ORIGINAL ARTICLE

Effect of Lactation on Periodontal Health Status of Postpartum Patients: A Cross-Sectional Study at 3 Months Postpartum

V. Jaswitha[1*], Gangolu Meghana[1], Boyapati Ramanarayana[1], K. Lakshmi Kanth[1], Ravindranath Dhulipalla[1] and Adurty Chaitanya[1]

[1]*Department of Periodontology, Sibar Institute of Dental Sciences, Takkellapadu, Guntur, India*

Abstract

Background: Breastfeeding is universally acknowledged as the optimal infant nutrition strategy, backed by evidence of its numerous benefits for both mothers and babies. For women with common metabolic conditions like polycystic ovary syndrome, diabetes, and obesity, breastfeeding may offer additional advantages. While the benefits of lactation are well-documented, its effects on periodontal health are less understood.

Objective: To evaluate the effect of lactation on periodontal health status in postpartum women by assessing clinical periodontal parameters, including Plaque Index, Gingival Index, Bleeding on Probing, and Probing Pocket Depth, in lactating and non-lactating mothers at three months postpartum.

Methods: A cross-sectional study was conducted among postpartum women at Sudha Maternity and General Hospital in Tadepalli, three months after delivery from December 2024 to February 2025. This study comprised 350 patients, divided into lactating and non-lactating groups, Periodontal evaluations were performed three months postpartum, assessing key parameters including plaque index, gingival index, probing pocket depth, and bleeding on probing.

Results: A total of 324 participants, either lactating or non-lactating, were included in the study at three months postpartum. The mean age of the participants was 27.5 ± 4.2 years. Lactating mothers exhibited statistically significant differences in plaque index, gingival index, bleeding on probing, and probing pocket depth compared to non-lactating mothers, with the latter showing the greatest disparity.

Conclusion: Our findings suggest that breastfeeding will be beneficial for women's periodontal health, reducing the risk of periodontitis. This information can be valuable in developing targeted oral health education for pregnant women.

Keywords: *Lactation, periodontal health, postpartum patients, pregnancy-related oral health, dentistry.*

INTRODUCTION

Periodontitis is a chronic bacterial infection that triggers a destructive inflammatory response, compromising the health of the tissues that hold teeth in place [1]. It is a widespread public health issue, affecting over 20% to 50% of the global population [2].

Periodontal disease is a widespread public health concern that affects individuals of all ages, with various risk factors including poor oral hygiene, smoking, diabetes, and genetic predisposition contributing to its onset and progression [3].

The substantial representation of women in the aging population, coupled with the well-documented influence of hormonal fluctuations on oral health, highlights the critical need to promote and maintain optimal oral health throughout a woman's lifespan.

Lactation may influence periodontal health through hormonal and immunological pathways. Postpartum, estrogen levels decline and remain low during breastfeeding, potentially reducing systemic inflammation. Oxytocin and prolactin, elevated during lactation, have anti-inflammatory and healing effects, possibly improving periodontal outcomes.

Research reveals that the decline in estrogen levels during menopause can lead to bone loss, increasing the risk of periodontitis progression or recurrence in women [4]. Breastfeeding is the natural way to nourish infants, and the composition of a mother's milk is perfectly tailored to meet the infant's nutritional needs [5]. Global health guidelines set by the World Health Organization recommend six months of exclusive breastfeeding, followed by breastfeeding alongside solid foods until the age of two or beyond [6]. Although breastfeeding rates have improved, 60% of mothers express a desire to cease breastfeeding [7]. Interestingly, while the overall health benefits of breastfeeding for mothers are well-documented, research on its specific impact on maternal oral health is limited.

Although the health benefits of breastfeeding for maternal health are well-documented, there has been limited research on its impact on maternal oral health.

Previous studies suggested no or minimal association between breastfeeding and periodontitis, but they have not accounted for important confounding factors including diabetes, hypertriglyceridemia,

**Corresponding author: V. Jaswitha, Department of Periodontology, Sibar Institute of Dental Sciences, Takkellapadu, Guntur, India, E-mail: vinthajaswitha@gmail.com*
Received: February 11, 2025; Revised: June 05, 2025; Accepted: June 27, 2025
DOI: https://doi.org/10.37184/lnjpc.2707-3521.7.71

  ISSN: 2708-9134 (Online) Liaquat National Journal of Primary Care 2025; 7(4): 366-371

and hypercholesterolemia which could influence the relationship [8]. Diabetes and lipid disorders are known to exacerbate periodontal disease through increased systemic inflammation and impaired tissue healing. Failing to account for these confounders may obscure the true relationship between lactation and periodontal health. Additionally, in one of the studies, the breastfeeding duration was categorized with a reference group under 18 months to 73 months. Another study treated breastfeeding duration as a continuous variable with the longest period being 15 years. Given the current low average birth rate (less than two children), such classifications may seem unreasonable. By considering these factors in our study, the study aimed to evaluate the effect of lactation on periodontal health status in postpartum women by assessing clinical periodontal parameters, including Plaque Index, Gingival Index, Bleeding on Probing, and Probing Pocket Depth, in lactating and non-lactating mothers at three months postpartum.

The 3-month postpartum period represents a critical window of hormonal and physiological adjustment. During this time, estrogen and progesterone levels remain suppressed due to lactational amenorrhea, while prolactin and oxytocin levels are elevated to support milk production. These hormonal shifts can influence immune function, inflammation, and bone metabolism—factors directly relevant to periodontal health [9]. We hypothesized that there would not be a statistically significant difference in periodontal health parameters between lactating and non-lactating mothers at three months postpartum. For the evaluation of this hypothesis, we conducted the present study to find evidence regarding our assumption.

MATERIALS AND METHODS

This cross-sectional observational study was conducted in the pediatric outpatient department of Sudha Maternity and General Hospital, Tadepalli, Guntur District, from December 2024 to February 2025. Ethical approval was obtained from the institutional ethics committee (IEC number-462/IEC/SIBAR/2024), and written informed consent was secured from all participants before enrollment. The study included women aged 20-40 years, with a minimum of 20 teeth, regardless of lactation status, who attended the hospital during the study period. Patients who have compromised systemic health or those who had received periodontal treatment within the past 6 months were excluded to minimize confounding factors.

The sample size was calculated using the formula $n=(Z\cdot\sigma/E)2$, Where Z=1.96Z (Z-score for a 95% confidence level), σ=0.477 (assumed population standard deviation) [9], E=0.05 (margin of error). A total of 350 postpartum women at three months post-delivery were initially selected through purposive sampling. Of these, 324 women met the inclusion criteria and agreed to participate, while 15 did not meet the criteria and 11 declined participation after receiving a full explanation of the study's purpose. The primary endpoint of the study was the comparison of mean values of these clinical periodontal parameters between the two groups to determine whether lactation status has a significant impact on periodontal health.

Data was collected through direct, face-to-face clinical examinations conducted by calibrated and trained dental professionals. Periodontal evaluations were performed during the 3-month postpartum period and included assessment of the Plaque Index (PI), Gingival Index (GI), Bleeding on Probing (BOP), and Probing Pocket Depth (PPD).

The study tools used were standardized periodontal indices. The Plaque Index given by Silness and Löe, 1964 assessed visible plaque from score 0 -no plaque to 3 heavy accumulation, with an average calculated per tooth [10]. The Gingival Index given by Löe and Silness, 1963 evaluated inflammation severity from 0 healthy to 3 severe spontaneous bleeding [11]. The Bleeding on Probing Index Ainamo and Bay, 1975 recorded bleeding within 30 seconds after probing and was expressed as a percentage, indicating gingival health or inflammation [12]. Probing Pocket Depth (Lang and Bartold, 2018) was measured at six sites per tooth; depths ≥4 mm were considered indicative of periodontal involvement [13].

Demographic details such as age and oral hygiene practices were documented. Oral hygiene was categorized as 0 for twice-daily brushing using the modified Bass technique and 1 for once-daily brushing with improper technique. All participants were non-smokers, eliminating smoking as a confounding factor. This allowed the analysis to focus specifically on the relationship between lactation status and periodontal health outcomes. Data were analyzed statistically to determine the prevalence and severity of periodontal conditions among lactating and non-lactating women.

SPSS software version 25 developed by IBM Corp in Armonk, New York, USA was utilized for statistical analysis. Frequencies and percentages were computed for categorical variables. Numerical variables were expressed as mean ± standard deviation. To determine the appropriate statistical tests, the normality of the data was assessed using the Shapiro-Wilk test, which is suitable for small to moderate sample sizes. A p-value greater than 0.05 indicated that the data followed a normal distribution. We compared periodontal parameters—including Plaque Index (PI), Gingival Index (GI), Bleeding on Probing (BOP), and Probing Pocket Depth (PPD)—between lactating and non-lactating postpartum women using an independent t-test (for normally distributed data) or Mann-Whitney U test (for non-normally distributed data). Linear regression analysis was performed to assess the relationship between lactation and periodontal health indicators,

Table 1: Descriptive statistics of the study groups.

Groups	Parameters	N	Mean	Std. Deviation	Minimum	Maximum
Lactating	Plaque index	164	1.89	1.31	0	13
	Bleeding on probing	164	20.59	12.73	0	122
	Gingival index	164	1.17	0.63	0	2
	Pocket probing depth	164	4.12	0.75	2	6
Non Lactating	Plaque index	164	3.25	1.18	0	6.5
	Bleeding on probing	164	32.95	7.91	12	50
	Gingival index	164	2.38	0.64	1	3
	Pocket probing depth	164	6.70	1.32	0	9

including Plaque Index, Bleeding on Probing, Gingival Index, and Pocket Probing Depth. Statistical significance was defined based on a p-value ≤0.05.

RESULTS

A total of 324 participants, either lactating or non-lactating, were included in the study at three months postpartum, with an age range of 20 to 35 years.

Table **1** depicts the descriptive statistics of the study groups. In lactating women, the mean plaque index is 1.89 ±1.31mm. Mean bleeding on probing is 20.59±12.73%. The mean gingival index is 1.17mm with a standard deviation of 0.63mm. The mean pocket probing depth is 4.12mm with a standard deviation of 0.75mm. In non-lactating women, the mean plaque index is 3.25mm with a standard deviation of 1.18mm. Mean bleeding on probing is 32.95% with a standard deviation of 7.91%. The mean gingival index is 2.38mm with a standard deviation of 0.64mm. The mean pocket probing depth is 6.7±1.32mm.

On comparison between the study groups using independent sample t-test. The mean plaque index, bleeding on probing, gingival index, and pocket probing were significantly lower in lactating women when compared with non-lactating women.

The results demonstrated a statistically significant association between lactation and improved periodontal health across all measured parameters. Specifically, an increase in lactation status was associated with a significant reduction in Plaque Index (B = -1.321, p<0.001), Bleeding on Probing (B = -12.140, p<0.001), Gingival Index (B = -1.226, p<0.001), and Pocket Probing Depth (B = -2.554, p<0.001) (**Table 2**).

These findings suggest that lactation may have a protective effect on periodontal health in postpartum women, with reductions observed across all key periodontal indices.

Table 2: Multiple linear regression analysis assessing the relation between lactation and periodontal health.

Variables	Unstandardized Coefficients		p-value
	B	Std. Error	
Plaque index	-1.321	0.139	*<0.001
Bleeding on probing	-12.140	1.180	*<0.001
Gingival index	-1.226	0.071	*<0.001
Pocket probing depth	-2.554	0.119	*<0.001

*p-value ≤0.05 is statistically significant

DISCUSSION

The findings of this investigation indicate the beneficial effect of breastfeeding on periodontal well-being.

The current study's results diverge from previous investigations, which reported a significant increase in periodontitis risk with prolonged breastfeeding duration among postmenopausal Korean women [14]. One reason for this result might be that women after menopause are more prone to have periodontal disease due to hormonal changes and other factors. A possible source of bias in the previous study is the potential overrepresentation of elderly women with large families, which may not accurately reflect the periodontal health experiences of the broader elderly population. Unlike previous studies, we did not employ reference age groups, which can act as confounding variables and influence periodontal health status.

Research has shown that Korean female adults who lactated for 14 years had a substantially higher prevalence rate of periodontal disease, with an odds ratio of 6.915 [15]. The observed changes in lactation-related factors can be attributed to the gradual decline in prolactin levels, the primary hormone responsible for milk production, which occurs over the lactation period, this protective effect may be attributed to hormonal regulation during lactation, which potentially stabilizes inflammatory responses and supports periodontal tissue recovery [16], we deliberately restricted our study to 3 months to coincide with the peak prolactin production phase, ensuring a more accurate assessment of periodontal health status.

Despite not employing a standardized periodontal disease measurement, a study conducted among women revealed that longer lactation periods were linked to better periodontal health outcomes, compared to those who did not lactate [3].

The current study aims to elucidate the relationship between lactation and periodontal infection by conducting a comparative analysis of lactating women over 3 months and non-lactating controls. Our analysis revealed significant differences in various periodontal parameters between lactating and non-lactating mothers, including

plaque index, gingival index, bleeding on probing and probing pocket depth.

The association between periodontitis and various noncommunicable diseases, such as breast cancer, cardiovascular disease, diabetes, hypertension, Alzheimer's disease, and depression, suggests a shared risk factor profile that may underlie the relationship between lactation and periodontal health, A major limitation of this study is the lack of specific information on the patient's comorbidities, which could potentially interfere with other disease conditions [17].

A significant association has been observed between periodontitis and breast cancer, which is noteworthy given the established inverse relationship between breastfeeding and breast cancer risk [18, 19].

The multifaceted benefits of breastfeeding may contribute to a reduced risk of periodontitis, as it has been shown to mitigate the risk of breast cancer, cardiovascular diseases, and other comorbidities that are associated with an increased risk of periodontitis [20, 21]. Another shared risk factor profile between autoimmune diseases, such as rheumatoid arthritis, and periodontitis suggests that lactation may exert a protective effect against these conditions by modulating the immune response [22, 23]. Breastfeeding for an extended duration may confer protection against periodontitis by mitigating the risk of autoimmune diseases [24, 25].

Not breastfeeding has been associated with higher rates of depression and anxiety, which may be a factor in the development of periodontal disease [26]. Depression has been linked to an increased risk of periodontitis [27], and therefore, breastfeeding may indirectly lower the risk of periodontitis by reducing the incidence of depression.

The present study demonstrated a significant positive relationship between lactation and periodontal health among postpartum women. Linear regression analysis revealed that lactating women exhibited significantly lower scores in Plaque Index, Bleeding on Probing, Gingival Index, and Pocket Probing Depth, indicating better periodontal status.

The significantly lower bleeding on probing and gingival index scores further support the hypothesis that lactation has a modulating effect on periodontal inflammation. The observed decrease in pocket probing depth suggests that lactation may also contribute to the stabilization of periodontal tissues in the postpartum phase. These findings are consistent with some earlier studies that reported improved periodontal parameters in lactating women, although the available literature on this specific topic remains limited.

Moreover, future research should explore the efficacy of adjunctive treatments that may further enhance periodontal health in this population. For instance, ozone therapy has demonstrated promising anti-inflammatory effects in chronic periodontal disease [27] photo biomodulation has been shown to reduce pain and promote healing in dental contexts [28], and Para probiotics have emerged as a novel intervention with potential immunomodulatory benefits for pregnant women with periodontitis. Investigating these therapies in postpartum patients could provide valuable insights into optimized management strategies for periodontal disease during this critical period [29].

The findings of this study underscore the importance of integrating oral health into maternal and child health strategies. From a clinical perspective, healthcare providers including obstetricians, pediatricians, and dental professionals should be encouraged to educate new mothers on the potential oral health benefits of breastfeeding. This includes highlighting the association between breastfeeding and reduced risk of periodontal disease, as well as the role of maternal oral hygiene in overall postpartum wellness.

This study employed a novel approach by incorporating periodontal parameters to assess the relationship between breastfeeding and periodontal disease progression, thereby providing new insights into the underlying mechanisms, potentially due to the modulatory effects of progesterone on the immune response and the mitigating effects of breastfeeding on depressive and anxiety symptoms. Additionally, the lack of randomized clinical trials investigating this association restricts the strength of current evidence and underscores the need for controlled interventional studies.

While this study provides valuable insights into the relationship between breastfeeding and maternal periodontal health, it is important to acknowledge the potential influence of unmeasured confounding variables. Factors such as socioeconomic status (SES), oral hygiene practices, access to dental care, dietary habits, and health literacy may have impacted both breastfeeding behaviors and periodontal outcomes.

LIMITATIONS

The present study is limited by its observational design, which precludes inference of a causal relationship between breastfeeding and periodontitis. Furthermore, the study's localized population sample may restrict the applicability of the findings to broader populations, and different correlations may exist in other demographic contexts. Besides its observational nature, the study lacks randomized clinical trial data. The absence of detailed comorbidity profiles further restricts the comprehensive interpretation of results. It is important to acknowledge the potential influence of unmeasured confounding variables. Factors such as socioeconomic status (SES), access to dental care, dietary habits, and health literacy may have impacted both breastfeeding behaviors and periodontal outcomes.

CONCLUSION

The results indicate that lactation in the initial months is associated with a reduced incidence of periodontitis, suggesting that breastfeeding may confer protective benefits for periodontal health. Lactation appears to influence periodontal health, with age and brushing habits showing limited impact in lactating women. In contrast, proper brushing habits significantly contribute to better periodontal outcomes in non-lactating women, highlighting the importance of tailored oral care strategies. This research underscores the importance of breastfeeding for women's oral health and provides a foundation for developing targeted educational interventions that support periodontal health management in lactating women.

ETHICS APPROVAL

This study was approved by the Institutional Ethics Committee of the Sibar Institute of Dental Sciences, with the approval number Pr.463/IEC/SIBAR/2024. All procedures performed in studies involving human participants followed the ethical standards of the institutional and/ or national research committee and the Helsinki Declaration.

CONSENT FOR PUBLICATION

Informed consent was obtained from all individual participants included in the study. The participants were informed about the objectives, procedures, potential risks, and benefits of the study, and agreed to the publication of anonymised data.

AVAILABILITY OF DATA

The data is available upon the considerable request made to the corresponding author.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

We acknowledge the support and cooperation received from Sudha Maternity and General Hospital, Tadepalli, which played a crucial role in facilitating the successful completion of this study.

AUTHORS' CONTRIBUTION

The authors collectively made substantial contributions to this research. Specifically, data analysis was conducted by Meghana, Ramanarayana, Lakshmikanth, and Ravindranath. Meghana led data interpretation and manuscript preparation, with input from Ramnarayan and Lakshmikanth. Ravindranath critically reviewed the manuscript, and all authors reviewed and approved the final version.

REFERENCES

1. Kononen E, Gursoy M, Kahraman Gursoy U. Periodontitis: a multifaceted disease of tooth-supporting tissues. J Clin Med 2019; 8(8): 1135. DOI: https://doi.org/10.3390/jcm8081135
2. Nazir MA. Prevalence of periodontal disease, its association with systemic diseases and prevention. Int J Health Sci (Qassim) 2017; 11(2): 72-80.
3. Tonetti MS, Jepsen S. Clinical guidelines on periodontal disease: pathogenesis, risk factors, and prevention. J Clin Periodontol 2013; 40(Suppl 14): S1-6. DOI: https://doi.org/10.1111/jcpe.12088
4. Martelli ML, Brandi ML, Martelli M, Nobili P, Medico E, Martelli F. Periodontal disease and women's health. Curr Med Res Opin 2017; 33(6): 1005-15. DOI: https://doi.org/10.1080/03007995.2017.1297928
5. Machado V, Ferreira M, Lopes L, Mendes JJ, Botelho J. Adverse pregnancy outcomes and maternal periodontal disease: an overview on meta-analytic and methodological quality. J Clin Med 2023; 12(11): 3635. DOI: https://doi.org/10.3390/jcm12113635
6. Romandini M, Shin HS, Romandini P, Laforí A, Cordaro M. Hormone-related events and periodontitis in women. J Clin Periodontol 2020; 47(4): 429-41. DOI: https://doi.org/10.1111/jcpe.13248
7. Aghazadeh Z, Behroozian A, Najafi H. Comparison of gingival and dental indices in lactating and non-lactating mothers during the first six months postpartum. Rev Bras Odontopediatr Clin Integr 2019; 19: e.
8. Silness J, Löe H. Periodontal disease in pregnancy II. Correlation between oral hygiene and periodontal condition. Acta Odontol Scand 1964; 22: 121-35.
9. Groer ME, Jevitt C, Ji M. Immune changes and dysphoric moods across the postpartum. Am J Reprod Immunol 2014; 73(3): 193-8. DOI: https://doi.org/10.1111/aji.12322
10. Loe H, Silness J. Periodontal disease in pregnancy I. Prevalence and severity. Acta Odontol Scand 1963; 21: 533-51.
11. Mansoor A, Patsekin V, Scherl D, Robinson JP, Rajwa B. BiofilmQuant: a computer-assisted tool for dental biofilm quantification. J Biomed Opt 2014; 19(12): 127004. DOI: https://doi.org/10.1117/1.JBO.19.12.127004
12. Kim NY, Kim JE, Choi CH, Chung KH. Association between birth-related factors and periodontitis in women: Korea National Health and Nutrition Examination Survey 2013-2018. J Clin Periodontol 2023; 50(10): 1326-35. DOI: https://doi.org/10.1111/jcpe.13845
13. Krüger MSdM, Casarin RP, Pinto GDS, Pappen FG, Camargo MBJ, Correa FOB, *et al.* Maternal periodontal disease and adverse perinatal outcomes: Is there an association? A hospital-based case-control study. J Matern Fetal Neonatal Med 2019; 32(20): 3401-7. DOI: https://doi.org/10.1080/14767058.2018.1464554
14. Peng Y, Zhuang K, Huang Y. Incidence and factors influencing delayed onset of lactation: a systematic review and meta-analysis. Int Breastfeed J 2024; 19(1): 59. DOI: https://doi.org/10.1186/s13006-024-00666-5
15. Heo SY, Lee EH. The relationship between breastfeeding and oral health. Int J Clin Prev Dent 2018; 14(2): 126-31. DOI: https://doi.org/10.15236/ijcpd.2018.14.2.126
16. Zucchetti BM, Peccatori FA, Codacci-Pisanelli G. Pregnancy and lactation: Risk or protective factors for breast cancer? Adv Exp Med Biol 2020; 1252: 195-7. DOI: https://doi.org/10.1007/978-3-030-41596-9_27
17. de Bataille C, Castellan M, Massabeau C, Jouve E, Lacaze JL, Sibaud V, *et al.* Oral mucosal changes induced by adjuvant endocrine therapies in breast cancer patients: clinical aspects and proposal for management. Support Care Cancer 2021; 29(4): 1719-22. DOI: https://doi.org/10.1007/s00520-020-05797-z

18. Tschiderer L, Seekircher L, Kunutsor SK, Peters SAE, O'Keeffe LM, Willeit P. Breastfeeding is associated with a reduced maternal cardiovascular risk: Systematic review and meta-analysis involving data from 8 studies and 1,192,700 parous women. J Am Heart Assoc 2022; 11(2): e022746.
DOI: https://doi.org/10.1161/JAHA.121.022746

19. Li DP, Du C, Zhang ZM, Li GX, Yu ZF, Wang X, *et al.* Breastfeeding and ovarian cancer risk: a systematic review and meta-analysis of 40 epidemiological studies. Asian Pac J Cancer Prev 2014; 15(12): 4829-37.
DOI: https://doi.org/10.7314/apjcp.2014.15.12.4829

20. Adab P, Jiang CQ, Rankin E, Tsang YW, Lam TH, Barlow J, *et al.* Breastfeeding practice, oral contraceptive use and risk of rheumatoid arthritis among Chinese women: the Guangzhou Biobank Cohort Study. Rheumatology (Oxford) 2014; 53(5): 860-6.
DOI: https://doi.org/10.1093/rheumatology/ket456

21. Chen H, Wang J, Zhou W, Yin H, Wang M. Breastfeeding and risk of rheumatoid arthritis: a systematic review and meta-analysis. J Rheumatol 2015; 42(9): 1563-9.
DOI: https://doi.org/10.3899/jrheum.150195

22. de Molon RS, Rossa C Jr, Thurlings RM, Cirelli JA, Koenders MI. Linkage of periodontitis and rheumatoid arthritis: current evidence and potential biological interactions. Int J Mol Sci 2019; 20(18): 4541.
DOI: https://doi.org/10.3390/ijms20184541

23. Ceccarelli F, Saccucci M, Di Carlo G, Lucchetti R, Pilloni A, Pranno N, *et al.* Periodontitis and rheumatoid arthritis: the same inflammatory mediators? Int J Inflam 2019; 2019: 6034546.
DOI: https://doi.org/10.1155/2019/6034546

24. Krol KM, Grossmann T. Psychological effects of breastfeeding on children and mothers. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 2018; 61(8): 977-85.
DOI: https://doi.org/10.1007/s00103-018-2769-0

25. Aldosari M, Helmi M, Kennedy EN, Badamia R, Odani S, Agaku I, *et al.* Depression, periodontitis, caries and missing teeth in the USA, NHANES 2009-2014. Fam Med Community Health 2020; 8: e000583.
DOI: https://doi.org/10.1136/fmch-2020-000583

26. Liao K, Chen J. Breastfeeding duration and the risk of autoimmune diseases: a systematic review and meta-analysis. Autoimmun Rev 2023; 22(5): 103281.
DOI: https://doi.org/10.1016/j.autrev.2023.103281

27. Adeniyi AA, Ramachandran S, Jevitt CM. Oral health, anxiety, depression, and stress in pregnancy: a rapid review of associations and implications for perinatal care. Int J Environ Res Public Health 2025; 22(1): 32.
DOI: https://doi.org/10.3390/ijerph22010032

28. Colombo M, Gallo S, Garofoli A, Poggio C, Arciola CR, Scribante A. Ozone gel in chronic periodontal disease: a randomized clinical trial on the anti-inflammatory effects of ozone application. Biology (Basel) 2021; 10(7): 625.
DOI: https://doi.org/10.3390/biology10070625

29. Elbay M, Elbay US, Kaya E, Kalkan OP. Effects of photobiomodulation with different application parameters on injection pain in children: a randomized clinical trial. J Clin Pediatr Dent 2023; 47(4): 54-62.
DOI: https://doi.org/10.22514/jocpd.2023.035