J Prev Epidemiol. 2026;11(2):e39309 Original

doi 10.34172/jpe.39309 Journal of Preventive Epidemiology http jprevepi.com

Oral and dental health as a predictor of low birth weight; a diagnostic cross-sectional study

Yalda Azimzadeh Moghaddam[1,2*]

[1]Islamic Azad University, Ardabil Branch, Ardabil, Iran
[2]Department of Stomatology, School of Health Sciences, University of Georgia, Tbilisi, Georgia

Correspondence to:
Yalda Azimzadeh Moghaddam,
Email:
azimzadehyalda@gmail.com

Received: 25 Nov. 2025
Revised: 8 Dec. 2025
Accepted: 9 Mar. 2026
ePublished: 1 Apr. 2026

Keywords: Oral health, Dental health surveys, Pregnancy, Pregnant women, Birth weight, Infant, Low birth weight

Abstract

Introduction: Maternal oral health has increasingly been recognized as an important component of prenatal care, with emerging evidence suggesting that poor oral and dental conditions may contribute to adverse pregnancy outcomes.
Objectives: This study investigates whether an oral and dental health assessment score can serve as a predictive indicator of low birth weight (LBW) among postpartum mothers.
Materials and Methods: This diagnostic cross-sectional study was conducted among 76 postpartum mothers referred to Sabalan Hospital in Ardabil, Iran, between September 2024 and April 2025. Participants were selected through simple random sampling and classified into LBW (<2500 g) and normal birth weight (≥2500 g) groups. Demographic and obstetric data were collected through interviewer-administered questionnaires and medical record review, while maternal oral and dental health status was assessed by a trained dentist using a standardized oral health risk assessment questionnaire for pregnant women, with higher scores indicating poorer oral health. The association between oral and dental health and LBW was assessed using statistical tests.
Results: The study enrolled 76 mothers, comprising 37 who had delivered a low-birth-weight infant and 39 whose infants were classified as normal birth weight. The findings showed that higher oral and dental health scores were strongly associated with increased odds of LBW in both unadjusted and adjusted regression models, with odds ratios of 1.26 and 1.25, respectively. Diagnostic analysis further demonstrated that the oral health score had acceptable discriminatory performance, with cutoffs of 4.5, 6.5, and 8.5 yielding sensitivities of 78%, 67%, and 62% and specificities of 72%, 77%, and 93%, respectively, reflecting a progressive shift from greater case detection to stronger rule-out capability as the threshold increased.
Conclusion: The findings indicate that poorer maternal oral and dental health is an independent predictor of LBW and may serve as a useful screening indicator.

Citation: Azimzadeh Moghaddam Y. Oral and dental health as a predictor of low birth weight; a diagnostic cross-sectional study. J Prev Epidemiol. 2026;11(2):e39309. doi: 10.34172/jpe.39309.

Introduction

Low birth weight (LBW), defined as a birth weight below 2,500 grams, remains a major global public health concern due to its strong association with neonatal morbidity, impaired growth, and long-term developmental complications (1-3). Epidemiological evidence indicates that LBW contributes substantially to infant mortality and increases susceptibility to chronic diseases later in life (4-6). Numerous maternal factors, including nutritional status, systemic inflammation, and socioeconomic determinants, have been implicated in the etiology of LBW (7-9). Understanding modifiable maternal risk factors is therefore essential for improving perinatal outcomes.

Oral and dental health during pregnancy has emerged as a significant maternal factor influencing systemic health (10,11). Periodontal disease, characterized by chronic inflammation of the supporting structures of the teeth, has been associated with elevated systemic inflammatory markers and adverse pregnancy outcomes (11,12). Pregnant individuals frequently experience changes in oral microbial composition, gingival inflammation, and salivary alterations, which may exacerbate pre-existing oral conditions (13,14). Evidence suggests that poor oral hygiene and periodontal inflammation may contribute to systemic inflammatory burden, thereby influencing fetal development (15,16).

A growing body of research supports a correlation between maternal oral health and LBW. Studies have demonstrated that periodontal disease is associated with increased risk of preterm birth and LBW, potentially mediated by inflammatory pathways and hematogenous spread of oral pathogens (12,16,17). For example, Temur et al reported that maternal periodontal parameters and inflammatory biomarkers

Key point

These findings highlight the importance of integrating maternal oral and dental health assessment into routine prenatal care, as poorer oral health functions as an independent predictor of low birth weight (LBW). Incorporating simple oral-health screening tools during antenatal visits could help clinicians identify women at elevated risk earlier in pregnancy, enabling timely referral for dental evaluation and preventive interventions.

were significantly associated with preterm LBW outcomes, highlighting the diagnostic value of oral health assessment during pregnancy (17). Additionally, research on children born with very LBW has shown long-term alterations in oral health, including higher caries indices and altered salivary immune markers, suggesting a bidirectional relationship between birth weight and oral health across the life course (18). Collectively, these findings underscore the importance of investigating oral and dental health as potential predictors of LBW and support the need for diagnostic studies to clarify these associations.

Objectives

The objective of this diagnostic cross-sectional study was to examine whether maternal oral and dental health status, as assessed through a structured oral health risk assessment questionnaire for pregnant women, serves as a significant predictor of LBW. A secondary aim was to evaluate the diagnostic performance of the oral and dental health score, through measures such as sensitivity, specificity, and optimal cutoff points, in identifying mothers at increased risk of delivering a low-birth-weight infant.

Materials and Methods

Study design and participants

This study employed a diagnostic cross-sectional design and was conducted among postpartum mothers referred to Sabalan hospital in Ardabil, Iran, under the supervision of the Islamic Azad University, Ardabil Branch, between September 2024 and April 2025. During the study period, 76 eligible mothers were recruited using a simple random sampling strategy to ensure unbiased selection. Following enrollment, participants were categorized into two groups according to the recorded birth weight of their infants, as documented in standardized hospital delivery records. Infants weighing less than 2500 g were classified as having LBW (n = 37), whereas those weighing 2500 g or more were classified as having normal birth weight (n = 39), in accordance with established international criteria (19-21).

Inclusion and exclusion criteria

Mothers were considered eligible for inclusion if they had delivered a live singleton infant during the study period, had a documented birth-weight measurement obtained immediately after delivery, and were in the postpartum period with the capacity to provide informed consent. Cases were excluded if the infant presented with congenital anomalies or medical conditions known to independently affect birth weight, or if the mother was unable or unwilling to participate in the oral health assessment or complete the study questionnaire due to medical instability or refusal. Participants were also excluded when essential study variables, such as the oral and dental health score or recorded birth weight, were incomplete or missing.

Data collection

Data were collected from postpartum mothers who provided informed written consent. Eligible mothers of live singleton infants were recruited by a simple randomized sampling method. After obtaining informed consent, demographic and obstetric information (maternal age, birth order, and educational level) was gathered through a structured interviewer-administered questionnaire and review of medical files. Birth weight was obtained from standardized hospital delivery records, which were measured immediately after birth using calibrated digital neonatal scales routinely employed in the maternity ward. Infants were subsequently classified into two categories based on established World Health Organization criteria; LBW (<2500 g) and normal birth weight (≥2500 g) (19-21). Oral and dental health status was assessed for each mother by a trained dentist using a standardized clinical examination protocol. The oral and dental health score was calculated according to the oral health risk assessment questionnaire for pregnant women, with higher scores indicating poorer oral health.

Validity of measurement tools

The oral health risk assessment questionnaire for pregnant women is scored by assigning numerical values to responses that reflect the presence and severity of oral health risk factors across domains such as dental pain, hygiene behaviors, fluoride exposure, diet, pregnancy-related symptoms, and access to dental care. Items indicating higher risk, such as current dental pain, bleeding gums, infrequent brushing or flossing, high sugar intake, lack of fluoride exposure, or absence of a dental home, receive higher scores, whereas responses reflecting protective behaviors or absence of symptoms receive lower scores. The total score is calculated by summing item-level values, with higher overall scores indicating poorer oral and dental health status (22).

Outcome measurement

The primary outcome was assessing the correlation between the oral and dental health score assessed by the oral health risk assessment questionnaire for pregnant women and birth weight status. The secondary outcome involved determining the diagnostic performance of the oral and dental health score in predicting LBW.

Statistical analysis

Data analysis was performed using SPSS software, version 27 (IBM Corp., Armonk, NY, USA). The distribution of quantitative variables was assessed for normality using Shapiro–Wilk test. Descriptive statistics were reported as means and standard deviations for continuous variables and as frequencies and percentages for categorical variables. Comparisons between mothers of low-birth-weight and normal-birth-weight infants were conducted using the independent samples t-test for normally distributed quantitative variables and the Fisher's exact test for categorical variables, given the sample size distribution across categories. Logistic regression analysis was employed to examine the association between the oral and dental health score and birth weight status. Both univariate and multivariate models were constructed, with the adjusted model controlling for potential confounders, including maternal age and educational level. Results were expressed as odds ratios (ORs) with corresponding 95% confidence intervals (CIs). The diagnostic performance of the oral and dental health score in predicting LBW was evaluated using receiver operating characteristic (ROC) curve analysis. The area under the curve (AUC), optimal cutoff points, sensitivity, and specificity values were calculated to determine the discriminative ability of the score. A significance level of $P < 0.05$ was considered statistically meaningful for all analyses.

Results

The study included 76 mothers with a mean age of 29.24 ± 4.97 years, of whom 37 had an infant with LBW, and 39 had a normal birth weight. The results indicated that demographic and clinical characteristics were similar between mothers of infants with normal versus LBW, and no meaningful distinctions were found in birth order or maternal education across the two groups. Maternal age showed a slight tendency toward being higher among mothers of normal-weight infants, though not to a statistically convincing extent. The most notable contrast was observed in oral and dental health status, where mothers of low-birth-weight infants demonstrated markedly poorer conditions, reflecting a statistically robust difference that distinguishes the two groups (Table 1).

The regression analysis demonstrates a clear and consistent association between oral and dental health status and the likelihood of LBW. In the unadjusted model, the odds ratio indicates that each incremental increase in the oral health score corresponds to an estimated 26% elevation in the odds of delivering a low-birth-weight infant, reflecting a meaningful and statistically robust relationship. This association persists in the adjusted model, where controlling for potential confounders such as maternal age and educational level yields an odds ratio of 1.25, underscoring that poorer oral and dental health independently contributes to the risk of LBW (Table 2).

The diagnostic evaluation reveals that the oral and dental health score exhibits meaningful capacity for identifying low-birth-weight infants, with several cutoff points offering varying balances of sensitivity and specificity. At the lowest threshold of 4.5, the measure demonstrates relatively high sensitivity at 78% alongside a specificity of 72%, indicating a stronger detection of true low-birth-weight cases while maintaining moderate accuracy in identifying normal-weight infants. Increasing the cutoff to 6.5 shifts this balance, yielding a sensitivity of 67% and a specificity of 77%, reflecting a more even trade-off between correctly identifying affected infants and minimizing false positives. At the highest evaluated threshold of 8.5, sensitivity decreases to 62% while specificity rises substantially to 93%, suggesting that this cutoff is most effective for confidently ruling out normal-weight infants, albeit with reduced ability to detect all low-birth-weight cases (Table 3, Figure 1).

Discussion

The present study found that poorer maternal oral and dental status was independently associated with an increased likelihood of LBW. This observation aligns

Table 1. Demographic and clinical characteristics stratified by birth weight

Qualitative variables		Normal birth weight (n = 39)		LBW (n = 37)		Total (N = 76)		*P* value
		No.	%	No.	%	N		
Birth order	1st	13	50	13	50	26		0.917*
	2nd	14	43.75	18	56.25	32		
	3rd	4	44.4	5	55.6	9		
	4th	3	75	1	25	4		
	6th	3	60	2	40	5		
Mothers' education	Sub-diploma	11	45.8	13	54.2	24		0.094*
	Diploma	6	33.3	12	66.7	18		
	Associate degree	4	100	0	0	4		
	Bachelor's degree and higher	17	56.7	13	43.6	30		
Quantitative variables		**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	***P* value**
Mothers' age (year)		30.31	4.98	28.11	4.71	29.24	4.97	0.052**
Oral and dental health score		4.28	3.66	10.86	6.52	7.49	6.18	<0.001**

LBW: Low birth weight, SD: Standard deviation, *Fisher's exact test, **Independent t-test.

Table 2. The association of oral and dental health score with birth weight using logistic regression

Oral and dental health score	LBW versus normal birth weight		
	OR	95% CI	*P* value
Unadjusted*	1.26	1.12 – 1.40	<0.001
Adjusted*	1.25	1.11 – 1.41	<0.001

LBW: Low birth weight, OR: Odds ratio, CI: Confidence interval. *Univariate, **Multivariate for mothers' age and education.

Table 3. Diagnostic value of oral and dental health score in the diagnosis of LBW

	AUC (0-1)	95% CI		Cut Off	Sensitivity (%)	Specificity (%)	*P* value
		Lower	Upper				
Oral and dental health score	0.789	0.681	0.897	4.5	78	72	< 0.001
				6.5	67	77	
				8.5	62	93	

AUC: Area under the curve, CI: Confidence interval.

with a substantial body of evidence suggesting that maternal periodontal inflammation and inadequate oral hygiene contribute to adverse pregnancy outcomes. Previous research has shown that periodontal disease is associated with systemic inflammatory responses that can impact fetal growth and gestational duration. For example, Xiong et al reported that periodontal disease was significantly associated with increased risks of preterm birth and LBW, proposing that inflammatory mediators originating from periodontal tissues may enter systemic circulation and affect placental function (12). Evidence from a recent study by Temur et al further demonstrated that maternal periodontal parameters were correlated with inflammatory blood markers and were significantly associated with preterm LBW outcomes, suggesting that oral health assessments may serve as useful indicators of systemic inflammatory burden during pregnancy (17). Smitha et al stated that periodontitis showed a significant association with the occurrence of LBW infants (23).

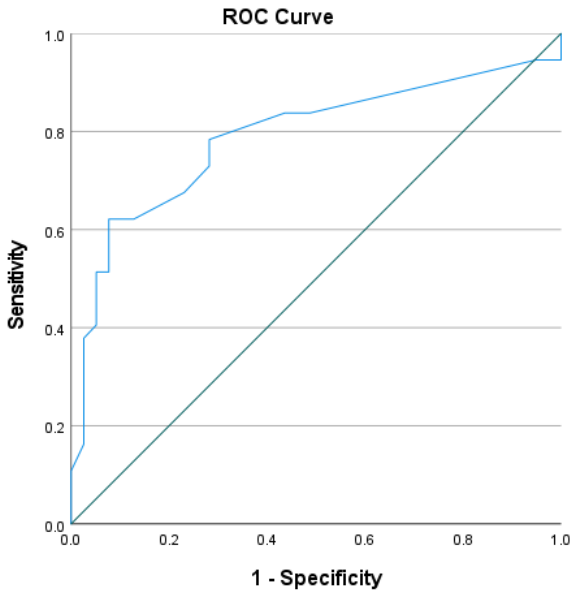

Figure 1. Oral and dental health score as a predictor of LBW using ROC curve analysis.

Cruz et al reported that periodontal disease may act as a contributing risk factor for the occurrence of LBW infants (24). A study conducted in Senegal reported a significant association between maternal periodontitis and the delivery of LBW infants (25). Systematic evaluations of the literature have also reported that periodontal disease appears to be linked with a heightened likelihood of adverse pregnancy outcomes (26). The biological plausibility of this association is supported by well-established mechanisms that link oral inflammation to systemic effects. Periodontal pathogens and their by-products can induce maternal immune activation, leading to elevated levels of pro-inflammatory cytokines such as interleukin-6 and tumor necrosis factor-α, which have been implicated in impaired placental development and fetal growth restriction (27). A systematic review by Teshome et al examined ten studies examining the link between periodontal disease and adverse birth outcomes, and nine of these investigations reported a positive association between maternal periodontal disease and an elevated risk of preterm birth, LBW, or combined preterm low-birth-weight outcomes, with odds ratios ranging from 2.04 to 4.19. Only one study found no significant relationship. In this review authors concluded that periodontal disease may contribute to the risk of preterm low-birth-weight delivery (28). In contrast, a case-control study conducted in Tanzania found that neither periodontal disease nor carious pulpal involvement appeared to contribute meaningfully to the risk of preterm delivery of LBW infants among Tanzanian-African mothers (29). The consistency between these findings and the results of the present study supports the growing recognition of oral health as an important component of prenatal care.

The practical implications of these findings are noteworthy. Given that oral and dental conditions are modifiable through preventive care, education, and timely treatment, integrating routine dental assessments into prenatal care may offer a feasible strategy for identifying women at elevated risk of adverse birth outcomes (30). This approach is supported by evidence from studies

showing that improving maternal oral hygiene and treating gingival inflammation during pregnancy can reduce the risk of preterm birth and LBW (12,17). The present study contributes to this literature by reinforcing the diagnostic value of maternal oral health status as a predictor of LBW. Nevertheless, further research is needed to clarify the extent to which targeted oral health interventions can directly influence birth weight outcomes, as well as to explore potential confounding factors such as nutrition, access to dental care, and broader social determinants of health.

Collectively, this study demonstrates that poor maternal oral and dental hygiene is independently associated with an increased likelihood of delivering an infant with LBW. These findings are consistent with previous research linking periodontal disease and oral inflammation to adverse pregnancy outcomes and support the inclusion of oral health assessments as part of comprehensive prenatal care. While the results highlight the potential value of oral health as a screening indicator for LBW risk, they also underscore the need for further studies to determine causal pathways and evaluate the effectiveness of preventive dental interventions during pregnancy.

Conclusion

These findings demonstrate that maternal oral and dental health is closely linked to birth-weight outcomes, with higher oral-health scores significantly increasing the likelihood of LBW and showing acceptable diagnostic performance across multiple cutoff points. The persistence of this association after adjustment for maternal age and education underscores that poor oral and dental health functions as an independent predictor of LBW. Collectively, the results suggest that incorporating maternal oral-health assessment into routine prenatal care may offer a valuable opportunity for early identification of at-risk pregnancies.

Limitations of the study

The relatively small sample size from a single hospital in Ardabil may restrict the generalizability of the findings to broader populations with different socioeconomic or healthcare contexts. Oral health assessments, although conducted by a trained dentist, may still be subject to observer variability, and the questionnaire-based scoring system relies partly on self-reported behaviors, which introduces the possibility of recall or social-desirability bias. Additionally, although key confounders such as maternal age and education were adjusted for, other influential factors, including nutritional status, systemic infections, or detailed socioeconomic indicators, were not fully captured, which may have resulted in residual confounding.

Acknowledgments

The authors express their sincere appreciation to the staff of Sabalan Hospital in Ardabil for their valuable cooperation and assistance during data collection. We also extend our gratitude to the participating mothers for their time and willingness to contribute to this research. The support provided by the Islamic Azad University, Ardabil Branch, in facilitating the implementation of this study is gratefully acknowledged.

Conflicts of interest

The author declares no conflict of interest.

Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declaration of generative artificial intelligence (AI) and AI-assisted technologies in the writing process

While preparing this work, the author utilized AI (Copilot and Grammarly) to refine grammar points and language style. Subsequently, the author thoroughly reviewed and edited the content as necessary, assuming full responsibility for the publication's content.

Ethical issues

The research was conducted under the tenets of the Declaration of Helsinki. This study was conducted at Sabalan Hospital and is derived from a research project by Yalda Azimzadeh Moghaddam with the Ethical code (IR.IAU.ARDABIL.REC.1403.069; https://ethics.research.ac.ir/form/2o7gdusglhalkrm5.pdf), approved by the Islamic Azad University – Ardabil Branch, Iran. Accordingly, written informed consent was taken from all participants. Besides, the author has ultimately observed ethical issues (including plagiarism, data fabrication, and double publication).

Funding/Support

The funding was supported by the Islamic Azad University – Ardabil Branch, Iran.

References

1. Dhivar NR, Gandhi R, Murugan Y, Vora H. Outcomes and Morbidities in Low-Birth-Weight Neonates: A Retrospective Study From Western India. Cureus. 2024;16:e61981. doi: 10.7759/cureus.61981.
2. Poudel K, Kobayashi S, Iwata H, Tojo M, Yamaguchi T, Yamazaki K, et al. Hokkaido birth cohort study in Japan on the growth trajectory of children born with low birth weight until 7 years of age. Early Hum Dev. 2024;189:105925. doi: 10.1016/j.earlhumdev.2023.105925.
3. Domellöf M. Meeting the Iron Needs of Low and Very Low Birth Weight Infants. Ann Nutr Metab. 2017;71 Suppl 3:16–23. doi: 10.1159/000480741.
4. Al Salmi I, Hannawi S. Birth Weight and Susceptibility to Chronic Kidney Disease. Saudi J Kidney Dis Transpl. 2020;31:717–26. doi: 10.4103/1319-2442.292305.
5. Lu X, Oda M, Ohba T, Mitsubuchi H, Masuda S, Katoh T. Association of excessive mobile phone use during pregnancy with birth weight: an adjunct study in Kumamoto of Japan Environment and Children's Study. Environ Health Prev Med. 2017;22:52. doi: 10.1186/s12199-017-0656-1.
6. Clark DC. Dairy and Growth, Latest Findings, and Lessons Learned. Food Nutr Bull. 2016;37 Suppl 1:S22–8. doi: 10.1177/0379572116629242.
7. Clark DC. Association of Dairy Protein Intake During Pregnancy with Birth Weight. Food Nutr Bull. 2018;39:S54–s9. doi: 10.1177/0379572118775824.
8. Alam MJ, Islam MM, Maniruzzaman M, Ahmed N,

Tawabunnahar M, Rahman MJ, et al. Socioeconomic inequality in the prevalence of low birth weight and its associated determinants in Bangladesh. PLoS One. 2022;17:e0276718. doi: 10.1371/journal.pone.0276718.
9. Broad J, Robertson RC, Evans C, Perussolo J, Lum G, Piper JD, et al. Maternal inflammatory and microbial drivers of low birthweight in low- and middle-income countries. Paediatr Int Child Health. 2024;44:79–93. doi: 10.1080/20469047.2024.2380974.
10. Testa A, Ganson KT, Jackson DB, Bojorquez-Ramirez P, Weiser SD, Nagata JM. Food insecurity and oral health care experiences during pregnancy: Findings from the Pregnancy Risk Assessment Monitoring System. J Am Dent Assoc. 2022;153:503–10. doi: 10.1016/j.adaj.2021.12.010.
11. Naavaal S, Brickhouse TH, Hafidh S, Smith K. Factors Associated with Preventive Dental Visits Before and During Pregnancy. J Womens Health (Larchmt). 2019;28:1670–8. doi: 10.1089/jwh.2018.7509.
12. Xiong X, Buekens P, Fraser WD, Beck J, Offenbacher S. Periodontal disease and adverse pregnancy outcomes: a systematic review. BJOG. 2006;113:135–43. doi: 10.1111/j.1471-0528.2005.00827.x.
13. Fujiwara N, Tsuruda K, Iwamoto Y, Kato F, Odaki T, Yamane N, et al. Significant increase of oral bacteria in the early pregnancy period in Japanese women. J Investig Clin Dent. 2017;8. doi: 10.1111/jicd.12189.
14. Rio R, Simões-Silva L, Garro S, Silva MJ, Azevedo Á, Sampaio-Maia B. Oral yeast colonization throughout pregnancy. Med Oral Patol Oral Cir Bucal. 2017;22:e144–e8. doi: 10.4317/medoral.21413.
15. Tattar R, da Costa BDC, Neves VCM. The interrelationship between periodontal disease and systemic health. Br Dent J. 2025;239:103–8. doi: 10.1038/s41415-025-8642-2.
16. Javaid MM, Khalid SN, Khan SA, Nasim H, Jawad Abbasi MM, Ahmad S, et al. Exploring the Influence of Oral Health on Pregnancy Outcomes: A Narrative Review: Oral Health and Pregnancy Outcomes. Glob Health Epidemiol Genom. 2025;2025:9304496. doi: 10.1155/ghe3/9304496.
17. Temur I, Temur KT, Dönertas SN, Dönertas AD, Kacmaz M. The relationship between maternal oral health parameters, inflammatory blood markers, and the evaluation of their effects on preterm low birth weight. BMC Pregnancy Childbirth. 2025;25:231. doi: 10.1186/s12884-025-07337-1.
18. Davidovich E, Borovitz Y, Sokolover N, Davidovits M, Barak-Mashal T, Polak D. The impact of very low birth weight on children's oral health in adolescence. Sci Rep. 2025;15:37709. doi: 10.1038/s41598-025-21530-4.
19. Paredes Mondragón CV, Molano Dorado H, Martínez Gómez SY, Ortiz Martínez RA, Arias Linthon S, López Benavides AC. Relationship Between the Absence of Adequate Social Support During Pregnancy and Low Birth Weight. Rev Colomb Psiquiatr (Engl Ed). 2019;48:140–8. doi: 10.1016/j.rcp.2017.11.002.
20. Figueiredo A, Gomes-Filho IS, Batista JET, Orrico GS, Porto ECL, Cruz Pimenta RM, et al. Maternal anemia and birth weight: A prospective cohort study. PLoS One. 2019;14:e0212817. doi: 10.1371/journal.pone.0212817.
21. Yaya S, Odusina EK. Association between household second-hand smoke and low birth weight in sub-Saharan Africa. PLoS One. 2025;20:e0330214. doi: 10.1371/journal.pone.0330214.
22. Battani K, Holt K. The partnership for integrating oral health care into primary care project 2019-2021: final report. National Maternal and Child Oral Health Resource Center; 2022.
23. Smitha K, Mohammed F, Basavraj S. Maternal periodontal status and risk of adverse pregnancy outcomes a case control study on Indian mothers. Natl J Integr Res Med. 2013;4:82–90.
24. Cruz SS, Costa Mda C, Gomes Filho IS, Vianna MI, Santos CT. [Maternal periodontal disease as a factor associated with low birth weight]. Rev Saude Publica. 2005;39:782–7. doi: 10.1590/s0034-89102005000500013.
25. Cisse D, Diouf M, Faye A, Diadhiou M, Tal-Dia A. Periodontal disease of pregnant women and low weight Newborn in Senegal: a case-control study. Open J Epidemiol. 2015;5:1–8. doi: 10.4236/ojepi.2015.51001.
26. Xiong X, Buekens P, Vastardis S, Yu SM. Periodontal disease and pregnancy outcomes: state-of-the-science. Obstet Gynecol Surv. 2007;62:605–15. doi: 10.1097/01.ogx.0000279292.63435.40.
27. Kim MY, Pang EK. Relationship between periodontitis and systemic health conditions: a narrative review. Ewha Med J. 2025;48:e27. doi: 10.12771/emj.2025.00101.
28. Teshome A, Yitayeh A. Relationship between periodontal disease and preterm low birth weight: systematic review. Pan Afr Med J. 2016;24:215. doi: 10.11604/pamj.2016.24.215.8727.
29. Mumghamba EG, Manji KP. Maternal oral health status and preterm low birth weight at Muhimbili National Hospital, Tanzania: a case-control study. BMC Oral Health. 2007;7:8. doi: 10.1186/1472-6831-7-8.
30. George A, Johnson M, Blinkhorn A, Ajwani S, Bhole S, Yeo AE, et al. The oral health status, practices and knowledge of pregnant women in south-western Sydney. Aust Dent J. 2013;58:26–33. doi: 10.1111/adj.12024.