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Association between breastfeeding and periodontitis in US women: a cross-sectional study

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BOSTON UNIVERSITY
HENRY M. GOLDMAN SCHOOL OF DENTAL MEDICINE

THESIS

**ASSOCIATION BETWEEN BREASTFEEDING AND
PERIODONTITIS IN US WOMEN: A CROSS-SECTIONAL STUDY**

by

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DEDICATION

I would like to dedicate this work to my beautiful family, whose love and support continue to inspire me every day—especially my husband, Bader, and our adorable son, Abdulmohsen. Becoming a mother has been a wonderful journey, one that constantly brings out the best in me.

ACKNOWLEDGMENTS

I would like to express my heartfelt gratitude to my dear friend and mentor, Dr. Hager El Shaafi, BDS, MPH, DScD, for her unwavering support and invaluable feedback throughout this journey. Her guidance, encouragement, and thoughtful insights have greatly contributed to the development and completion of this research.

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Boston University, Henry M. Goldman School of Dental Medicine, 2025

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ABSTRACT

Objectives Despite growing evidence of breastfeeding’s benefits for maternal and child health, its impact on periodontal health remains understudied. This study examined the association between breastfeeding and periodontitis among parous U.S. women aged 30 and older.

Methods A cross-sectional analysis was conducted using NHANES 2009–2012 data. The sample included women aged ≥ 30 who had given birth. Periodontal status (present/absent) was the outcome variable. The main exposure was self-reported breastfeeding for at least one month (“yes” or “no”). Women with missing periodontal data were excluded. Logistic regression accounting for NHANES complex sampling design was used to assess the association, adjusting for confounders.

Results Among the 2,683 participants, 572 women (49%) who did not breastfeed were found to have periodontal disease upon examination, compared to 692 women (32%) who had reported a history of breastfeeding for at least one month and had periodontal disease. After adjusting for confounding variables, a significant inverse association

between breastfeeding and periodontitis was observed, with an OR of 0.7 (95% CI: 0.5–0.9, $p = 0.005$).

Conclusions Breastfeeding for at least one month was associated with a 30% lower prevalence of periodontitis. These findings suggest that promoting breastfeeding may contribute to reducing periodontal disease burden and support the integration of maternal oral health education into public health strategies.

PREFACE

This thesis was inspired by my personal experience with breastfeeding—a journey I had to end sooner than I had hoped, despite understanding its many benefits. As a dentist and a new mother, I couldn't ignore the lingering questions I had about my own oral health during the postpartum period.

While the benefits of breastfeeding for infants are well-documented, I was struck by how little research existed on its effects on maternal oral health. This gap in the literature—and my desire to understand it—led me to this project. Through this work, I hope to contribute to a more complete understanding of the breastfeeding experience, one that includes the mother's well-being too.

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LIST OF ABBREVIATIONS

- BU Boston University
- FMPE Full-Mouth Periodontal Examination
- MEC Mobile Exam Center
- NHANES National Health and Nutrition Examination Survey
- PHQ Patient Health Questionnaire
- PIR Poverty Income Ratio

GLOSSARY

Breastfeeding: The act of feeding an infant directly from the breast. It involves both the secretion of milk and the infant's suckling.

Lactation: The physiological process by which the mammary glands produce and secrete milk, regardless of whether the infant is fed directly from the breast.

Nursing: A general term often used interchangeably with breastfeeding, referring to the practice of feeding an infant at the breast.

Note:

Although lactation, nursing, and breastfeeding have distinct definitions, in the context of this research, all three terms are used synonymously to mean breastfeeding—the act of feeding an infant from the breast.

INTRODUCTION

I. Background information

Pregnancy induces a spectrum of physical, mental, and emotional changes in women, making them susceptible to oral health problems due to heightened stress sensitivity and lower resistance to infections. The gestational period is marked by increased vulnerability to oral diseases, influenced by several factors such as plaque accumulation, hormonal changes, education level, and pre-pregnancy oral care (Yenen & Ataçağ, 2019).

Breastfeeding, also referred to as nursing, involves feeding an infant with milk directly from the mother's breast. While breastfeeding is acknowledged for its diverse health benefits for both infants and mothers, its association with maternal oral health remains relatively unexplored. Breastfeeding is known to mitigate maternal risks of various conditions, including breast cancer, ovarian cancer, diabetes, hypertension, cardiovascular disease, and postpartum depression, aligning with the World Health Organization's recommendation for exclusive breastfeeding for the first six months and continued breastfeeding for up to two years (Ip et al., 2007; Chung et al., 2008; Gouveri et al., 2011; Salone, Vann, & Dee, 2013; Wang et al., 2023).

Periodontal disease is a complex, noncommunicable inflammatory condition caused by pathogenic plaque biofilm that affects the gums, bone, and alveolar bone, leading to bleeding gums, periodontal pockets, loss of attachment, and potentially tooth loss, and is also associated with various systemic diseases such as breast cancer,

cardiovascular disease, diabetes, hypertension, Alzheimer's disease, and depression (Khajuria, Zahra, & Razdan, 2018; WHO, 2022).

Despite extensive research on breastfeeding's positive impacts on maternal health, there exists a significant knowledge gap concerning its potential effects on periodontal health. To our knowledge, only three previous studies have delved into this relationship, with inconsistent findings and limitations such as overlooking confounding factors and inconsistent breastfeeding period classifications (Heo & Lee, 2018; Romandini et al., 2020; Wang et al., 2023).

Some studies suggest that breastfeeding or lactation reduces the risk of periodontal disease. For instance, Wang et al. observed that longer durations of breastfeeding were significantly associated with a decreased risk of periodontitis (Wang et al., 2023). In contrast, other studies have found the opposite relationship, indicating that longer periods of lactation may increase the risk of periodontitis. Romandini et al. found that periodontitis was independently linked to longer durations of lactation (Romandini et al., 2020). The authors also noted an inverse relationship between periodontitis and a history of artificial menopause, as well as early and late menopausal ages (Romandini et al., 2020). Similarly, Heo SY and Lee EH reported that the prevalence of periodontal disease significantly increased with longer lactation periods and a higher number of children breastfed (Heo & Lee, 2018).

Additionally, these studies focused exclusively on Korean women, raising concerns about the relevance of their conclusions when considering the diverse population experiences in the United States. Also, the reference studies used the

Community Periodontal Index (CPI) to assess periodontal health, which may result in outcome misestimation due to its simplified scoring system and reliance on index teeth rather than a full-mouth examination (Brito et al., 2022). This approach can underestimate or misclassify disease severity by overlooking localized issues and using broad diagnostic categories. Additionally, variability in examiner calibration may further compromise accuracy (Brito et al., 2022). A more comprehensive method, such as a full-mouth periodontal examination (FMPE), provides a precise and reliable assessment of periodontal health, reducing these limitations. Furthermore, none of the studies considered diet as a potential variable, leaving a crucial aspect unexplored.

II. Objectives

We aim through this research to assess the impact of breastfeeding on periodontal health in nursing women within the US population, which holds both scientific and social implications. By investigating the association and considering the Healthy Eating Index (HEI) as a potential contributing factor, this study strives to contribute valuable insights to oral health education for nursing women, addressing a significant research gap and emphasizing the importance of a comprehensive approach to maternal well-being.

METHODS

I. Data and participants

For this study, we utilized data from the National Health and Nutrition Examination Survey (NHANES). Specifically, we analyzed secondary data from two NHANES 2-year survey cycles: 2009–2010 and 2011–2012, collectively referred to as

NHANES 2009–2012. These two cycles were selected for several reasons. First, the full-mouth periodontal examination (outcome variable) was only conducted in three cycles (2009–2010, 2011–2012, and 2013–2014). Second, the question used in this study to identify the explanatory variable of breastfeeding experience was only included in the 2009–2012 cycles and was discontinued in 2013–2014. Further details regarding the explanatory variable will be provided in the relevant section below. NHANES employs a stratified multistage probability sampling design to obtain a nationally representative sample of the civilian noninstitutionalized population across the 50 US states and the District of Columbia. Each year, approximately 5,000 individuals are surveyed, with a total of 20,293 participants in the NHANES 2009–2012 cycles.

We included parous women aged 30 years and older who reported their breastfeeding status in their lifetime, which served as the explanatory variable. NHANES does not include periodontal examinations for individuals younger than 30 years, and eligibility for the periodontal examination was restricted to adults who had at least one natural tooth and no health conditions requiring antibiotic prophylaxis before periodontal probing. Participants who lacked information on periodontal disease status, the outcome variable, were excluded from the final analysis. After applying these inclusion criteria, the final sample size was 2,683 participants. The detailed inclusion criteria for the analyzable sample are illustrated in **Figure 1**.

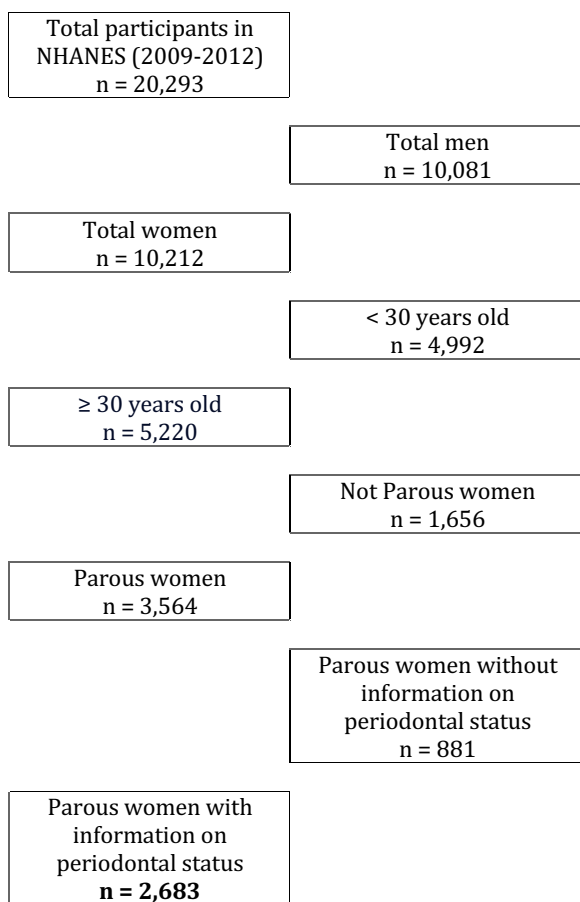


Figure 1. Analyzable Sample Flowchart

II. Outcome Variable

The presence or absence of periodontitis was the outcome variable. Eligibility for the NHANES periodontal examination was restricted to adults 30 years or older who had 1 or more natural teeth and no health conditions requiring antibiotic prophylaxis before periodontal probing. The full-mouth periodontal examination (FMPE) was performed by a calibrated dentist who assessed the periodontal status of the participants. Periodontal examinations comprised probing depths (PD) and clinical attachment loss (AL) at the mobile exam center (MEC). Following the protocol described by Eke and colleagues in the Journal of Periodontology, the FMPE involves collecting probing measurements from six sites per tooth around all teeth, excluding third molars (Eke et al., 2016). Severe periodontitis was defined as having two or more interproximal sites with AL of 6 mm or more (not on the same tooth) and one or more interproximal sites with PD of 5 mm or more. Moderate periodontitis was defined as having two or more interproximal sites with AL of 4 mm or more (not on the same tooth) or two or more interproximal sites with PD of 5 mm or more (not on the same tooth). Mild periodontitis was defined as having two or more interproximal sites with AL of 3 mm or more, and two or more interproximal sites with PD of 4 mm or more (not on the same tooth) or one site with PD of 5 mm or more. We recategorized periodontitis into two categories: yes (indicating the presence of mild, moderate, or severe periodontitis) and no (indicating the absence of periodontitis).

III. Explanatory variable

Breastfeeding status was used as the explanatory variable. The reproductive health questionnaire of NHANES includes two questions regarding breastfeeding experience for women over 20 years of age. One of these questions, "*Now breastfeeding a child?*" only includes responses from women aged 44 years and younger. The other question "*Have you breastfed any child for at least 1 month?*" did not have age restrictions and was utilized in this study in order to maintain a larger study sample for analysis. This question has a binary response: 'yes' or 'no', with the latter serving as the reference group.

IV. Study variables

We examined 14 covariates potentially associated with breastfeeding and periodontitis, including age, race/ethnicity, household income, education, smoking, alcohol consumption, oral contraceptive use, sleep duration, self-reported oral health, flossing frequency, history of periodontal treatment, diabetes, hypertension, and depression severity. These covariates were grouped into three categories: socio-educational factors, health behaviors, and medical-dental factors.

Socio-demographic characteristics included age (categorized as 30-39, 40-49, and 50+), race/ethnicity (Non-Hispanic White, Non-Hispanic Black, Hispanic, and Multiracial), household income level (determined by the poverty income ratio [PIR] while applying the appropriate thresholds that are updated annually by the US Census Bureau (U.S. Census Bureau, 2024) and categorized as low income [PIR <1.39], middle

income [PIR ≥ 1.39 to < 3.99], and high income [PIR ≥ 3.99]), and education (11th grade or less, high school graduate or equivalent, and university/college or higher).

Health behaviors encompassed dental floss use (yes or no), sleep duration (categorized as ≤ 6 hours [less than ideal], 7-8 hours [recommended], and ≥ 9 hours), and oral contraceptive (OC) use (yes or no). Smoking status was based on two questions: "*Have you smoked at least 100 cigarettes in your lifetime?*" and "*Do you currently smoke cigarettes?*" with participants classified as 'current smokers' if they answered yes to both questions, 'former smokers' if they answered yes to the first question but no to the second, and 'never smokers' if they answered no to both questions.

Dietary quality was assessed using the Healthy Eating Index (HEI), a comprehensive measure of adherence to the Dietary Guidelines for Americans (DGA) (Shams-White et al., 2023). HEI was derived from NHANES dietary data, which includes 24-hour dietary recalls collected using computer-assisted dietary interview software. Nutrient values for each food were assigned according to the United States Department of Agriculture (USDA) Food and Nutrient Database for Dietary Studies (Cogswell et al., 2018).

The HEI-2015 consists of 13 dietary components, including nine adequacy components (e.g., total fruit, whole grains, dairy, and fatty acids) and four moderation components (e.g., refined grains, sodium, added sugars, and saturated fats). Scores for adequacy components increase with higher intakes, while scores for moderation components increase with lower intakes. Each component has a maximum score of 5 or

10 points, and the total possible HEI score is 100, with higher scores indicating better adherence to dietary guidelines (USDA, 2023).

Medical-dental variables included self-rated oral health (recategorized to poor [fair, poor] or good [excellent, very good, good]); history of periodontal treatment (categorized as yes or no) based on the question “*ever had treatment for gum disease such as scaling and rootplaning, sometimes called "deep cleaning"?*”; Diabetes Mellitus (DM) and hypertension statuses were determined by participants' responses to questions regarding previous diagnoses of these conditions by a healthcare professional; Of note the NHANES data did not differentiate between type 1 or type 2 diabetes so all were grouped under diabetes. DM categorized as yes (including those with borderline diabetes) or no; hypertension, categorized as yes or no. Depression severity assessed using the NHANES mental health depression screener replicating the Patient Health Questionnaire [PHQ-9] (categorized as minimal [0-4], mild to moderate [5-9], and moderately severe to severe [10-27]) (Kroenke, Spitzer, & Williams, 2001).

V. Statistical analysis

Descriptive characteristics of all variables are presented as unweighted values (N), complex sample-based weighted percentages (%), and p-values. The association between breastfeeding status and periodontitis was tested using logistic regression analysis in a complex sample framework, adjusting for potential confounders. Three models were constructed. Model 1 adjusted for sociodemographic factors (age, race and ethnicity, income, education level); Model 2 further adjusted for behavioral factors (HEI,

flossing, smoking status, sleep duration, OC); and Model 3 additionally adjusted for medical-dental factors (hypertension, DM, depression severity, self-rated OH, history of periodontal treatment).

After adjusting for confounders, the association between breastfeeding duration and periodontitis was analyzed and determined. A p-value of less than 0.05 denoted statistical significance for all tests. All analyses were performed using SAS version 9.4.

RESULTS

A total of 3,564 women aged ≥ 30 who had given birth participated in the survey. Of these, 881 participants lacked periodontal status information, resulting in an analyzed sample of 2,683 parous women. **Table 1** presents the baseline characteristics of the participants, including demographics, health behavior, and medical-dental factors. There were no significant differences between the two groups of women in terms of flossing, alcohol consumption, sleep duration, depression severity, and history of periodontal treatment (*p-value* ≥ 0.05). The remaining variables displayed significant differences (*p-value* < 0.05) between the two groups of women, indicating potential confounders.

Women who did not breastfeed had a higher prevalence of periodontal disease (49%) compared to women who breastfed (32%), suggesting that breastfeeding may be associated with a lower risk of periodontal disease. Breastfeeding women had a slightly higher mean HEI scores, out of a total of 100, for women who did not breastfeed (58 and 54, respectively). Women who breastfed tended to be younger than 49 years old, while those older than 50 were less likely to have breastfed.

The majority of participants were non-Hispanic whites, with an equal distribution (69%) between those who breastfed and those who did not. Breastfeeding was more prevalent among Hispanic women (16%) but significantly less prevalent among non-Hispanic Black women (8%). Conversely, the inverse trend was observed in the non-breastfeeding group, with 8% being Hispanic and 18% being non-Hispanic Black.

Women in the middle-income level were equally represented in both groups. However, among women who breastfed, the highest proportion was in the higher income level (38%), while the lowest proportion of breastfeeding was in the lower income level (25%). Breastfeeding was more prevalent among women with the highest educational attainment (70%) compared to those who did not breastfeed (49%).

Breastfeeding and smoking status showed statistically significant associations. Women who breastfed were more likely to never smoke (66%), while those who did not breastfeed had higher prevalence of some form of tobacco exposure (54%). Nursing women reported better oral health (78%) compared to the non-breastfeeding group (72%). Additionally, diagnoses of diabetes (15%) and hypertension (44%) were more prevalent among women who did not breastfeed compared to those who breastfed (10% and 28%, respectively).

Table 2 presents the multivariate association between breastfeeding and periodontitis. Across all statistical models, women who breastfed for at least 1 month in their lifetime had at least a 30% lower prevalence of periodontitis compared to women who did not breastfeed at all. Specifically, in Model 1, the adjusted odds ratio (aOR) was 0.6 [95% CI: 0.5-0.8]; in Model 2, the aOR was 0.6 [95% CI: 0.5-0.8]; and in Model 3,

the aOR was 0.7 [95% CI: 0.5-0.9]. The association was statistically significant ($P < 0.05$) in all models.

Table 1 General characteristics of participants according to Breastfeeding Status (explanatory variable), NHANES 2009-2012.

| Variable | By breastfed child at least 1 month in lifetime | | | | P-value |
|---|---|------------|--------------------------------|------------|-------------------|
| | Yes | | No | | |
| | Unweighted N | Weighted % | Unweighted N | Weighted % | |
| Periodontitis (n=2683) | | | | | <0.0001 |
| Absent | 932 | 68 | 487 | 51 | |
| Present | 692 | 32 | 572 | 49 | |
| Healthy Eating Index (n=2683) Mean \pm SD (Min – Max) | 58.27 \pm 13.47 (17.01 – 94.20) | | 54.06 \pm 13 (21.56 – 89.90) | | < 0.05 |
| Age (n=2683) | | | | | <0.0001 |
| 30-39 | 381 | 24 | 163 | 16 | |
| 40-49 | 417 | 28 | 221 | 21 | |
| \geq 50 | 826 | 48 | 675 | 63 | |
| Race/Ethnicity (n=2683) | | | | | <0.0001 |
| Non-Hispanic White | 666 | 69 | 471 | 69 | |
| Non-Hispanic Black | 249 | 8 | 341 | 18 | |
| Hispanic | 526 | 16 | 187 | 8 | |
| Multiracial† | 183 | 7 | 60 | 5 | |
| Household Income (n=2683) | | | | | 0.002 |
| Lowest | 650 | 25 | 471 | 33 | |
| Middle | 553 | 37 | 372 | 37 | |
| High | 421 | 38 | 216 | 30 | |
| Education Level (n=2677) | | | | | <0.0001 |
| \geq Elemental school | 431 | 15 | 268 | 19 | |
| Middle | 252 | 15 | 322 | 32 | |
| High School | 937 | 70 | 467 | 49 | |
| Flossing (n=2643) | | | | | 0.8 |

| | | | | | |
|--|------|----|-----|----|------------------|
| No | 419 | 21 | 300 | 22 | |
| Yes | 1185 | 79 | 739 | 78 | |
| Smoking (n=2683) | | | | | <0.000 |
| | | | | | 1 |
| Never | 1124 | 66 | 597 | 54 | |
| Former | 185 | 11 | 224 | 20 | |
| Current | 315 | 23 | 238 | 26 | |
| Oral Contraceptive (n=2683) | | | | | 0.5 |
| No | 453 | 22 | 284 | 23 | |
| Yes | 1171 | 78 | 775 | 77 | |
| Sleep Duration (n=2682) | | | | | 0.3 |
| ≤6 hours | 630 | 34 | 451 | 37 | |
| 7-8 hours | 884 | 60 | 536 | 56 | |
| ≥9 hours | 109 | 7 | 72 | 7 | |
| Depression Severity (n=2661) | | | | | 0.2 |
| Minimal | 1170 | 76 | 719 | 72 | |
| Mild-Moderate | 261 | 16 | 194 | 17 | |
| Severe | 180 | 8 | 137 | 11 | |
| Self-Rated Oral Health (n=2640) | | | | | 0.007 |
| Poor | 475 | 22 | 378 | 28 | |
| Good | 1126 | 78 | 661 | 72 | |
| Periodontal Treatment (n=2629) | | | | | 0.2 |
| No | 1186 | 78 | 772 | 75 | |
| Yes | 410 | 22 | 261 | 25 | |
| Diabetes Mellitus (n=2681) | | | | | 0.008 |
| No | 1401 | 90 | 870 | 85 | |
| Yes | 222 | 10 | 188 | 15 | |
| Hypertension (n=2680) | | | | | <0.000 |
| | | | | | 1 |
| No | 1086 | 72 | 548 | 56 | |
| Yes | 535 | 28 | 511 | 44 | |

Table 2 Multiple Logistic Regression models for the association between Breastfeeding Status and the presence or absence of Periodontitis, NHANES 2009-2012

| | Odds Ratio (95% Confidence Interval) | | | |
|---------------|---|--------------------------|--------------------------|--------------------------|
| | Crude | Model¹ | Model² | Model³ |
| Breastfeeding | <i>N</i> = 2683 | <i>N</i> = 2677 | <i>N</i> = 2636 | <i>N</i> = 2597 |
| No | Reference | Reference | Reference | Reference |
| Yes | 0.5 (0.4-0.6) | 0.6 (0.5-0.8) | 0.6 (0.5-0.8) | 0.7 (0.5-0.9) |

¹Model 1 Adjusted for sociodemographic factors (age, race and ethnicity, income, education)

²Model 2 Further Adjusted for behavioral factors (HEI, flossing, smoking, OC, sleep duration)

³Model 3 Additionally Adjusted for medical-dental factors (hypertension, DM, depression severity, self-rated OH, history of periodontal treatment)

Bold denotes $\sim P < 0.05$

DISCUSSION

This study explored the relationship between breastfeeding and periodontitis. The multivariable analysis findings revealed that women who breastfed for at least one month had a reduced risk of periodontitis compared to those who did not breastfeed, by at least 30%. Breastfeeding may offer protective benefits for periodontal health through various biological mechanisms linked to hormonal changes. The periodontium, being sensitive to fluctuations in sex hormones like estrogen and prolactin, can be influenced by breastfeeding, which increases prolactin levels (Romandini et al., 2020). Prolactin has been shown to impact the RANK/RANKL/OPG system, which regulates bone metabolism, potentially affecting alveolar bone health. Additionally, breastfeeding may modulate immune responses and alter the periodontal microbiota, contributing to a more favorable inflammatory environment (Romandini et al., 2020).

Our study findings align with previous research conducted on Korean women, highlighting the continued relationship between breastfeeding and a reduced risk of periodontitis despite differences in study populations. A study by Wang et al. observed that a longer duration of breastfeeding was significantly linked with a decreased risk of periodontitis among women aged 50–59 ($P < 0.05$). Specifically, compared to women in the same age group who never breastfed, those who breastfed had 1.6 times lower odds of developing periodontitis (Wang et al., 2023). This consistency in findings across diverse populations, such as those in the US and Korea, strengthens the evidence supporting the beneficial effects of breastfeeding on oral health (Wang et al., 2023; Heo & Lee, 2018).

Consistent with our findings, younger maternal age, higher educational attainment (college or higher), and positive health behaviors such as non-smoking were associated with better oral health status; additionally, a better subjective health status was linked to improved periodontal status (Vogt et al., 2010; Kotha et al., 2017).

Although the correlation between depression and breastfeeding was not found to be significant in our analysis, we initially wanted to explore this factor in reference to recent literature. A comprehensive meta-analysis, including data from 18,570 women across six countries, found that breastfeeding reduced the odds of postpartum depression (PPD) by 14%, with exclusive breastfeeding (EBF) for more than one month showing even stronger benefits (37% reduction) (Xia et al., 2022). This protective effect may be linked to hormonal changes, such as increased prolactin and oxytocin levels, both of which have antidepressant effects (Xia et al., 2022). Prolactin, not only supports mental health but also plays a role in periodontal health, as mentioned earlier, by influencing the

RANK/RANKL/OPG system, which regulates bone metabolism and may help maintain alveolar bone health (Romandini et al., 2020). Oxytocin, also known as the "love hormone," has well-established roles in reproduction and social behavior, but recent studies highlight its influence on bone metabolism, linking breastfeeding to overall physiological and mental well-being, in addition to promoting oral health (Romandini et al., 2020; Xia et al., 2022; Breuil, Trojani, & Ez-Zoubir, 2021).

Women with shorter sleep duration postpartum experienced fatigue and physical stress by the fifth day after childbirth (Kawashima, Detsuka, & Yano, 2022). A study by Kim et al. found that individuals sleeping less than eight hours had poorer oral health, attributing this to changes in saliva and the oral environment caused by inadequate sleep, which can lead to oral diseases such as periodontal disease and dental caries (Kim, Park, & Nho, 2021). However, in our study, sleep duration did not differ significantly between the two groups of women.

The finding that breastfeeding is associated with slightly higher Healthy Eating Index (HEI) scores, relates to broader dietary patterns observed in women during lactation. According to the Dietary Guidelines for Americans, women who are pregnant or lactating generally have better diet quality (HEI scores of 62-63) compared to their non-pregnant or non-lactating peers (average score of 54) (Shams-White et al., 2023). However, despite this improvement, dietary intakes often fall short of recommendations, with excessive consumption of added sugars, saturated fats, and sodium, and insufficient intake of critical nutrients like calcium, vitamin D, potassium, and dietary fiber .

From a dental public health perspective, this finding highlights a significant opportunity to integrate dietary counseling into maternal care to improve both oral and systemic health outcomes. The slightly higher HEI scores in breastfeeding women suggest that lactation may encourage healthier dietary habits, potentially reducing the intake of cariogenic foods and beverages. Addressing the nutrient deficiencies noted in lactating women, such as calcium and vitamin D, is particularly relevant as these nutrients play a crucial role in maintaining oral health, including bone and periodontal integrity (Nascimento et al., 2022; Liang et al., 2023).

Public health initiatives targeting nursing women could highlight the diverse benefits of breastfeeding, including its protective effect on periodontal health and its role in promoting better dietary patterns. Integrating maternal nutrition strategies with oral health promotion—such as reducing added sugar consumption and encouraging nutrient-rich food intake—can mitigate diet-related oral diseases like periodontitis and dental caries while supporting overall maternal and child health.

Breastfeeding offers significant public health value, benefiting both infant health and maternal well-being. Promoting exclusive and prolonged breastfeeding aligns with public health goals of enhancing maternal health outcomes and reducing the prevalence of chronic diseases. By positioning breastfeeding as a preventive measure, healthcare professionals can improve the quality of life for mothers and infants and lower healthcare costs related to conditions like postpartum depression and periodontal disease. Educating and supporting breastfeeding practices through public health initiatives is essential for fostering healthier populations and achieving long-term, multi-generational benefits.

I. Limitations

This study has several limitations. First, the reproductive health questionnaire in NHANES 2009-2012 included only two questions on breastfeeding. One of these questions, which was not utilized in this study, had an age restriction up to 44 years, potentially compromising the sample size. Consequently, we could not investigate “current breastfeeding” in relation to periodontal status and compare across different breastfeeding statuses (never and former).

Second, we were unable to determine the effect of breastfeeding duration on periodontal health and compare those who breastfed for 11 months or less, those who breastfed for 12 months or more, and those who never breastfed. Despite this, we still found a significant benefit of breastfeeding on periodontal health. Third, participation in the questionnaire was subject to memory bias, potentially leading to inaccuracies. This potential bias could not be ruled out because participants with missing periodontal data were excluded. Fourth, the cross-sectional study design limits our ability to explain causal relationships.

Despite these limitations, this study has several strengths. First, unlike previous studies that focused exclusively on Korean women, this study provides a better representation and relationship with different populations, given the diverse socio-demographics and cultural diversity of the US population. Second, we used a large national dataset and analyzed a sufficient number of study participants. Third, our study is meaningful as it identifies factors related to periodontal health in women, considering

this topic focusing on oral health among lactating women is understudied; therefore, our findings support the importance of maternal oral health education.

II. Future Directions

An important future direction for this research is to conduct a cohort study to explore the relationship between maternal breastfeeding and periodontal health over different durations. This would include investigating subjective factors influencing whether women choose to initiate breastfeeding, breastfeed full-term, or discontinue breastfeeding (Rollins et al., 2016; Raihana et al., 2021; Seidu et al., 2020). Follow-up studies could help determine the benefits of breastfeeding on the periodontal health of nursing women. Additionally, socio-cultural factors and oral health beliefs have been reported as impediments to oral health management in pregnant and nursing women. Therefore, further studies are required to confirm these findings.

CONCLUSION

In conclusion, breastfeeding for at least one month is significantly associated with a reduced risk of periodontitis among women in the US population, underscoring its potential protective effects on periodontal health. This finding not only reinforces the myriad benefits of breastfeeding but also highlights an actionable opportunity within dental public health to integrate oral health education and support into maternal care programs. Integrating maternal nutrition strategies with oral health promotion can mitigate diet-related oral diseases like periodontitis and dental caries while supporting overall maternal and child health. By advocating for breastfeeding as part of a holistic approach to improving maternal and oral health outcomes, this research strengthens the call for collaborative efforts between healthcare providers and public health initiatives to empower women and promote healthier communities.

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CURRICULUM VITAE

