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# Oral health behavior of pregnant women in Nigeria: a scoping review

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## Abstract

**Background** Oral health care behaviors during pregnancy affects maternal and child health outcomes. This scoping review sought to map the existing literature on the oral healthcare behaviors of pregnant women in Nigeria.

**Methods** PubMed, Science Direct, Web of Science, EBSCOHOST, Sabinet, African Index Medicus, and Scopus data based were searched in August 2023. Articles with reports on the oral health behavior of pregnant women in Nigeria, published in English in peer review were included in the review. Articles whose full lengths could not be accessed, and commentaries on studies, and letters to the editor were also excluded. Data on authors and year of publication of the study, study location, study objective, study design, methodological approach for data collection, and study outcomes were extracted and descriptively synthesized.

**Results** The search yielded a total of 595 articles of which 573 were unique. Only 21 articles were left after titles and abstracts screening and only 18 articles met the eligibility criteria. The proportion of pregnant women had utilized dental services ranged from 4 to 62.9%, the use of toothbrush and toothpaste ranged from 59.6 to 99.3%, twice daily tooth brushing ranged from 5.2 to 66.9%, and the use of toothbrush among pregnant women in the studies varies from 70.9 to 100%. Chewing stick was used by 0.1–27.7% of study participants. Dental problems such as caries, pain, swollen gums, and excessive salivation were reasons for seeking dental care. We identified individual, structural, and behavioral factors, including myths as barriers for dental service utilization.

**Conclusion** This scoping review shows that dental service utilization by pregnant women in Nigeria is poor and mainly due to curative than preventive needs. Oral health behaviours also need to be improved through tailored oral health education accessible to pregnant women in Nigeria.

**Keywords** Oral healthcare, Antenatal care, Toothbrush, Toothpaste, Chewing stick, Twice daily toothbrushing, Disparity, oral health education, Access to dental services

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## Introduction

Oral diseases that occur during pregnancy have significant implications for the health of both the expectant mother and the unborn child. The risk for oral diseases is enhanced by the temporary physiological changes experienced by women during pregnancy, including alterations in their physical structure, hormone levels, metabolism, and immune system. [1, 2] These changes often lead to increased consumption of refined carbohydrates, episodes of vomiting, reduced saliva production, and a heightened acidity level in saliva. [3–4] favorable conditions for developing oral health issues, such as periodontal disease and dental caries. [5] Furthermore, the fluctuating levels of estrogen and progesterone during pregnancy can lead to increased absorbency in the oral tissues, rendering the mouth more susceptible to potential infections. [6, 7] Additionally, these hormonal shifts can compromise the efficiency of the host's immune system, further raising the likelihood of dental infections. [8, 9]

Moreover, oral diseases associated with poor pregnancy outcomes range from gingivitis [10–13] to periodontitis, the severity of periodontal diseases, periapical infection, severe periodontal disease, gingival recession, periodontal pocket and loss of clinical attachment level. [7, 14–17] Poor pregnancy outcomes from oral diseases include low birth weight, preterm birth, preterm and low birth weight, neonatal stunting, and wasting. Underweight, and small head circumference, uterine leiomyoma, preterm premature rupture of membranes, pre-eclampsia, eclampsia, spontaneous abortion, vaginal bleeding, chorioamnionitis, stillbirth, macrosomia, congenital anomaly, and infant/neonatal death, gestational diabetes, fetal growth restriction and hypertensive disorders of pregnancy. [7, 16, 18–22]

Despite the widespread prevalence of oral diseases during pregnancy and their well-documented link to adverse pregnancy outcomes, many pregnant women do not actively seek oral care during this crucial period. [23–25] This trend can be attributed, in part, to the common misconception among many pregnant women that these oral health issues are a normal part of pregnancy and will naturally resolve after childbirth. [23]. Regrettably, oral healthcare screenings are frequently lacking in antenatal care settings, including many clinics in Nigeria. This deficiency is primarily due to the absence of established guidelines regarding oral health screening and treatment for pregnant women [23, 24]. In addition, oral health care is poorly integrated into the primary health care system, where pregnant women often receive perinatal care in Nigeria [26]. Furthermore, preventive oral care uptake by pregnant women across Nigeria is influenced by multiple social-cultural factors that are yet to be fully explored and understood in ways that can inform policies. [25, 27] This

scoping review highlights this knowledge gap by mapping out the knowledge and practice of preventive oral care among pregnant women in Nigeria.

## Methods

This scoping review adopted the 'York methodology' outlined by Arksey & O'Malley [28]. The review follows the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) extension for the scoping reviews checklist [29, 30].

## Research question

The research question was: What are the factors associated with oral healthcare behavior among pregnant women in Nigeria?

## Identification of relevant studies

The search was conducted in August 2023 for relevant articles published in English in seven electronic databases (PubMed, Science Direct, Web of Science, EBSCOHOST, Sabinet, African Index Medicus, and Scopus) using the terms shown in Appendix 1. A search of related citations and references was also carried out.

## Selection of studies for review

Identified studies were downloaded into Endnote, imported into Rayyan, and duplicates were removed. Rayyan, an automation tool, was utilized to enhance the validity of the selection process for inclusion in reviews. It facilitates easy importation of references, collaboration among researchers, and tracking of screening decisions. Two researchers (LBA and AOE) independently performed title and abstract screening using pre-defined inclusion and exclusion criteria. Articles were selected when there was concurrence among the two. Any discrepancies in the eligibility of publications determined by the two researchers were resolved by a third researcher (OSI) who independently reviewed the publications for its eligibility. A discussion was then held, and consensus reached between the three researchers on the eligibility status of the publication. Following this, the researchers conducted individual assessments of the complete texts of the remaining articles, and supplementary searches were manually performed on the reference compilations of potentially pertinent publications.

## Inclusion criteria

Articles with reports on the oral health behavior of pregnant women in Nigeria, published in English in peer review were included in the review. All articles included had undergone peer-review.

### Exclusion criteria

Articles with participants outside Nigeria were excluded. Articles whose full lengths could not be accessed, and commentaries on studies, and letters to the editor were also excluded. Narrative reviews which did not focus on the oral health behavior of pregnant women in Nigeria were also excluded along with qualitative studies and gray literature.

### Data charting process

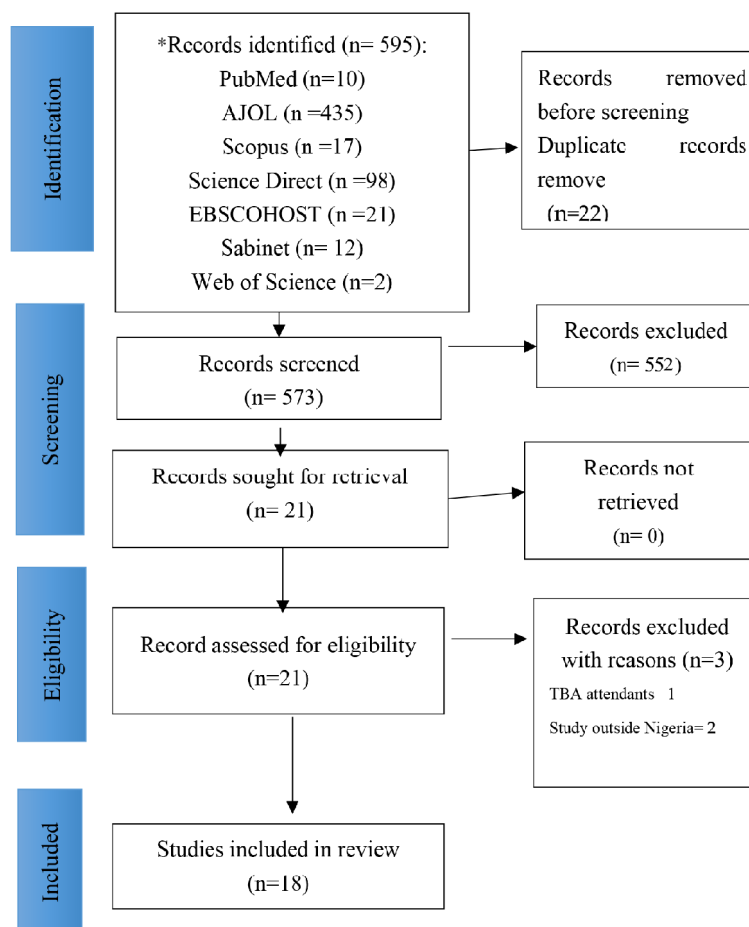
The authors developed a data-charting form for extracting pertinent variables and then individually performed data extraction for each study included in the review. Two distinct authors who were uninformed about each other's findings charted the data, ensuring precision in data extraction. The authors recorded variables associated with the aim of the scoping review, such as authors and year of publication of the study, study location, study objective, study design, methodological approach for data collection, and study outcome.

### Data analysis

The data extracted from the included studies underwent thematic analysis to uncover recurring themes, patterns, or trends across the literature. These emerging themes were closely aligned with key concepts, issues, or findings within the scope of the review. Subsequently, the findings from the included studies were synthesized narratively, organized around identified themes or key concepts and elucidating gaps in the literature. The key findings were compared to identify the oral care behaviors by pregnant women in Nigeria. In addition, the reasons for using or not using dental services during pregnancy were summarized.

### Results

As can be seen in the flowchart (Fig. 1), the search yielded a total of 595 articles. After removing duplicate records, 573 unique records remained. After an initial screening of titles and abstracts and a subsequent screening process, 21 articles met the eligibility criteria for full-text review. On reviewing the full articles, three were excluded due to data not being pertinent to the target



**Fig. 1** Flow diagram of included studies

study group and the study not being specific to Nigeria. The final 18 articles were reviewed.

Table 1 provides a summary of three studies excluded from the review, along with the reasons for their exclusion. Two studies [31, 32] conducted outside Nigeria, one in Pakistan and the other in Nepal, were excluded due to their geographical location. The third study [33], conducted in Nigeria, was excluded because it focused on pregnancy managed by traditional birth attendants, which fell outside the scope of the review. This suggests that the review focused specifically on studies conducted within Nigeria and within the scope of the review's objectives.

### Characteristics of the selected studies

As shown in Table 2, the year of publication of the 18 included studies ranged from 2010 to 2022. There were 11 (61.1%) studies published between 2010 and 2019 [21, 34, 35, 37–42, 45, 46], and seven (38.9%) studies were conducted between 2021 and 2022 [15, 25, 36, 43, 44, 47, 48]. There was no study published in year 2020.

The 18 studies were conducted in five of the six geopolitical zones in Nigeria: Southwest 38.9% ( $n=7$ ) [35–39, 43, 46], Southsouth 38.9% ( $n=7$ ) [15, 21, 34, 40, 41, 45, 47] Southeast 11.1% ( $n=2$ ) [25, 48], Northwest 5.6% ( $n=1$ ) [44] and Northeast ( $n=1$ ) [40]. The studies conducted in Southwest Nigeria were conducted in four of the six states in the geopolitical zones, namely Lagos ( $n=3$ ) [35, 37, 43], Oyo ( $n=2$ ) [39, 46], Ogun ( $n=1$ ) [36] and Osun ( $n=1$ ) [38]. In Southsouth Nigeria, the studies were conducted in three of the six states in the region: Edo ( $n=3$ ) [41, 42, 45], Rivers ( $n=3$ ) [15, 21, 47], and Cross Rivers ( $n=1$ ) [34]. The two studies in Southeast Nigeria were in Enugu State [25, 48], while the single study in Northwest Nigeria was Kaduna State [44], and that in Northeast Nigeria was conducted in two states – Taraba and Maiduguri [40].

The sample sizes across the 18 studies varied, ranging from 77 to 480 participants. In total, these studies involved 5,083 participants. It's worth noting that the sample size for Onwuka et al. [25] and Onwuka et al. [48], as well as Okeigbemen & Adam [41] and Adam et al. [42], were counted as a single instance in the total

sample size calculation. This adjustment was made because these pairs of studies had identical sample sizes and were conducted among the same population during the same period. Of the 18 studies included in this review, 17 (94.1%) were cross-sectional studies. The other study design was a cohort study [46]. None of the studies employed qualitative or mixed research methods. All the studies were facility-based surveys, and none were conducted in a community setting.

### Oral hygiene practices

Table 2 highlights the different oral hygiene practices assessed in the study. Oral hygiene practices assessed were a history of dental visits [15, 21, 25, 35–46], the use of toothbrush and toothpaste [34, 39, 40, 42, 44, 46–48] or its use in combination with chewing sticks [34, 38, 40, 44, 48]. The chewing stick alone [15, 34, 35, 38, 39, 42, 44–46]. The proportion of respondents who used toothbrushes with toothpaste ranged from 42 to 100% across different studies. Dental floss [36, 41, 42, 47, 48] for oral hygiene was also assessed. Two studies assessed the rinsing of the mouth with water after vomiting [36, 38]. Only one study documented the dietary choices that affect women's oral health during pregnancy. [35]

Some of the studies assessed the frequency of oral hygiene practices. These include daily frequency of toothbrushing once daily [15, 25, 35–40, 42–45], 46, 47], twice daily [15, 25, 35, 36, 38, 39, 41, 43–48], and more than twice daily [35, 40, 42, 44, 46]. One study also reported frequency of tooth brushing of once a week and 2–6 times a week among pregnant women [42]. The frequency of tooth brushing once daily ranged from 31.1% [44] to 71.4% [46], while the frequency of tooth cleaning twice daily or more ranged from 5.2 [38] to 66.9% [44]. None of the studies provided information on the frequency of toothbrushes and toothpaste usage for oral care among pregnant women. Nevertheless, some alternative cleaning agents used by pregnant women, as reported in the studies, included charcoal in Taraba State [40, 42] and table salt and baking soda in Edo State [42].

The frequency of those who rely solely on chewing sticks for tooth cleaning ranged from 0.1% in Cross River State [34] to 1% in Kaduna State [44] and 10.6% in Oyo

**Table 1** Excluded studies based on country and reasons for exclusion

Authors/Year of publication	Title	Country	Reasons for exclusion
Ishaq et al. (2018) [31]	Oral Health Seeking Behaviour among Pregnant Women-A cross sectional survey in Parkistan	Pakistan	Conducted outside Nigeria
Lubon et al. (2018) [32]	Oral health knowledge, behavior, and care seeking among pregnant and recently-delivered women in rural Nepal: a qualitative study	Nepal	Conducted among recently delivered women and outside Nigeria
Ligali et al. (2017) [33]	A survey of self-reported oral health practices, behaviour and oral health status of pregnant women attending TBA ante-natal clinics in a Nigerian rural community	Nigeria	Reported on pregnancy managed by traditional birth attendance, outside scope of review

**Table 2** Characteristics of the selected studies

Author/year of publication	Geopolitical zone	State	Study population	Sample size	Study objective	Study type	Study outcomes
Bashiru et al., (2016) [21]	Southsouth	Rivers	Pregnant women 18 to 49 years	320	To assess the oral health awareness and experience among pregnant women attending the antenatal clinic at the University of Port Harcourt Teaching Hospital, Rivers State, Nigeria	Cross-sectional	Dental visits: 27.9%
Onwuika et al., (2021) [25]	Southeast	Enugu	Pregnant women attending antenatal clinic of the University of Nigeria Teaching Hospital (UNTH), Ituku/Ozalla	413	To determine the prevalence of routine dental consultation among pregnant women and to identify factors affecting the utilization of dental services in pregnancy	Cross-sectional	Dental visits: 8.7% Frequency of brushing/day Once: 44.6% Twice: 55.4% Frequency of brush changing > 3 month: 37.5% Three monthly: 62.5%
Bassey et al. (2010) [34]	Southsouth	Cross Rivers	Pregnant women attending the antenatal clinic of the University of Calabar Teaching Hospital	252	Determine the oral health habits, awareness, education, and treatment needs among pregnant women attending the antenatal clinics at the University of Calabar Teaching Hospital.	Cross-sectional	Dental visits: 31.7% Toothbrush and toothpaste: 94.4% Toothbrush/toothpaste/chewing stick: 4.8% Chewing stick alone: 0.8%
Abiola et al. (2011). [35]	Southwest	Lagos	Pregnant women receiving antenatal care at Lagos State University Teaching Hospital (LASUTH) in 2008	460	To describe the self-reported oral health knowledge, attitudes, and oral hygiene habits among pregnant women receiving antenatal care at the Lagos State University Teaching Hospital	Cross-sectional	Dental visits: 62.9% Use of toothbrush: 94.0% Chewing stick: 2.4% Other tools: 3.6% Frequency of brushing/day Once a day: 65.6% Twice a day: 32.9% More than twice a day: 1.5% Weekly confectionery consumption > 4 times: 6.0% 2–3 times: 8.4% Less than once a week: 85.7%
Soroye and Bello (2022) [15]	Southsouth	Rivers	Women at the antenatal clinic of the University of Port Harcourt Teaching Hospital between July and August 2017	101	To access pregnant women's oral hygiene practices, their use of dental services during pregnancy, and their periodontal status.	Cross-sectional	Dental visits: 39.6% Toothbrushing: 99.9% Chewing Stick: 0.1% Frequency of brushing/day Once: 70.3% Twice: 29.7% Cleaning material Fluoride-containing toothpaste: 63.4% Herbal toothpaste: 36.6%

**Table 2** (continued)

Author/year of publication	Geopolitical zone	State	Study population	Sample size	Study objective	Study type	Study outcomes
Chinenye-Julius et al. (2021) [36]	Southwest	Ogun	Pregnant women attending six primary health care centers in Ijebu Northeast	385	To examine the knowledge, attitude, and practices of oral hygiene among pregnant women attending antenatal clinics	Cross-sectional	Dental visits: 21% Frequency of dental visits annually Once: 62.9% Twice: 37.0% Frequency of brushing/day once: 70.9% twice: 29.1% Rinse mouth with water after vomiting: 23.4% Flossing: 51.7% Dental visits: 7.0%
Adeniyi et al. (2010). [37]	Southwest	Lagos	Pregnant women receiving antenatal care at the Lagos State University Teaching Hospital in 2008	342	To determine the proportion of dental services utilization and the reasons for non-utilization among women receiving antenatal care at the Lagos State University Teaching Hospital	Cross-sectional	
Afolabi et al., (2014) [38]	Southwest	Osun	Pregnant women attending three tertiary levels of care	480	To evaluate the oral health knowledge and practice among pregnant women in a Nigerian population	Cross-sectional	Dental visits: 20% Use of toothbrush: 79.8% Nili: 37.5% Toothbrush and/chewing stick: 14.4% Chewing stick alone: 5.0% Frequency of brushing/day Once: 56.9% Twice: 5.2% Rinse mouth with water after vomiting: 41.9%
Ifesanya. et al., (2010) [39]	Southwest	Oyo	Pregnant women at two primary health care ante-natal clinics in a local government area	405	To assess the variables that affect oral hygiene status among pregnant women in a southwestern Nigerian locality.	Cross-sectional	Dental visits: 4% Toothbrush and toothpaste: 89.1% Frequency of brushing/day Once: 66.2% Twice: 33.8% Chewing stick alone: 10.6%
Bukar, et al. (2012). [40]	Northeast	Taraba and Maiduguri	Pregnant women at the antenatal clinic of two tertiary health institutions between May 1 and July 1, 2009.	294	To document oral health practices of pregnant women in two tertiary institutions in northeastern Nigeria.	Cross-sectional	Dental visits: 15% Toothbrush and toothpaste: 89.8% Chewing stick: 8.8% Charcoal: 0.7% Frequency of brushing/day Once: 36.1% Twice: 55.8% 3–5 times a day: 8.2% Toothbrush and chewing stick: 0.7%

Table 2 (continued)

Author/year of publication	Geopolitical zone	State	Study population	Sample size	Study objective	Study type	Study outcomes
Okeigbemen & Adam. (2015) [41]	Southsouth	Edo	Women at the antenatal clinic of the public secondary health facilities in Benin City between October 2014 and October 2015 at Central Hospital Benin City and Stella Obasanjo Women and Children Hospital	274	Assessed the factors affecting practice of oral hygiene among pregnant women attending antenatal clinic in public secondary health facilities in Benin City, Nigeria.	Cross-sectional	Regular dental visits: Yes: 8.8% No: 57.7% No response: 33.6% <i>Oral hygiene</i> Twice daily brushing: 46.0% Regular flossing: 4.7% Tooth picking: 1.1 Improved diet: 3.3% Lifestyle change: 3.6% Dental visits: 55.7% Toothbrush and toothpaste: 99.3% Toothpaste with fluoride: 74.6% <i>Cleaning agents:</i> Toothbrush: 99.3% Chewing sticks: 27.7% Toothpicks: 19.0 Dental floss: 36.8% Charcoal: 7.7% Baking soda: 1.8% Table salt: 0.4% <i>Frequency of brushing/day:</i> Once: 42% Twice or more: 53.6% Once a week: 1.1% 2–6 times a week: 3.3%
Adam et al. (2017) [42]	Southsouth	Edo	Women attending antenatal clinic between October 2014 and October 2015 at Central Hospital Benin City and Stella Obasanjo Women and Children Hospital	274	To assess the knowledge, attitude towards, and practice of oral hygiene among antenatal clinic attendees in public secondary health facilities in Benin City, Nigeria.	Cross-sectional	Dental visits: 54.7% Toothbrush and toothpaste: 96.6% Chewing stick only: 1.0 Toothbrush /toothpaste & chewing stick: 2.4% <i>Frequency of brushing/day</i> Once: 31.1% Twice: 66.9% More than twice: 2.0%
Onigbinde et al. (2022) [43]	Southwest	Lagos	Pregnant women, December 2017 - March 2018	415	To assess pregnant women's oral health knowledge and practice and their relationship with periodontal disease and adverse pregnancy outcomes.	Cross-sectional	Dental visits: 36.4% Frequency of tooth brushing Once: 66% Twice: 34%
Omisakin, Moham-med, Fomete Adze (2021) [44]	Northwest	Kaduna	Pregnant women attending the antenatal clinic of Barau Dikko Teaching Hospital from January to June 2018.	320	To assess the level of knowledge, attitude, and practices of oral health among pregnant women	Cross-sectional	Dental visits: 54.7% Toothbrush and toothpaste: 96.6% Chewing stick only: 1.0 Toothbrush /toothpaste & chewing stick: 2.4% <i>Frequency of brushing/day</i> Once: 31.1% Twice: 66.9% More than twice: 2.0%



**Table 2** (continued)

Author/year of publication	Geopolitical zone	State	Study population	Sample size	Study objective	Study type	Study outcomes
Azodo and Omuemu (2012) [45]	Southsouth	Edo	Pregnant women attending the Antenatal Clinic of the University of Benin Teaching Hospital, Benin City in Nigeria	394	To assess the perceived oral health, oral self-care habits, dental visits, and self-reported oral health problems among pregnant women in Benin City, Nigeria.	Cross-sectional	Dental visits: 19.8% Toothbrush: 98.7% Frequency of brushing/day Once: 43.1% Twice: 49.2% Frequency of brush changing Every month: 21.8% Every three months: 46.7%
Lasisi & Abdusalam (2018) [46]	Southwest	Oyo	Pregnant women attending the antenatal clinic at Adeoyo Maternity Hospital	77	To describe the pattern of oral health among a cohort of pregnant women.	Cohort study	Dental visits: 3.9% Toothbrush and toothpaste: 98.7% Frequency of brushing/day Once: 71.4% Twice: 26% More than twice: 2.6% Chewing stick alone: 1.3%
Soroye and Onigbinde (2022) [47]	Southsouth	Rivers State	Pregnant women attending the University of Port Harcourt Teaching Hospital antenatal clinic, Port Harcourt, Nigeria, between March and April 2020.	151	To assess oral hygiene and gingival bleeding perception of pregnant women.	Cross-sectional	Toothbrush: 100% Toothbrush and toothpaste: 59.6% Frequency of brushing/day Once: 66.2% Twice: 33.8% Dental flossing: 19.4% Toothpick: 80.4% Fluoridated toothpaste: 59.6% Herbal toothpaste: 40.4%
Onwuka et al. (2021) [48]	Southeast	Enugu	Pregnant women attending the antenatal clinic of the University of Nigeria Teaching Hospital (UNTH), Ituku/Ozalla, Enugu State, Nigeria, from January 2018 to May 2018	413	To determine the awareness and practices of oral health among pregnant women in Enugu, Southeastern Nigeria	Cross-sectional	Toothbrush + toothpaste: 84.75% Frequency of brushing/day Twice: 55.45% Once: 44.5% Toothbrush + toothpaste + chewing Stick: 15.25% Dental floss: nil Frequency of brush changing > month: 37.53% Every three months: 62.47%



State [39]. Also, up to 0.7% in Taraba and Maiduguri [40], 2.4% of respondents in Kaduna State [44], 4.8% in Cross River State [34], 14.4% in Osun State [38], and 15.25% in Enugu State [48] combined toothbrushes and toothpaste with local chewing sticks as part of their oral hygiene routine.

The prevalence of the use of dental floss ranged from 0% in Enugu [48] to 51.7% in Ogun [36], 19.8% in Rivers [47], and 36.8% in Edo [42]. However, out of the 18 studies, only three (16.5%) provided documentation on the utilization of toothpicks [41, 42, 47], the use of fluoride toothpaste [15, 42, 48], and the frequency of changing toothbrushes [25, 45, 48] among pregnant women.

### Reasons for use and non-use of dental services

The use of dental services ranged from as low as 3.9% in Oyo State [46] to as high as 62.9% in Lagos State [35]. Dental service utilization by pregnant women was less than 30% in 11 (73.3%) of the 15 studies that reported on dental service utilization [15, 21, 25, 36–41, 45, 46]; 54.7% in Lagos [41] and Kaduna States [44] respectively, 55.7% in Edo State [42] and 62.9% in Lagos State [35] as shown in Table 2.

Table 3 sheds light on the factors influencing the utilization of dental services among pregnant women in Nigeria. Among the 18 studies examined, eight (44.4%) investigated the drivers of the usage or avoidance of dental services. These determinants encompassed various considerations such as managing dental caries, [21, 25, 42] alleviating pain, [21, 25, 42] and managing periodontal problems. [21, 27, 34].

Four of these eight studies also explored why pregnant women refrained from visiting dental clinics. These rationales were individual, structural, and behavioral-related factors. Individual factors were the fear of dental treatments [15, 45], fear of pain during dental procedures [15], and prior negative encounters at dental clinics [15]. Structural factors encompassed challenges like limited accessibility to dental facilities [45], financial constraints [41, 45], and medical advice against dental visits from healthcare professionals [45]. Lastly, behavioral factors included inadequate awareness about the necessity of dental visits [41], insufficient prioritization of dental care due to time constraints, [45] and an unfavorable attitude, ranging from indifference toward dental health [45] to the belief that dental care was unnecessary. [15, 41, 45] A study also uncovered a misconception that dental visits were unsafe during pregnancy. [41]

### Discussion

This scoping review presents a comprehensive overview of the oral health practices among pregnant women in Nigeria. The findings reveal that many pregnant women in Nigeria engage in self-directed oral health behaviors,

such as brushing their teeth with toothpaste and using chewing sticks. However, brushing teeth twice daily, considered optimal for good oral self-directed oral health care, is not widely adopted. The utilization of dental services varies across the studies, with the highest proportion of dental service users reported in urban areas like Lagos, Edo, and Kaduna. The reasons for seeking dental services predominantly revolve around curative care, while factors preventing service utilization range from individual characteristics to structural and behavioral factors, as well as misconceptions about receiving dental care during pregnancy.

This study provides the first comprehensive insights into the state of oral health practices among pregnant women in Nigeria. Including studies from a wide geographical range within Nigeria enhances the diversity and applicability of the findings. Furthermore, the study sheds light on the epidemiological profile of oral health behavior among pregnant women, offering valuable information that can inform policies and strategies to reduce the risk of adverse pregnancy outcomes in Nigeria.

Nevertheless, the review has some limitations. First, the exclusion of unpublished gray literature, potentially limiting comprehensiveness of the findings. Also, all included studies were cross-sectional, with only one cohort study, thus constraining the level of evidence. Lastly, the lack of specificity in data collection tools for oral health behavior limited the collection of relevant data regarding oral health products such as fluoride containing toothpastes, name and type of chewing stick the use of sugar free chewing gums and the use of mouth washes. This hinders detailed analysis. Despite these limitations, the findings contribute valuable evidence that can guide future research endeavors.

Oral health behaviors include the frequency and technique of toothbrushing, including the use of fluoride toothpaste [49], regularity and effectiveness of flossing to remove food particles and plaque from between teeth [50, 52], utilization of mouthwash or antimicrobial rinses as part of oral hygiene routines [51, 52], dietary choices, [51] particularly the consumption of sugary and acidic foods and beverages that can contribute to dental caries, [51, 54, 55] tobacco use, both smoking and smokeless forms, [52, 56] excessive alcohol consumption, [57] and the frequency of dental checkups for routine examinations and cleanings [53]. These behaviors are associated with pregnancy outcomes [40, 41, 43–45].

First, we observed that the studies do not report on the use of mouthwash (except for rinsing the mouth with water after vomiting), alcohol consumption, tobacco use during pregnancy, and the frequency and quantity of free sugar consumption. These gaps restrict the discussion on the breadth of oral health practices among pregnant women in Nigeria, as these practices vary widely among

**Table 3** Reasons for visit and non-visits of dental clinics by pregnant women in Nigeria

Author/year of publication	Reasons for dental services utilization					Reasons for non-dental visit utilization										
	Caries	Pain	Swollen gum	Excessive salivation	Bleeding gum	Fear of dental treatment	Fear of pain	Previous negative experience	No accessible clinic	Not bothered	No time to visit	No fund/insurance	No need to visit/no dental problem	Not safe for pregnancy	Advised against visit by doctor	Do not understand need for visit
Bashiru et al. (2016) [21]	√	√	√	√	√	-	-	-	-	-	-	-	-	-	-	-
Onwuika et al., (2021) [25]	√	√	√	√	√	-	-	-	-	-	-	-	-	-	-	-
Bassey et al., (2010) [34]	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	-
Soroye and Bello (2022) [15]	-	-	-	-	√	√	√	√	-	-	-	√	-	-	-	-
Bukar et al. (2012) [40]	√	√	√	√	√	-	-	-	-	-	-	-	-	-	-	-
Okeigbemen & Adam (2015) [41]	-	-	-	-	-	-	-	-	-	√	√	√	√	√	-	√
Adam et al. (2017) [42]	√	√	√	√	√	-	-	-	-	-	-	-	-	-	-	-
Azodo and Omuemu (2012) [45]	-	-	-	-	-	√	-	-	√	√	√	√	√	-	√	-

individuals and populations. It is important to identify every factor that contributes to the country's unfavorable national maternal and child health indicators as the pooled estimate of adverse birth outcomes in the country is 27.69% [58]. Poor oral health contributes to adverse birth outcomes in Nigeria [59]. The current study highlights that while the daily tooth cleaning using toothbrushes and toothpaste among pregnant women seem optimal, the frequency was not. Adequate frequency is needed to reduce the risk for caries and periodontal diseases [60]. These two oral diseases are risk factors for adverse pregnancy outcomes [5, 10–13]. Introducing oral health education into the perinatal care of pregnant women in Nigeria could enhance the effectiveness of the current toothbrushing habits of pregnant women in Nigeria [61]. There are currently no established protocols for incorporating oral health education [10]. The current study underscores the need for changes in policy and practices in ways to support pregnant women to optimize their self-care oral health practices.

Furthermore, observations indicate that the utilization of dental services among pregnant women in Nigeria is generally low, with a moderate uptake observed in urbanized areas. Interestingly, these urban centers enhance citizens' access to information through various educational channels [62, 63] and facilitate increased access to primary, secondary, and tertiary dental care services in Nigeria's public and private healthcare settings [62]. Integrating dental health services into Nigeria's primary healthcare system can potentially enhance pregnant women's access to dental care, given that all primary healthcare services in Nigeria include antenatal care. Regrettably, very few primary healthcare centers in Nigeria offer oral health services [63], and those that do are predominantly located in cosmopolitan areas like Lagos. It becomes imperative to raise oral health awareness among pregnant women by integrating oral health education into routine antenatal check-ups, possibly through a dedicated section in the road to health chart. There is also a need for concerted efforts to promote the integration of oral health services into primary healthcare centers across Nigeria, thereby improving the oral health of pregnant women. This approach serves as a strategy to address structural barriers that hinder access to oral healthcare.

Second, we noticed limited dental service utilization by pregnant women, and when utilized, it is for curative care. The national health insurance scheme, if effectively utilized, provides supports for the access of all pregnant women to primary oral health care. However, the coverage is low – as low as 6.9% - and much lower among women less than 30 years, with no formal education, and primigravidae [67]. Addressing structural barriers to accessing oral health care services by pregnant

women will need to be addressed to improve preventive oral health care access by pregnant women in Nigeria. In addition, behavior-related obstacles such as misconceptions and myths about oral health service utilization during pregnancy needs to be tackled through proactive public health education initiatives and awareness campaigns. Active engagement of Community Health Extension workers and Community Health Influencers, Promoters, and Services who are trained to conduct culturally appropriate health promotion and disease prevention services through primary health care and healthy living practices in rural and under-served communities [68–72] can be mobilized to help in this respect. The 625 operational broadcast stations [73] are valuable platforms that can be harnessed to disseminate information on oral health to communities nationwide. In addition, midwives and obstetricians, the primary caregivers that pregnant women interact with during antenatal care can have their competency built to promote the oral health of pregnant women. Currently, they face challenges when discussing oral health concerns and making referrals for dental treatment [74, 75].

However, it is important to emphasize the growing importance of self-care. As highlighted in this review, there is a high level of toothbrush use, which is one form of self-care. There is a rising need to develop and deploy point-of-care devices that empower individuals to assess their oral health needs promptly to enhance the utilization of dental services for oral healthcare. One potential solution is the microbial-enzymatic N-benzoyl-DL-arginine-2-naphthylamide (BANA) test, which is being advocated as a viable point-of-care method for improving oral care among pregnant women [76]. The creation of affordable, sensitive, and precise self-care tools like these can further enhance the practice of oral health self-care among pregnant women.

In addition, we observed regional discrepancies in the volume of published information with extremely few studies from Northern Nigeria, where the maternal and child health crisis is higher [63]. The skewness in the publication volume to Southern Nigeria creates a significant knowledge gap in understanding the multifaceted determinants that impact women's oral healthcare behaviors during pregnancy. This gap can hinder the development of evidence-based, effective interventions and policies to promote maternal oral health in the country. [64] Thus, future studies from other parts of the country, especially Northcentral Nigeria, where no study exists, are needed.

We also observed the absence of publications in the year 2020. This absence may indicate a lack of research focus or interest in the topic during that specific year. Several factors could have contributed to this, including a potential shift in research priorities, challenges in accessing relevant datasets or research resources,

methodological obstacles in conducting studies, or external factors such as funding constraints, policy changes, or global events. Additionally, the absence of publications in 2020 could be attributed to publication lag, where studies conducted during that time were not published until later years, potentially skewing the distribution of studies across different time periods. Further investigation and analysis are necessary to fully comprehend the implications of this absence within the broader research landscape. Nevertheless, the overall trend in publication suggests a progressive increase in the number of publications, indicating a growing interest in the topic. It is anticipated that by the end of the decade, publications on oral health behavior among pregnant women in Nigeria will continue to rise. Therefore, the current review is timely and significant as it can inform and influence the direction of future research in this field.

Of interest is the observed use of chewing sticks by pregnant women [15, 34, 35, 38–40, 42, 44–46]. Promoting contemporary oral hygiene practices while acknowledging and respecting cultural traditions is crucial to enhancing and preserving pregnant women's oral health. Although modern oral care products have evolved into advanced multifunctional solutions capable of maintaining the presence and effectiveness of active oral health-enhancing ingredients in the mouth to offer continuous protection throughout the day [65], chewing sticks can also effectively clean oral tissues, may surpass toothbrushes in some respects, and has significant anti-plaque properties [66]. This study highlights the need to include information on the effective use of chewing sticks in the oral health information package for pregnant women in Nigeria. However, there is a lack of research comparing the effectiveness of chewing sticks and toothbrushes during pregnancy, calling for further investigation.

## Conclusions

This scoping review underscores significant disparities in oral hygiene practices among pregnant women in Nigeria. Many pregnant women rely on self-care methods such as tooth cleaning, while a smaller proportion seek out dental services. However, both the frequency of toothbrushing and the utilization of dental services fall short of optimal levels. Identified individual, structural, and behavioral factors deter pregnant women from accessing dental services. Future studies are needed to enhance our understanding of the oral health practices among pregnant women, and more studies are needed from Northern Nigeria.

## Abbreviations

PRISMA Preferred Reporting Items for Systematic Review and Meta-Analysis

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12903-024-04728-2>.

Supplementary Material 1

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## Author contributions

Conceptualization: L.B.A.; Methodology: L.B.A., and A.O.E.; Software: L.B.A., A.O.E., and O.S.I. Validation: L.B.A., A.O.E., and O.S.I.; Formal Analysis: L.B.A., A.O.E., and M.O.F. investigation, L.B.A., A.O.E., O.S.I.; resources: L.B.A., and A.O.E., G.U.E. and M.O.F.; Data Curation: L.B.A., A.O.E., M.O.F., G.U.E.; Writing—original draft preparation, L.B.A.; writing—review, A.O.E., G.U.E., and M.O.F.; Visualization, L.B.A., A.O.E., G.U.E. and M.O.F. supervision, G.U.E. and M.O.F. All authors reviewed and approved the final published manuscript.

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## Data availability

The data provided in this research can be freely accessed on PubMed, Science Direct, Web of Science, EBSCOHOST, Sabinet, African Index Medicus, and Scopus.

## Declarations

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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