The effect of elevated ovarian hormones on periodontal health: oral contraceptives and pregnancy. *Women Health* 1993;20:21-30.
- Lopatin DE, Korman KS, Loesche WJ. Modulation of immunoreactivity to periodontal disease-associated microorganisms during pregnancy. *Infect Immun* 1980;28:713-8.
- Offenbacher S, Katz V, Fertik G, et al. Periodontal infections as a possible risk factor for preterm low birth weight. *J Periodontol* 1996;67(suppl 10):110330.
- Wilder R, Robinson C, Jared HL, Lief S, Bogges K. Obstetricians' knowledge and practice behaviors concerning periodontal health and preterm delivery and low birth weight. *J Dent Hyg* 2007;81:81.
- Strafford KE, Shellhaas C, Hade EM. Provider and patient perceptions about dental care during pregnancy. *J Matern Fetal Neonatal Med* 2008;21:63-71.
- Romero BC, Chiquito CS, Elejalde LE, Bernardoni CB. Relationship between periodontal disease in pregnant women and the nutritional condition of their newborns. *J Periodontol* 2002;73:1177-1183.
- A. Morgan, J. Crall, R. L. Goldenberg & J. Schulkin (2009) Oral health during pregnancy, *The Journal of Maternal-Fetal & Neonatal Medicine*, 22:9, 733-739.
- Women and periodontal disease. *J Am Dent Assoc.* 2002.
- Offenbacher S. Maternal periodontal infections, prematurity, and growth restriction. Prevention of preterm birth. *Clin Obstet Gynecol.* 2004;47:808-821.
- Lachat, M. F., Solnik, A. L., Nana, A. D., & Citron, T. L. (2011). Periodontal disease in pregnancy. *The Journal of Perinatal & Neonatal Nursing*, 25(4), 312319.
- Wener ME, Lavigne ME. Can periodontal disease lead to premature delivery? How the mouth effects the body. *J Obstet Gynecol Neonatal Nurs.* 2004;8(5):442-431.
- Campbell E. It's more than the mouth: the effects of periodontal disease on systemic health. *Dent Assist.* 2007;76:26-28, 30, 31.
- Fehder WP. Nursing care and management of pathological oral conditions among women and children. *MCN Am J Matern Child Nurs.* 2008;31(1):38-44.
- Gaffield ML, Gilbert BC, Malvitz DM, Romaguera R. Oral health during pregnancy: an analysis of information collected by the Pregnancy Risk Assessment Monitoring System. *J Am Dent Assoc.* 2001;132:1009-1016.
- Mukherjee PM, Almas K. Orthodontic considerations for gingival health during pregnancy: a review. *Int J Dent Hygiene.* 2010;8:3-9.
- Figueroa, E., Carrillo-de-Albornoz, A., Marti'n, C., Tobr'as, A., & Herrera, D. (2013). Effect of pregnancy on gingival inflammation in systemically healthy women: A systematic review. *Journal of Clinical Periodontology*, 40(5), 457-473.
- Ehlers, V., Callaway, A., Hortic, W., Kasaj, A., & Willershausen, B. (2013). Clinical parameters and aMMP-8-concentrations in gingival crevicular fluid in pregnancy gingivitis. *Clinical Laboratory*, 59(5-6), 605-611.
- Gogeneni, H., Buduneli, N., Ceyhan-O' ztu'rk, B., Gu'mu's, P., Akcali, A., Zeller, I., O' zc aka, O' . (2015). Increased infection with key periodontal pathogens during gestational diabetes mellitus. *Journal of Clinical Periodontology*, 42(6), 506-512.
- Corbella, S., Taschieri, S., Del Fabbro, M., Francetti, L., Weinstein, R., & Ferrazzi, E. (2016). Adverse pregnancy outcomes and periodontitis: A systematic review and meta-analysis exploring potential association. *Quintessence International*, 47(3), 193-204.
- Guimaraes, A. N., Silva-Mato, A., Siqueira, F. M., Cyrino, R. M., Cota, L. O. M., & Costa, F. O. (2012). Very low and low birth weight associated with maternal periodontitis. *Journal of Clinical Periodontology*, 39(11), 1024-1031.
- Ha, J. E., Jun, J. K., Ko, H. J., Paik, D. I., & Bae, K. H. (2014). Association between periodontitis and preeclampsia in never-smokers: A prospective study. *Journal of Clinical Periodontology*, 41(9), 869-874.
- Xiong, X., Elkind-Hirsch, K. E., Vastardis, S., Delarosa, R. L., Pridjian, G., & Buckens, P. (2009). Periodontal disease is associated with gestational diabetes mellitus: A case-control study. *Journal of Periodontology*, 80(11), 1742-1749.
- Lin D, Smith MA, Champagne C, et al. Porphyromonas gingivalis infection during pregnancy increases maternal tumor necrosis factor alpha, suppresses maternal interleukin10, and enhances fetal growth restriction and resorption in mice. *Infect Immun.* 2003;71:5156-5162.
- Leon R, Silva N, Ovalle A, Chaparro A, Ahumada A, Gajardo M. Detection of porphyromonas gingivalis in the amniotic fluid in pregnant women with a diagnosis of threatened premature labor. *J. Periodontol.* 2007;78:1249-1255.
- Waranuch P, Josophura K, Rich-Edwards J, Williams P, Douglass C, Gillman M. Periodontitis and plasma C-reactive protein during pregnancy. *J Periodontol.* 2006;77:821-825.
- Task Force on Periodontal Treatment of Pregnant Women, American Academy of Periodontology. American Academy of Periodontology statement regarding periodontal management of the pregnant patient. *J Periodontol* 2004;75:495