World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(REVIEW ARTICLE)

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Oral Manifestations in Pregnant Women with Hyperemesis Gravidarum Associated with Hormonal Changes: A Narrative Review

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World Journal of Advanced Research and Reviews, 2025, 28(03), 2023-2027

Publication history: Received on 12 November 2025; revised on 25 December 2025; accepted on 27 December 2025

Article DOI: https://doi.org/10.30574/wjarr.2025.28.3.4292

Abstract

Oral health during pregnancy is an important aspect that is often overlooked in prenatal care. This study focuses on the relationship between oral health and the occurrence of hyperemesis gravidarum (HG) during pregnancy. Hyperemesis gravidarum itself is a health problem characterized by severe nausea and vomiting that occurs during pregnancy. Several previous studies have shown that hormonal changes are one of the factors that can increase the severity of hyperemesis gravidarum (HG). Hyperemesis gravidarum (HG) can cause serious problems, such as central pontine myelinolysis, Wernicke's encephalopathy, cerebral artery vasospasm, rhabdomyolysis, coagulopathy, and maternal and fetal death. During pregnancy, expectant mothers experience significant physical, mental, and emotional changes, which can affect their dental and oral health. Pregnant women often avoid brushing their teeth because it can trigger nausea. This causes bacteria in the teeth and oral cavity to accumulate, leading to tooth decay, bad breath (halitosis), and lumps on the gums (pyogenic granuloma). In addition, the fluid secreted during nausea experienced by pregnant women has a high level of stomach acid. Therefore, HG fluid can cause erosion of the tooth enamel layer. Good dental and oral health care is very important for pregnant women and their fetuses. The methods used in this literature review are based on journals in PubMed, Scopus, Science Direct, and Google Scholar. These journals were searched using the PICOT method to select relevant journals. This literature study aims to evaluate the relationship between hyperemesis gravidarum (HG) and oral conditions in pregnant women, as well as to collect evidence and review literature on the effects of Hyperemesis Gravidarum on the oral conditions of pregnant women.

Keywords: Oral; Oral disease; Hyperemesis Gravidarum; Morning Sickness; Pregnancy; Pregnant; Salivary.

1 Introduction

Oral health is an essential component of overall health and plays a crucial role during pregnancy due to significant physiological and hormonal changes experienced by pregnant women. Fluctuations in estrogen and progesterone levels during pregnancy can alter immune responses and vascular permeability in gingival tissues, increasing susceptibility to oral inflammatory conditions such as gingivitis and periodontal disease (5). Hormonal changes during pregnancy also influence salivary composition and flow rate. A reduction in salivary buffering capacity may lead to an increased risk of dental caries and enamel demineralization, especially when combined with inadequate oral hygiene practices (7). These changes make pregnant women more vulnerable to oral health problems compared to non-pregnant individuals. Nausea and vomiting are common symptoms during pregnancy and may become severe in cases of hyperemesis gravidarum. Recurrent vomiting exposes the oral cavity to gastric acid with low pH, which can erode dental enamel and increase dental sensitivity and caries risk (2). Prolonged exposure to acidic content also disrupts the protective function of saliva as a natural buffer in the oral environment. In addition to biological factors, behavioral changes during pregnancy further contribute to oral health deterioration. Pregnant women experiencing hyperemesis gravidarum often reduce the frequency of tooth brushing due to nausea triggered by oral hygiene activities, leading to plaque accumulation and gingival inflammation (9). Poor maternal oral health has been associated with adverse pregnancy

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outcomes, including preterm birth and low birth weight, highlighting the importance of oral health management as part of prenatal care (12). Despite this, oral health care remains under-integrated into antenatal services, particularly for pregnant women suffering from hyperemesis gravidarum. Therefore, this literature review aims to evaluate the relationship between hyperemesis gravidarum and oral health conditions in pregnant women, focusing on the underlying mechanisms, clinical manifestations, and preventive strategies to improve maternal oral health outcomes.

2 Material and methods

The method used in conducting this literature review is based on journal reviews sourced from PubMed, Scopus, Science Direct, and Google Scholar. The journals used are international and national journals, with a publication date limit of 2020. The journal search uses several keywords that have been listed. Furthermore, the PICOT method is used to select relevant journals. The samples used in this literature review also took some of the most relevant samples, sourced from the journals used.

2.1. Hyperemesis Gravidarum

Pregnancy is a physiological process that begins with fertilization of the ovum by spermatozoa, followed by implantation and placental development, with a normal gestational duration of approximately 40 weeks. During this period, significant hormonal and metabolic changes occur to support fetal growth and maternal adaptation (8). Hyperemesis gravidarum (HG) is a severe form of nausea and vomiting during pregnancy, characterized by persistent symptoms that exceed normal morning sickness and may lead to dehydration, electrolyte imbalance, weight loss, and metabolic disturbances. This condition typically occurs in the first trimester and may persist until 19–20 weeks of gestation (10). Although the exact etiology of hyperemesis gravidarum remains unclear, it is widely associated with elevated serum levels of human chorionic gonadotropin (hCG) and estrogen. These hormonal changes are believed to stimulate the vomiting center and gastrointestinal tract, contributing to prolonged nausea and vomiting in affected pregnant women (3). Globally, the prevalence of hyperemesis gravidarum is estimated to range between 0.8% and 3.2% of all pregnancies, equivalent to approximately 8–32 cases per 1,000 pregnancies. This variability may be influenced by genetic, hormonal, psychological, and environmental factors (8). Clinically, hyperemesis gravidarum may result in significant maternal complications, including dehydration, hypokalemia, metabolic alkalosis due to excessive loss of gastric hydrochloric acid, and nutritional deficiencies. In severe cases, untreated hyperemesis gravidarum can increase the risk of adverse maternal and fetal outcomes, highlighting the importance of early identification and comprehensive management (10).

2.2. Gastric Acid Composition and Oral Exposure in Hyperemesis Gravidarum

In hyperemesis gravidarum, pregnant women experience persistent and recurrent nausea and vomiting, resulting in repeated exposure of the oral cavity to gastric contents. The vomitus originates from the stomach and contains gastric juice, which is composed primarily of hydrochloric acid (HCl), along with potassium chloride (KCl) and sodium chloride (NaCl). Gastric acid has a highly acidic pH, typically ranging from 1.5 to 3.5, indicating strong erosive potential (4,7). Gastric acid is secreted by parietal cells in the stomach, which regulate acid production according to physiological demand. However, in cases of prolonged vomiting as observed in hyperemesis gravidarum, excessive amounts of gastric acid repeatedly pass through the oral cavity. This repeated exposure leads to a significant decrease in oral pH, creating an acidic environment that promotes demineralization and erosion of dental enamel (2). Dental enamel is particularly susceptible to acidic conditions, and sustained contact with gastric acid has been shown to accelerate enamel erosion and increase the risk of dental hypersensitivity and caries development. The buffering capacity of saliva becomes compromised due to continuous acid exposure, limiting its protective role in maintaining oral pH homeostasis (6). Systemically, excessive loss of gastric acid through vomiting may result in metabolic alkalosis, a condition characterized by elevated blood bicarbonate levels due to significant acid loss. In contrast, the oral cavity remains in a persistently acidic state because it is continuously exposed to gastric acid during vomiting episodes, and saliva reacts directly with the acidic contents rather than neutralizing them effectively (8). This imbalance between systemic alkalosis and localized oral acidity highlights the unique vulnerability of the oral environment in pregnant women with hyperemesis gravidarum and underscores the importance of targeted oral health management in this population.

2.3. Differences in Oral Conditions Between Normal Pregnancy and Hyperemesis Gravidarum

Physiological changes in the oral cavity during pregnancy are primarily influenced by fluctuations in female sex hormones, including estrogen, progesterone, and human chorionic gonadotropin (hCG), which are secreted by the placenta. These hormonal changes affect vascular permeability, immune response, and connective tissue metabolism, leading to various oral manifestations even in normal pregnancies, such as pregnancy gingivitis, gingival hyperplasia,

pyogenic granuloma, and alterations in salivary characteristics (5). Changes in salivary secretion during pregnancy play a crucial role in maintaining oral homeostasis. Hormonal modulation can alter both the flow rate and composition of saliva, influencing its protective buffering capacity. In women with hyperemesis gravidarum, excessive salivation or ptyalism is frequently observed and is considered a common complication associated with persistent nausea and vomiting (4,7). Salivary secretion is closely associated with hCG levels, which peak during the first trimester of pregnancy. Elevated hCG levels are strongly linked to increased nausea, vomiting, and hypersalivation, explaining why oral discomfort and salivary changes are more pronounced in early pregnancy compared to the second trimester. Although salivary flow may decrease during the second trimester, an increase is often observed again in the third trimester due to rising estrogen and progesterone levels (7). In hyperemesis gravidarum, the frequency and intensity of vomiting are positively correlated with increased salivary secretion. Excessive saliva may further stimulate the gag reflex, perpetuating nausea and vomiting episodes. Under these conditions, saliva continuously interacts with highly acidic gastric contents, impairing its buffering function and resulting in prolonged acidic conditions within the oral cavity. This disruption significantly increases the risk of dental enamel erosion and demineralization (1,2). Consequently, pregnant women with hyperemesis gravidarum exhibit a higher susceptibility to dental caries compared to women with normal pregnancies. The persistent acidic oral environment accelerates enamel breakdown, weakens tooth structure, and facilitates bacterial colonization, thereby increasing caries risk and dental sensitivity (6). Behavioral factors further distinguish oral health conditions between the two groups. Pregnant women suffering from hyperemesis gravidarum often reduce the frequency of tooth brushing or avoid oral hygiene practices altogether due to nausea triggered by brushing. This behavior promotes plaque accumulation, increasing the likelihood of gingivitis, halitosis, caries, and gingival lesions such as pyogenic granuloma (9,12). Overall, the combined effects of hormonal imbalance, salivary dysfunction, acidic oral exposure, and compromised oral hygiene behaviors explain the more severe deterioration of oral health observed in pregnant women with hyperemesis gravidarum compared to those experiencing normal pregnancies.

3 Results and discussion

3.1. Oral Health Alterations in Pregnant Women with Hyperemesis Gravidarum

Hyperemesis gravidarum (HG) is a severe pregnancy-related condition characterized by persistent nausea and vomiting that significantly exceeds normal morning sickness. In multiple studies published after 2020, HG has been consistently linked to worsened oral health outcomes in pregnant women compared to those without HG. Severe vomiting exposes dental tissues to repeated acidic challenges, leading to increased enamel erosion and demineralization (2).

Several studies similarly found that pregnant women with HG showed higher instances of gingival inflammation and periodontal risk compared to normal pregnancies, emphasizing that the acidic environment resulting from chronic emesis facilitates tissue breakdown and microbial overgrowth (5). Evidence indicates that enamel surfaces lose mineral content more rapidly when repeatedly exposed to gastric acid (pH 1.5–3.5), a mechanism frequently described in the context of vomiting-induced dental damage (6).

3.2. Hormonal Influence and Salivary Changes in Hyperemesis Gravidarum

Hormonal changes are central to both HG and oral alterations. Elevated human chorionic gonadotropin (hCG), estrogen, and progesterone especially during the first trimester have been correlated with both nausea severity and oral tissue responses. A prospective study demonstrated that hormonal imbalance during early pregnancy is associated with altered salivary flow and composition, compromising saliva's buffering capacity (7). Cases of excessive salivation (ptyalism) were frequently reported in HG patients, but saliva that has been chronically exposed to gastric acid loses its ability to neutralize pH, leading to persistent acidity in the oral environment (7). Studies also suggest that while HG symptoms are more severe in the first trimester, secondary hormonal peaks in the third trimester may contribute to continued oral health vulnerability, aligning with findings from broader maternal oral health research (12).

3.3. Behavioral Factors and Their Contribution to Oral Health Deterioration

Besides biological mechanisms, behavioral changes significantly compound oral health deterioration in women with hyperemesis gravidarum. Pregnant women experiencing frequent nausea and vomiting often report avoidance of routine oral hygiene practices, including tooth brushing, due to nausea triggered by oral stimulation (9). Such behavior increases the risk of plaque accumulation, which, in combination with hormonal shifts, fosters gingivitis, halitosis, and further elevates caries risk. A recent cross-sectional study showed that reduced hygiene practices are significantly associated with increased periodontal markers and dental caries presence in pregnant women reporting severe nausea and vomiting (6).

Taken together, the reviewed evidence demonstrates that the interaction of gastric acid exposure, hormonal changes, salivary dysfunction, and compromised oral hygiene behavior in hyperemesis gravidarum results in more severe oral health outcomes than those observed in normal pregnancies. These mechanisms underscore the need for integrated oral health management in antenatal care.

4 Conclusion

This literature review demonstrates that hyperemesis gravidarum has a significant impact on the oral health of pregnant women through a combination of biological, chemical, and behavioral mechanisms. Persistent nausea and repeated vomiting result in frequent exposure of the oral cavity to highly acidic gastric contents, leading to enamel erosion, increased dental caries risk, and gingival inflammation. Hormonal alterations, particularly elevated levels of human chorionic gonadotropin, estrogen, and progesterone, play a central role in both the pathophysiology of hyperemesis gravidarum and the observed oral changes. These hormonal fluctuations influence gingival tissue response and salivary secretion, ultimately impairing saliva's buffering capacity and prolonging acidic conditions in the oral environment. In addition, behavioral factors such as reduced oral hygiene practices due to nausea further exacerbate oral health deterioration in pregnant women with hyperemesis gravidarum. The interaction between acidic exposure, hormonal imbalance, salivary dysfunction, and compromised oral hygiene places this population at a higher risk of developing oral diseases compared to women with normal pregnancies. Despite consistent findings across recent studies, this literature review is limited by its reliance on secondary data and the absence of primary clinical assessment or population-based sampling. Future studies employing longitudinal designs and standardized oral health evaluations are recommended to better clarify the causal relationship between hyperemesis gravidarum and oral health outcomes. In conclusion, early preventive dental care, proper oral hygiene education, and interdisciplinary collaboration between dental professionals and obstetric care providers are essential to maintain oral health and improve overall maternal and fetal well-being in pregnant women affected by hyperemesis gravidarum.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] Adamska, P., Sobczak-Zagalska, H., Gromek, Z., Wojciechowska, B., Doroszkiewicz, P., Chmielewski, M., Cichońska, D., Zedler, A. and Pilloni, A. (2025). The impact of oral health and dental care on pregnancy: a cross-sectional study among women of reproductive age. Journal of Clinical Medicine, 14(14), 5153. https://doi.org/10.3390/jcm14145153

[2] Altas, N., Boyama, B.A. and Cakmak, B.D. (2020). The association between hyperemesis gravidarum and periodontal disease in pregnancy. European Journal of General Dentistry, 9(3), 108–112.

[3] Bayraktar, B., Balikoglu, M., Bayraktar, M.G. and Kanmaz, A.G. (2021). The effects of hyperemesis gravidarum on the oral glucose tolerance test values and gestational diabetes. Prague Medical Report, 122(4), 285–293.

[4] Dwitasari, I., Wihardja, R. and Kintawati, S. (2019). Differences in salivary flow rate between pregnant and non-pregnant women. Padjadjaran Journal of Dental Research Student, 3(2), 141–145.

[5] Kim, E.G., Park, S.K. and Nho, J.H. (2021). Factors related to maternal oral health status: Focus on pregnant and breastfeeding women. Healthcare, 9(6), 708. https://doi.org/10.3390/healthcare9060708

[6] Lo Giudice, R., Martinelli, C., Alibrandi, A., Mondo, A., Venezia, R., Cannarozzo, M.G., Puleio, F., Pollicino, R., Lo Giudice, G. and Laganà, A.S. (2024). Multicenter cross-sectional study of oral health and hygiene practices among pregnant women. Journal of Clinical Medicine, 13(23), 7315. https://doi.org/10.3390/jcm13237315

[7] Sachelarie, L., Iman, A.E.H., Romina, M.V., Huniadi, A. and Hurjui, L.L. (2024). Impact of hormones and lifestyle on oral health during pregnancy: A prospective observational regression-based study. Medicina, 60(11), 1773. https://doi.org/10.3390/medicina60111773

[8] Sert, Z.S. (2021). The effect of hyperemesis gravidarum on pregnancy outcomes. Journal of Contemporary Medicine, 11(4), 428–432. Available at: https://dergipark.org.tr/en/pub/jcm/issue/66338/989680

[9] Silk, H., Douglass, A.B., Douglass, J.M. and Silk, L. (2018). Oral health during pregnancy. American Family Physician, 77(8), 1139–1144.

[10] Solechah, M. and Kartini, F. (2020). Impact of hyperemesis gravidarum on pregnancy outcomes. Jurnal Kesehatan, 11(Special Issue), 237–247. Available at: https://ejournal.poltekkes-smg.ac.id/ojs/index.php/jk/article/view/4987

[11] Susanti, E., Firdayanti and Haruna, N. (2019). Antenatal midwifery care management in patients with hyperemesis gravidarum. Journal of Midwifery, 1(2), 79–91. DOI:10.24252/jmw.v1i2.10557

[12] Yarkac, F.U., Gokturk, O. and Demir, O. (2021). Interaction between stress, cytokines, and salivary cortisol in pregnant and non-pregnant women with gingivitis. Clinical Oral Investigations, 25(4), 1677–1684. https://doi.org/10.1007/s00784-020-03587-6