


RELATIONSHIP BETWEEN PERIODONTAL DISEASES AND PREECLAMPSIA: A WARNING FOR ORAL HEALTH DURING PREGNANCY

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ABSTRACT

Objective: The objective of this narrative literature review is to address the relationship between periodontal disease in pregnant women and its correlation with the risk of acquiring preeclampsia. **Methodology:** During the development of the article, it became evident that there was a need to acquire as much relevant information related to the topic as possible, articles, research and other tested, proven and published studies, serving as a source of support and enrichment for the review. Thus, research was done in the following databases: PubMed; Scielo; The Cochrane Library; Science Direct; PROSPERO in conjunction with Google Academy. **Results:** Preeclampsia is a serious disorder that can cause deterioration of several organs in different systems, which is the cause of maternal death in the vast majority of cases, in addition to being able to lead to fetal death. Many studies indicate the correlation of periodontal disease in pregnant women as a factor that favors the development of this disorder, through the concept that inflammation may be associated with the etiology and pathology of preeclampsia in the following ways: through the increased risk of uteroplacental atherosclerosis and through the possibility of potentiating the systemic inflammatory response. **Conclusion:** Several studies indicate the relationship between periodontal disease and preeclampsia, however, more research and studies on the subject are needed.

Keywords: Preeclampsia. Periodontal diseases. Pregnancy. Oral health.

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INTRODUCTION

Over the years, more studies and scientific research have proven that many systemic diseases have some correlation with the oral cavity as a whole, from its functioning to its health, health problems such as Diabetes, Alzheimer's, Thyroid Disease, Stroke, Lung Disease, Heart Problems and other pathologies (dos Santos et al., 2024; Guimarães Sampaio Trajano Dos Santos et al., 2024; Guimarães Sampaio Trajano Dos Santos et al., 2025; U.S. Department of Health and Human Services, 2000; U.S. General Accounting Office, 2000). Thus, it is clear that oral health is much more than just the health of the teeth, it is about maintaining overall health, as the mouth is connected to the body as a whole and the health of one will impact the health of the other, having a direct relationship (U.S. General Accounting Office, 2000).

Preeclampsia is a condition that usually affects pregnant women with hypertension, but can occur in pregnant women with no history of high blood pressure, with symptoms of increased blood pressure equal to or greater than 140x90mm/hg from the 20th week of gestation in conjunction with altered proteinuria values (Rezende Filho et al., 2013). Preeclampsia is one of the most important conditions to be studied in gynecology and obstetrics, it is a disorder that can put the life of the mother and baby at risk, and can cause fetal death, deterioration of maternal organs and systems, in addition to ending up leading to maternal death if left untreated (Cunningham et al., 2000).

In order to combat and reduce cases of pre-eclampsia, studies have begun to seek to understand what is related to this disorder. Researchers has discovered the relationship between preeclampsia and periodontal disease, where pregnant women with periodontal disease have a greater chance of developing preeclampsia during their pregnancy, exposing their lives and the lives of their babies, showing that diseases of the oral cavity can indeed negatively impact the health of a fetus and a pregnant woman (Vettore et al., 2006), in addition to showing the importance of periodic visits to the dentist during pregnancy in order to improve the health of the patient who is going through a pregnancy, which will consequently be positive for the baby. Thus, the objective of this narrative review of the literature is to address the relationship between periodontal disease in pregnant women and its correlation with the risk of acquiring pre-eclampsia.

METHODOLOGY

Since this article is a literature review, it became evident that there was a need to use an existing study that could serve as a guide to contribute and guide the structuring and development of this narrative literature review. Thus, Rother's work (2007) was the study used as an aid in this review, as it is an article that addresses the characteristics, differences and structure of two types of literature reviews: systematic review and narrative review, which is the type of article that is being developed in the present study, thus serving as a kind of guide on how this type of article should be carried out. During the development of the article, it became evident that there was a need to acquire as much relevant information related to the topic as possible, articles, research and other tested, proven and published studies, serving as a source of support and enrichment for the review. Thus, searches were made in the following databases: PubMed; Scielo; The Cochrane Library; Science Direct; PROSPERO in conjunction with Google Academy. Gray Literature was also used during the search for information relevant to the topic. In addition, keywords were used during online searches, terms that were used with the objective of acquiring only information that is related to what is being addressed in this review, filtering the content obtained in the databases. The following terms were used: Preeclampsia; Periodontal diseases; Pregnancy; Oral health.

RESULTS

PREGNANCY AND ORAL HEALTH

During pregnancy, significant hormonal changes occur, mainly increased levels of estrogen and progesterone, which directly impact the oral environment. These changes cause greater vascularization of the gingival tissues and alter the immune response, making pregnant women more susceptible to the accumulation of biofilm and gingival inflammation, even with good oral hygiene. Studies show that up to 75% of pregnant women can develop pregnancy gingivitis, characterized by bleeding, gingival edema and greater periodontal probing depth (Moimaz et al., 2016). The lack of dental care during prenatal care worsens this condition, as popular culture still maintains the myth that dental treatments should be avoided during pregnancy, which contributes to neglect of oral health. This negligence can lead to the worsening of periodontitis, a chronic inflammatory condition that, in addition to local damage, acts as a risk factor for several systemic gestational

complications, such as premature birth, low birth weight and pre-eclampsia (dos Santos et al., 2024).

PERIODONTAL DISEASES

Periodontal diseases involve an exacerbated inflammatory response to microorganisms present in the subgingival biofilm. Gingivitis, a milder and reversible form, can progress to periodontitis, characterized by destruction of the periodontal ligament, alveolar bone loss, and formation of periodontal pockets. This chronic inflammation leads to the local and systemic release of proinflammatory cytokines such as interleukin-1 (IL-1), interleukin-6 (IL-6), tumor necrosis factor alpha (TNF- α), and prostaglandins (especially PGE2), which cross the gingival epithelial barrier and enter the bloodstream. Once in the circulatory system, these mediators can impact distant organs, including the placenta (Swati et al., 2013). Furthermore, periodontopathogenic bacteria such as *Porphyromonas gingivalis*, *Fusobacterium nucleatum* and *Aggregatibacter actinomycetemcomitans* have the ability to invade the oral epithelium and reach systemic tissues by hematogenous dissemination. These bacteria have been identified in placental tissues of women with premature birth and preeclampsia (Vettore et al., 2006).

PREECLAMPSIA AND ITS PATHOPHYSIOLOGY

Preeclampsia is a pregnancy-specific multisystem syndrome characterized by the onset of arterial hypertension ($\geq 140/90$ mmHg) and proteinuria (>300 mg/24h) after the 20th week of gestation. Its etiology is not yet fully understood, but it is known to be associated with poor placental perfusion due to failure of trophoblast invasion of the spiral artery, resulting in hypoxia, oxidative stress, and placental inflammation (Cunningham et al., 2000). The systemic inflammatory response is central to the pathophysiology of preeclampsia. Studies have shown increased circulation of inflammatory markers such as IL-6, TNF- α , and CRP (C-reactive protein) in patients with the disorder. Endothelial dysfunction, in turn, contributes to vasoconstriction, increased vascular permeability and platelet activation, leading to HELLP syndrome, eclampsia and other serious complications (Rezende Filho et al., 2013). Preexisting systemic inflammation or inflammation exacerbated by diseases such as periodontitis may therefore function as an adjuvant factor in the genesis or worsening of preeclampsia.

CORRELATION BETWEEN PERIODONTAL DISEASES AND PRE-ECLAMPSIA

Scientific literature consistently demonstrates an association between periodontal diseases and gestational complications, especially pre-eclampsia. According to Vettore et al. (2006), pregnant women with periodontal disease have a two to seven times greater risk of developing pre-eclampsia, compared to those with preserved periodontal health. This relationship is supported by three main mechanisms:

- **Hematogenous dissemination of pathogens:** Bacteria such as *Fusobacterium nucleatum* have been isolated from placental tissue and can cause local inflammation and dysfunction at the maternal-fetal interface.
- **Exacerbation of systemic inflammation:** Cytokines released from the periodontal focus contribute to increased systemic inflammation and endothelial dysfunction, amplifying the pre-eclampsia picture.
- **Altered immune response during pregnancy:** Pregnant women with periodontitis have an exacerbated pro-inflammatory immune profile, with greater expression of Th17 lymphocytes and lower activity of regulatory T cells, which contributes to the dysregulation of the placental immune axis.

Swati et al. (2013) observed that the severity of periodontal disease was positively associated with the intensity of gestational hypertensive conditions. Thus, periodontitis is not only a risk marker, but a possible cofactor in the etiopathogenesis of preeclampsia. Other clinical studies and meta-analyses reinforce this association. A survey conducted by Xiong et al. (2006), involving more than 3,500 pregnant women, concluded that the presence of periodontal disease doubled the risk of developing preeclampsia. Furthermore, the study demonstrated that periodontal treatment during pregnancy, especially in the early stages, was able to significantly reduce the levels of inflammatory markers such as IL-6 and CRP (C-reactive protein), suggesting a protective effect against adverse gestational outcomes.

The causal relationship between periodontitis and preeclampsia is also supported by histopathological studies that detected periodontal pathogens, such as *Treponema denticola* and *Fusobacterium nucleatum*, in placental samples from pregnant women with complications. The presence of these microorganisms activates local immune pathways, stimulating the production of pro-inflammatory cytokines and causing endothelial damage and chronic placental inflammation (Offenbacher et al., 2006). Additionally, the inflammatory environment generated by periodontitis can aggravate endothelial dysfunction—a central

element in the pathophysiology of preeclampsia by interfering with the production of nitric oxide and other vasodilators, which contributes to hypertension, vasoconstriction, and placental ischemia. This process ultimately generates a vicious cycle of systemic inflammation, oxidative stress, and endothelial damage that potentiates the progression of preeclampsia. It is also important to highlight social and behavioral factors. Women with lower socioeconomic status or limited access to oral health services have a higher prevalence of periodontal diseases and, consequently, are more exposed to obstetric risks. This reinforces the importance of health education and the integration of dental care into prenatal care, especially in regions of greater vulnerability.

DISCUSSION

Pregnancy is an essential and decisive period in the life of the fetus, and it is a moment that can have a positive or negative impact, impacts that will be reflected in the rest of the child's life, being a delicate but decisive moment in many issues of the child's health. Caring for the oral health of the pregnant woman is a determining factor in the health of the fetus. Several diseases associated with pregnancy can end up triggering current or future problems in the child, which can harm its health or development or even prevent the child from being born. Caring for oral health is something that must be done throughout the pregnancy. The pregnant woman must make periodic visits to the dentist in order to avoid oral diseases such as gingivitis and periodontitis, pathologies that can impact the life of the fetus, and may, for example, cause the baby to be born prematurely, the birth of a baby with low birth weight or lead to preeclampsia, which often causes fetal death (dos Santos et al., 2024). Oral pathologies have a major impact on a pregnant woman's life if they develop during pregnancy or if she does not treat something that was already established before pregnancy, putting the life of the fetus and the pregnant woman at risk.

It is a fact that during pregnancy, women nowadays undergo a range of examinations and follow-ups with doctors such as obstetricians and gynecologists. However, unfortunately, in today's society there is still no culture or custom of pregnant women having periodic consultations with a dentist, which should be something rooted in the population, which highlights the need for more public awareness actions that address this issue, showing its relevance and importance. In addition, gynecologists and obstetricians should be advised to recommend pregnant women to have consultations with the dentist during pregnancy, explaining the direct impact on the fetus that compromised

oral health and without assistance can end up causing, reinforcing the interprofessional relationship between dentistry and medicine, in order to improve human health (dos Santos et al., 2024; Moimaz, 2016; Swati et al., 2013).

The construction of interprofessionality between medicine (obstetrics and gynecology specifically) and dentistry is extremely necessary. This relationship of support and connection in the care of pregnant women will not only enhance the health of the pregnant woman and the fetus, but will also prevent a range of pathologies that may manifest during or after pregnancy. However, in addition to creating a relationship between these professions, it is necessary to break the population's customs and myths, such as the belief that something in the mouth cannot reach the fetus and even harm it. This is something that many people continue to believe, despite the advances and proofs of science (Capri, 2020). However, in the vast majority of cases, due to the lack of access to information, many people are not aware of this information, and during pregnancy, they underestimate or consider oral health as something that is not important for the health of the pregnant woman and the fetus.

CONCLUSION

Several studies point to the relationship between periodontal disease and pre-eclampsia, however, more research and studies on the subject are necessary to better understand this correlation, which already has evidence, but still requires more studies that can provide greater explanations. However, it is conclusive that the oral cavity is directly related to other diseases in other parts of the body, which may be a systemic pathology, or a pathology that enters or causes impaired oral health, which can happen in pregnant women, mouth problems that can harm the life of both her and the fetus, highlighting the need for greater care with oral health during pregnancy, in addition to the interprofessional relationship between the dentist and obstetrics and gynecology, a relationship that will avoid complications in the fetus and pregnant woman, improving the health of both and preventing pathologies.

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