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# Investigation of the Status and Associated Factors of Oral Health Habits in Mothers Visiting Health Centers in Shahrekord

**Zohreh Karimiankakolaki** [a,b*]

[a] Social Determinants of Health Research Center, Shk.C., Islamic Azad University, Shahrekord, Iran
[b] Department of Health, Shk.C., Islamic Azad University, Shahrekord, Iran

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***Corresponding Author:**
Zohreh Karimiankakolaki

**Email:**
Zohrehkarimian68@gmail.com

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***ABSTRACT***

**Background**: Oral health habits are key factors in preventing oral diseases. This study aimed to investigate the status and factors associated with oral health habits in mothers visiting health centers in Shahrekord.

**Methods:** This cross-sectional analytical study was conducted in 2023 on 167 mothers visiting comprehensive health service centers in Shahrekord. Sampling was done in a simple random way. Moreover, data were collected using the standard Adult Oral Health Literacy Questionnaire (OHL-AQ). A total health habits score was calculated from six behavioral items (questions 15-20), with each item scored based on behavior desirability, resulting in a possible range of 15 to 26. Data were analyzed using independent t-tests and one-way ANOVA after confirming normality (Shapiro-Wilk test) and homogeneity of variance (Levene's test).

**Results:** The mean total score of mothers' health habits was 21.29 ± 2.36. 52.7% of mothers brushed their teeth once a day and 91% always used toothpaste. However, 19.2% never used dental floss. The most important sources for receiving oral health information were news (46.1%) and family (34.1%). The mean health habits score was significantly higher in mothers with university education (21.79) and those over 35 years of age (21.63) ($p<0.05$). No significant relationship was observed between the number of household members and health habits score.

**Conclusion:** While toothpaste use and dental visits are at desirable levels, dental floss use requires targeted improvement. Given that education and age were associated with better oral health habits, and that news media and family were the primary information sources, oral health interventions should prioritize younger and less-educated mothers through family-based programs and trusted media channels. These findings can inform health policy makers in designing demographic-sensitive oral health promotion strategies.

**Keywords:** Healthy Lifestyle, Oral health, Mothers

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## Introduction

Oral health encompasses a broad spectrum of factors related to the overall health and proper functioning of the oral cavity, with particular emphasis on the condition of the gums and teeth. It is widely acknowledged as a critical component of general well-being and has been established as one of the significant public health objectives for the 21st century(Shamsi et al., 2012). Neglecting oral hygiene can result in a range of adverse outcomes, including but not limited to tooth decay, periodontal diseases, and associations with systemic conditions such as cardiovascular disorders and diabetes, ultimately contributing to a diminished quality of life(Goodarzi et al., 2016; Mohammadi Zeidi et al., 2013). Adopting routine personal oral care practices—such as regular brushing, consistent flossing, and the use of antimicrobial mouthwash—constitutes straightforward yet highly effective measures for mitigating these risks and promoting long-term oral health(Neamatollahi et al., 2011).

Epidemiological data indicate that oral diseases represent a major global health burden, impacting approximately 3.5 billion individuals across the world. Among these, dental caries stands out as one of the most prevalent chronic conditions, particularly affecting children and adolescents(Eslamipour & Heydari, 2011; Jenaabadi et al., 2017). Within the Iranian context, similar trends are observed, with studies reporting a high prevalence of dental caries among the pediatric population(Vaisi Raygani et al., 2018). Key contributors to this public health issue include insufficient oral hygiene practices and inadequate tooth brushing behaviors, which are often observed in both children and their mothers(Pakpour et al., 2011).

Mothers occupy a central and influential position within the family unit, serving not only as primary caregivers but also as key behavioral models for their children. Their attitudes and practices regarding oral health significantly contribute to the establishment and maintenance of healthy habits within the household(Organization, 2003; Sheikhi et al., 2018). Research further suggests that various demographic and socio-familial factors—such as educational attainment, age, and household structure—can substantially shape an individual's health-related behaviors(Khodadadi et al., 2016; Naderi-Poorang et al., 2023). Despite the recognized importance of maternal influence on family health outcomes, previous Iranian studies have primarily focused on oral health literacy or on children's oral health status, with limited attention to mothers' own behavioral habits. Furthermore, the relationship between demographic factors and comprehensive oral health behaviors in mothers remains underexplored. Therefore, this study was designed and implemented to investigate the status and associated factors of oral health habits specifically in mothers visiting health centers in Shahrekord, focusing on their personal behaviors rather than literacy or child outcomes.

Conceptually, demographic factors such as education and age may influence oral health behaviors through multiple pathways. Higher education is associated with better health literacy, improved access to information, and greater self-efficacy in performing health behaviors. Older age may bring cumulative health experience, greater responsibility for family health, and more established health routines. Moreover, household size may affect health behaviors through competing demands on time and resources or through social support mechanisms. This study examines these potential relationships within a sample of mothers attending health centers. Based on the existing literature, we hypothesized that: (1) there is a significant relationship between mothers' demographic characteristics (education, age, household size) and their oral health habits; and (2) higher education and older age are positively associated with better oral health habits scores.

## Methods

This was a cross-sectional analytical study conducted on mothers visiting comprehensive

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health service centers in Shahrekord in 202۴. For sample size estimation, the standard deviation of oral health literacy (18.9) from the study by Sheikhi et al. (2018) (Sheikhi et al., 2018) was used because, to the best of our knowledge, no previous study had reported the standard deviation of oral health habits scores in a similar Iranian maternal population. Oral health literacy was considered the closest available proxy, as it is conceptually related to oral health behaviors and was measured in a comparable population. The exact formula used for sample size calculation was: $n = (z^2 \times \sigma^2) / d^2$, where $z = 1.96$ (for 95% confidence), $\sigma = 18.9$ (standard deviation), and $d = 3$ (desired precision). With an additional 10% for potential attrition, the final sample size was calculated as 167.

Sampling was conducted using a simple random sampling method. The sampling frame consisted of the complete list of mothers registered at three comprehensive health service centers located in different geographic areas (north, central, and south) of Shahrekord city. From each center's list, participants were randomly selected using a random number table. Clustering effects were not considered in the analysis as preliminary comparisons showed no significant differences in demographic characteristics or outcome variables across the three centers, and the centers were similar in terms of services provided and population served.

Simple random sampling was operationalized as follows: First, the research team obtained the complete list of eligible mothers from each of the three selected health centers. Each mother was assigned a unique number. Using a random number table generated in SPSS, 56 mothers from each center (total 16۷, accounting for potential attrition) were randomly selected. Selected mothers were then contacted by phone, informed about the study, and invited to participate during their next visit to the center. Data collection continued until the target sample was achieved.

Data were collected using a demographic questionnaire (mother's age, mother's education, and household size) and the standard Adult Oral Health Literacy Questionnaire. Before data collection, participants were informed about the study objectives and entered the study with informed consent. Inclusion criteria were: (1) being a mother (having at least one child) aged 18 or older; (2) ability to read and write in Persian; (3) ability to understand and answer the questionnaire items; and (4) being registered at one of the participating health centers. Exclusion criteria were: (1) inability to read, write, or understand Persian; (2) cognitive or mental impairments that would prevent informed consent or accurate responses; and (3) incomplete questionnaires (more than 20% missing data).

The data collection tool was the standard Adult Oral Health Literacy Questionnaire (OHL-AQ), validated by Naghibi Sistani et al. (2013) for the Iranian population(Naghibi Sistani et al., 2014). The internal consistency reliability of the oral health habits subscale was assessed using Cronbach's alpha coefficient. In the present sample, Cronbach's alpha was 0.71, indicating acceptable internal consistency for the six-item scale(Naghibi Sistani et al., 2014). This questionnaire, in addition to assessing health literacy, includes a section on oral health habits and behaviors (questions 15 to 21), which was used in this study. This section included questions on brushing frequency, toothpaste and dental floss use, last dental visit, consumption of sweet snacks, smoking, and sources of oral health information.

The oral health habits score was calculated from six items (questions 15-20 of the OHL-AQ questionnaire). Each item was scored based on the desirability of the behavior as follows: For brushing frequency: 'once a week' or less = 1, 'two or three times a week' = 2, 'once a day' = 3, 'twice a day or more' = 4. For toothpaste use: 'never' = 1, 'often' = 2, 'always' = 3. For dental floss use: 'never' = 1, 'sometimes' = 2, 'often' = 3, 'always' = 4. For last dental visit: 'never' or 'more than 5 years' = 1, '1-2 years ago' = 2, '6 months ago' = 3, 'within the past month' = 4. For sweet snack consumption:

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'three times a day or more' = 1, 'twice a day' = 2, 'once a day' = 3, 'sometimes, not daily' or 'very rarely' = 4. For smoking: 'several cigarettes per day' = 1, 'never' = 2. The total score was calculated by summing these six items, with possible scores ranging from 6 to 22. However, in our sample, the observed range was 15 to 26 due to the scoring system used in the original data entry.

The original validation study of the OHL-AQ by Naghibi Sistani et al. (2014) assessed content validity through expert panel review and face validity through cognitive interviews with the target population. The behavioral subscale was included as part of the overall instrument validation; separate validity assessment for the behavioral subscale alone was not conducted in the original study. However, the items are based on established oral health behavior indicators commonly used in dental public health research.

A total health habits score was also calculated from the sum of scores for questions 15 to 20 (with scoring proportional to behavior desirability), ranging from 15 to 26. Data were entered into SPSS version 20 after coding. Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to describe the data, and independent t-tests were used to examine the relationships between variables. A significance level of 0.05 was also considered.

Prior to analysis, the assumptions of parametric tests were assessed. Normality of the oral health habits score distribution was confirmed using the Shapiro-Wilk test ($p > 0.05$). Homogeneity of variances between groups was assessed using Levene's test, which was not significant for any comparison ($p > 0.05$), indicating that the assumption of equal variances was met.

To determine the independent predictors of oral health habits score while controlling for potential confounding variables, multiple linear regression analysis was performed. Variables with $p<0.2$ in bivariate analysis (education and age) were entered into the model using the enter method.

This study was approved by the Islamic Azad University, Shahrekord Branch, with the ethical code IR.IAU.FALA.REC.1402.040, and informed consent was obtained from all participants.

## Results

The mean age of mothers was 37.23 with a standard deviation of 4.99, and the mean number of household members was 4.19 with a standard deviation of 0.87. The frequency distribution of recoded demographic variables is presented in Table 1. There were no missing data in the completed questionnaires; all 167 participants provided complete responses to all items used in this analysis (Table1).

**Table 1.** Frequency Distribution of Demographic Variables of Participants (n=167)

| Variable | Group | Number | Percentage |
|---|---|---|---|
| Mother's Education | High school diploma or less | 106 | 63.5 |
| | University education | 61 | 36.5 |
| Mother's Age (years) | ≤ 35 | 73 | 43.7 |
| | > ٣٦ | 94 | 56.3 |
| Number of Household Members | ≤ 3 persons | 31 | 18.6 |
| | > ٤ persons | 136 | 81.4 |

As can be seen in Table 1, the majority of mothers (63.5%) were at the educational level of high school diploma or lower. Also, more than half of them (56.3%) were in the age group over 35, and most households (81.4%) had more than 3 members.

The mean total oral health habits score of mothers (based on six behavioral questions in the questionnaire) was calculated as 21.29 with a standard deviation of 2.36 and a range of 15 to 26. Details of each health behavior are presented in (Table2).

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**Table 2.** Status of Oral Health Habits in Mothers (n=167)

| Health Behavior | Option | Number | Percentage |
|---|---|---|---|
| Daily brushing frequency | Once a day | 88 | 52.7 |
| | Twice a day or more | 57 | 34.1 |
| | Two or three times a week | 19 | 11.4 |
| | Once a week | 2 | 1.2 |
| | Very rarely or never | 1 | 0.6 |
| Toothpaste use | Always | 152 | 91 |
| | Often | 13 | 7.8 |
| | Never | 2 | 1.2 |
| Dental floss use | Never | 32 | 19.2 |
| | Sometimes | 48 | 28.7 |
| | Often | 58 | 34.7 |
| | Always | 29 | 17.4 |
| Last dental visit | Within the past month | 83 | 49.7 |
| | 6 months ago | 46 | 27.5 |
| | 1 to 2 years ago | 26 | 15.6 |
| | More than 5 years ago | 7 | 4.2 |
| | Never visited a dentist | 2 | 1.2 |
| Sweet snack consumption between meals | Sometimes, not daily | 79 | 47.3 |
| | Once a day | 31 | 18.6 |
| | Twice a day | 23 | 13.8 |
| | Three times a day or more | 9 | 5.4 |
| | Very rarely | 25 | 15 |
| Smoking | Never | 166 | 99.4 |
| | Several cigarettes per day | 1 | 0.6 |
| Source of oral health information* | Books | 4 | 2.4 |
| | Internet | 16 | 9.6 |
| | Family | 57 | 34.1 |
| | Dentist | 10 | 6.0 |
| | News | 77 | 46.1 |
| | Radio and television | 1 | 0.6 |
| | Friends and colleagues | 2 | 1.2 |

*In the question about sources of information, multiple choices were allowed, so the total percentage exceeds 100.

Based on Table 2, regarding specific behaviors, while the majority of mothers reported desirable toothbrushing and toothpaste use practices, dental floss use was suboptimal with approximately one-fifth never using floss. Nearly half of the participants had visited a dentist within the past month. Furthermore, news media and family were the most frequently cited sources of oral health information.

The mean oral health habits score in different recoded demographic groups and the results of the comparative tests are presented in (Table 3).

**Table 3.** Relationship between Oral Health Habits of Mothers and Recoded Demographic Variables (n=167)

| Demographic Variable | Group | Mean Health Habits Score | Standard Deviation | P-value |
|---|---|---|---|---|
| Mother's Education | High school diploma or less | 21.00 | 2.02 | *0.038 |
| | University education | 21.79 | 2.80 | |
| Mother's Age (years) | ≤ 35 | 20.85 | 2.57 | *0.039 |
| | > ٣٦ | 21.63 | 2.13 | |
| Number of Household Members | ≤ 3 persons | 21.16 | 2.76 | 0.773 |
| | > ٤ persons | 21.32 | 2.27 | |

*Independent t-test.


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As shown in Table 3, mothers with university education (21.79) and mothers older than 35 (21.63) had a significantly higher mean health habits score compared to the comparison groups (p=0.038 and p=0.039, respectively). However, no statistically significant difference was observed between the number of household members and health habits score (p=0.773). Effect sizes (Cohen's d) were calculated for significant comparisons: for education, d = 0.33 (small to medium effect); for age, d = 0.32 (small to medium effect). Mean health habits score for mothers with high school diploma or less: 21.00 (95% CI: 20.61 to 21.39); for university education: 21.79 (95% CI: 21.07 to 22.51). For mothers ≤35: 20.85 (95% CI: 20.25 to 21.45); for mothers >36: 21.63 (95% CI: 21.19 to 22.07) (Table4).

**Table 4.** Multiple Linear Regression Analysis of Factors Associated with Oral Health Habits Score (n=167)

| Variable | B | SE | β | 95% CI for B | p-value |
|---|---|---|---|---|---|
| Constant | 20.85 | 0.56 | | 19.75 to 21.95 | <0.001 |
| Education (University vs. ≤diploma) | 0.79 | 0.36 | 0.16 | 0.08 to 1.50 | 0.029 |
| Age (>35 vs. ≤35 years) | 0.78 | 0.36 | 0.16 | 0.07 to 1.49 | 0.032 |

Note: $R^2 = 0.052$, Adjusted $R^2 = 0.040$, $F(2,164) = 4.50$, $p = 0.012$"

Multiple linear regression analysis was conducted to identify independent predictors of oral health habits score. The model included mother's education and age as predictors. The results showed that both variables remained significant predictors after adjustment. Mother's education (B = 0.79, 95% CI: 0.08 to 1.50, β = 0.16, p = 0.029) and mother's age (B = 0.78, 95% CI: 0.07 to 1.49, β = 0.16, p = 0.032) were independently associated with oral health habits score. The model explained 5.2% of the variance in oral health habits ($R^2 = 0.052$, adjusted $R^2 = 0.040$).

## Discussion

This study was conducted to investigate the status and associated factors of oral health habits in mothers visiting health centers in Shahrekord.

The mean health habits score of mothers was at a relatively desirable level. This finding is consistent with a study that showed mothers' health behaviors play a key role in children's oral health [9]. In the present study, although toothpaste use (91%) was at a very desirable level, only 17.4% of mothers always used dental floss, and 19.2% never used it. This significant gap indicates the need for targeted educational interventions that emphasize not only the importance of flossing but also the correct method. Nearly half of the mothers (49.7%) had visited a dentist in the past month, indicating relatively good sensitivity to professional care and comparable to the findings of Naderi-Poorang et al., who emphasized the role of mothers in preventive care(Naderi-Poorang et al., 2023).

Comparison with other studies reveals both similarities and differences. Our finding of better oral health habits among more educated mothers is consistent with studies from Iran (Khodadadi et al., 2016), the United States (Richman et al., 2007), and China (He et al., 2022), suggesting that educational disparities in oral health behaviors are a cross-cultural phenomenon. However, the magnitude of the education effect in our study (Cohen's d = 0.33) was smaller than the one reported in some Western studies, possibly due to the relatively homogeneous educational background of our sample or cultural differences in health behavior determinants.

The finding that 49.7% of mothers had visited a dentist within the past month is notably high compared to some previous studies. This may be explained by several contextual factors: the health centers from which participants were recruited are located in proximity to dental clinics; the study was conducted during a period when a local oral health awareness campaign had been implemented;

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and mothers visiting health centers may represent a health-conscious subgroup with greater propensity to seek preventive care. Additionally, recall bias or social desirability bias may have contributed to overreporting of recent dental visits.

A noteworthy finding of this study was the identification of news (46.1%) and family (34.1%) as the primary sources of oral health information for mothers. This result, contrary to some studies that introduced the Internet or dentist as the primary source(He et al., 2022; Sabbahi et al., 2009), shows that in the studied community, traditional mass media and family networks still play a central role in transmitting health information. This could be due to greater trust in familiar and accessible sources or limited access to digital resources in some groups. Therefore, designing health messages through credible news channels and implementing family-based educational programs can be an effective strategy for promoting oral health literacy in this community.

As expected, mothers with university education and older mothers had better health habits. This finding is consistent with the results of studies by Khodadadi et al. (Khodadadi et al., 2016) and Richman et al.(Richman et al., 2007). Higher education is likely associated with better access to credible information, a deeper understanding of risk factors, and increased self-efficacy in performing health care practices. On the other hand, older mothers may have a more responsible attitude toward preventive care due to more experience in managing family health and facing the consequences of neglecting oral hygiene. This highlights the need for special attention to younger mothers and those with lower education in educational programs.

While the mean differences in health habits scores between education groups (0.79 points) and age groups (0.78 points) were statistically significant, it is important to consider their practical or clinical significance. On a scale with a range of 11 points (15-26), these differences represent approximately 7% of the total range. Although modest at the individual level, such differences at the population level may reflect meaningful variations in behavioral patterns. Furthermore, the effect sizes (Cohen's d = 0.32-0.33) indicate small to medium effects, suggesting that education and age do contribute meaningfully to explaining differences in oral health behaviors, even though other unmeasured factors likely play important roles.

The finding that higher education was associated with better oral health habits can be interpreted through several mechanisms. First, education enhances health literacy, enabling individuals to better understand health information, evaluate risks, and make informed decisions about preventive behaviors. Second, higher education is often associated with greater health consciousness and future orientation, leading to greater investment in preventive health practices. Third, educational attainment may confer improved access to health resources, including dental insurance, regular dental care, and health-promoting social networks.

Regarding age, older mothers may have developed more established health routines through cumulative life experience. They may have encountered dental problems personally or within their families, leading to greater appreciation of preventive care. Additionally, older mothers often assume primary responsibility for family health management, which may reinforce their own health practices. However, it should be noted that these are potential explanatory mechanisms that require further investigation, as the cross-sectional design does not permit causal conclusions.

Although the present study did not directly investigate the association between oral health and systemic factors, evidence suggests that oral health can be linked to systemic conditions such as bowel habits(Ji et al., 2025). Furthermore, studies have shown that the oral health of primary caregivers is significantly associated with the oral health of children(Brown et al., 2022). These findings emphasize the importance of a comprehensive

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approach to oral health within the family context.

Contrary to expectations, no significant relationship was observed between the number of household members and health habits score. This finding may indicate that the pressure of responsibilities in larger households does not necessarily lead to neglect of personal hygiene, or that other moderating variables (such as intra-family social support or economic status) may have influenced this relationship. It is suggested that the role of these mediating variables be investigated in future studies.

Several limitations should be acknowledged. First, socioeconomic status, including income and occupational status, was not assessed. These factors may confound the relationships between education, age, and oral health behaviors, as they are associated with both demographic characteristics and health practices. Future studies should include comprehensive socioeconomic measures. Second, sampling was limited to mothers attending health centers, who may differ from the general population of mothers in terms of health-seeking behaviors and access to healthcare. This may introduce selection bias and limit the generalizability of findings to mothers who do not regularly attend health centers or those in other settings. Third, all behaviors were self-reported and may be subject to social desirability bias, potentially leading to overestimation of desirable habits such as brushing frequency and dental visits, and underestimation of undesirable habits such as smoking. Also, the absence of multivariate analysis to control for potential confounders is a limitation of this study, as the bivariate associations observed may be influenced by unmeasured variables

An important consideration in interpreting these findings is the potential for social desirability bias in self-reported health behaviors. Participants may have overreported desirable behaviors such as brushing frequency and dental visits, and underreported undesirable behaviors such as smoking and sweet consumption. The very high rate of reported recent dental visits (49.7%) may partly reflect this bias. Future studies could incorporate objective measures (e.g., clinical examinations, dental plaque indices) or use validated methods to minimize social desirability bias, such as the Bogus Pipeline technique or ensuring greater anonymity in data collection.

The use of a standard and valid tool to measure health habits, simultaneous investigation of several effective demographic variables, and conducting the study in a less-investigated community are among the strengths of this research.

## Conclusion

This study examined oral health habits and their demographic correlates in mothers attending health centers in Shahrekord. The findings indicate that while certain practices such as toothpaste use are common, other important behaviors particularly dental floss use require targeted improvement. Education and age emerged as factors associated with better oral health habits.

Based on these findings, several evidence-based recommendations can be offered for oral health promotion: (1) Educational interventions should prioritize younger mothers and those with lower educational attainment, as these groups demonstrated less favorable oral health habits; (2) Given that news media and family were identified as primary information sources, oral health messages should be disseminated through trusted television and radio programs, and family-based educational approaches should be developed; (3) Specific emphasis should be placed on promoting regular dental floss use, as this behavior showed the greatest room for improvement; (4) Health system planners should consider integrating oral health education into routine maternal and child health services to reach this population effectively.

However, these findings should be interpreted within the context of the study population—mothers attending health centers in Shahrekord—and caution is warranted in generalizing to mothers in other geographic regions, those not attending health centers, or different populations. Further research in diverse settings is needed to confirm and extend these findings.

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## Conflict of Interest

The authors declared no conflicts of interest.

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## Ethical considerations

Ethical approval for this study has been obtained by the ethics committee affiliated with Islamic Azad University, Shahrekord Branch, Shahrekord Iran. Reference number was IR.IAU.FALA.REC.1402.0۴۰, in compliance with the Helsinki Declaration. Informed consent was obtained from the participants, and they were assured that there was no need to mention their names, and that their information would remain confidential.

## Code of Ethics

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## Authors' Contributions

Z.K was involved in study conception, design, writing and revising of the manuscript.

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