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Assessing Oral Health Knowledge and Practices: A Study of Mothers and Children in Northwestern Nigeria

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Abstract

Purpose – To explore the knowledge, attitude, and practices regarding oral and dental health for mothers of children aged 6 months to 8 years and older children aged above 8 years to 15 years seeking healthcare in a tertiary health facility in the Sokoto metropolis.
Design/methods/approach – A cross-sectional study was conducted between February and April 2022. Subjects included mothers of 6 months to < 8 years and children aged 8 to 15 years presenting with minor illnesses to the General outpatient clinic. A structured questionnaire and focus group discussion guide were used to collect the information. Data was analyzed using IBM SPSS version 25.
Findings – Out of 238 participants, 128 children were 6 months to <8 years, while 110 were above 8 to 15 years old. Less than half of mothers, 46.9%, had inadequate knowledge, while 20.3% had adequate practices. Among the older children in this study, the proportion of those with good knowledge, attitude, and practice level of oral health was 60%, 61.8%, and 32.7%. There was a significant moderate positive correlation between knowledge and attitude scores but not practice for the 2 groups. Mothers' education and fathers' occupation were significantly related to good scores (p=<0.05). Mothers of children with primary teeth and older children with permanent teeth in this study all had poor oral and dental health practices. More awareness programs should be conducted in the community to target those with poor practices. Increasing female education and empowerment is also essential in this regard.
Research implications/limitations – This research implies that from an early age, it is necessary to check oral and dental health to prevent infectious diseases.
Originality/value – Oral and dental health is an essential aspect of primary health care and is a situation in which the mouth, teeth, and gums are healthy and free from any diseases. Parents, especially mothers, are responsible for maintaining good oral hygiene practices and inculcating good oral hygiene habits in children.

Keywords Dental Health, Practices mothers, Oral health

Paper Type Research paper

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1. Introduction

Oral and dental health is an essential aspect of primary health care and is a situation in which the mouth, teeth, and gums are healthy and free from any diseases. This critical aspect of general health needs to be well inculcated right from early childhood, as it has been documented that poor mouth hygiene is one of the risk factors for oral diseases (Akinyamoju et al., 2020). Parents, especially mothers, are responsible for maintaining good oral hygiene practices and inculcating good oral hygiene habits in children (Salama et al., 2020). Maintaining good oral and dental hygiene is also an essential aspect in the prevention of severe infections like infective endocarditis (IE) in children with structurally normal hearts as well as those with congenital and acquired heart defects. Infections of the teeth and gums and interventions for their prevention and treatment can lead to the transfer of micro-organisms from the oral cavity into the bloodstream, which can adhere to endocardial surfaces and cause infective endocarditis (Bumm & Folwaczny, 2021).

Recent guidelines for preventing IE have emphasized the maintenance of good oral hygiene above antibiotic prophylaxis given before specific dental procedures because significant bacteremia can even occur during simple everyday activities like chewing and brushing (Lockhart et al., 2008). Also, poor oral hygiene can lead to conditions like gingivostomatitis, which can lead to progressive ulceration (Noma), especially in young and severely malnourished children lima nam. This study was therefore undertaken to explore the knowledge and practices regarding oral and dental health for mothers of children aged 6 months to 8 years as well as knowledge and practices of older children aged above 8 years to 15 years seeking healthcare in a tertiary health facility in Sokoto metropolis to expose gaps in this regard for public health education.

Studies have highlighted the critical role of mothers in shaping the oral health practices of their children, emphasizing the importance of maternal knowledge and attitudes toward dental care and indicating that maternal behavior significantly influences children's dental health outcomes (Brailer et al., 2019; Rahina et al., 2021). Research demonstrates a direct correlation between mothers' dental health practices and their children's oral health status (Hammersley et al., 2022; Khan et al., 2022). Further investigations have provided insights into the effectiveness of various tools and interventions in improving maternal dental health knowledge and practices, such as developing specialized questionnaires and mobile applications (Ramírez-Trujillo et al., 2021; Setijanto et al., 2021). Studies have shed light on the multifaceted nature of oral health education, underscoring the need for culturally sensitive interventions tailored to specific community needs (Kumari et al., 2019; Sabdho Wening et al., 2019).

Learning in early childhood education is very important in stimulating children's cognitive development. However, as previous research found, some learning in early childhood education institutions is one-way. Namely, teachers give children lectures or activity sheets for coloring, and so on(Martono, 2018; Nurdin & Anhusadar, 2020). Apart from that, early childhood learning also forces children(Fadlillah, 2020), thereby eliminating the essence of children's learning, namely playing (Suyanto, 2005).

Providing stimulus for early childhood education should adapt to children's learning concepts. Previous literature states that there are several ways to stimulate children's cognitive development, namely: drawing geometric shapes (Natacik, 2018), scientific approaches (Akromah & Rohmah, 2019), demonstration methods (Anggraini & Suyadi, 2019), playing with blocks(Dea & Latipah, 2017), calistung learning(Yulisar et al., 2020), domino cards (Wulandari et al., 2022), and smart boards (Candra, 2022; Luh & Wahyuni, 2022). This literature does not provide freedom of learning for young children.

However, significant gaps and controversies remain in the field, including a lack of awareness and engagement among mothers regarding their children's dental health, indicating a critical need for more effective and accessible educational programs (Gerreth et al., 2020; Ludovichetti et al., 2022). Research has pointed out the variability in parental perceptions and practices across different regions, suggesting a need for region-specific strategies (Alshammari et al., 2021; Soares et al., 2022).

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This study aims to explore innovative approaches to early childhood oral and dental health education, focusing on the role of mothers. By examining existing gaps and limitations in current strategies, this research seeks to develop a more holistic and practical model for oral health education that can be implemented from an early age, thereby reducing the prevalence of dental diseases in future generations (Butten et al., 2020; Riaz et al., 2020).

2. Methods

This study was conducted at the General Outpatient Clinic (Paediatric section) of Usmanu Danfodiyo University Teaching Hospital, Sokoto, targeting children aged 1 month to 15 years. The clinic primarily handles minor illnesses under the care of medical officers, resident doctors, and consultants, referring more complex cases to the Emergency Paediatric Unit and multi-specialty clinics. It was a cross-sectional study, with data collection from February to April 2022. The subjects included mothers of children aged 6 months to under 8 years and children aged 8 to 15 years, all presenting with minor illnesses. Inclusion criteria were children between 6 months and 15 years whose caregivers provided informed written consent, along with children aged 8 years and above who gave assent. Exclusion criteria encompassed children undergoing dental treatment belonging to the same family. The minimum sample size was calculated using a specified formula:

$$\boldsymbol{n = \frac{Z^2 pq}{d^2}}$$

Where n = minimum sample size, z = Standard average deviation set at 1.96, and p = Prevalence of adequate knowledge of oral health among school-age children in Lagos. Therefore, a prevalence of 52.3% (0.523) was used.

$$\boldsymbol{n = \frac{(1.96)^2(0.523)(0.477)}{0.05^2}} = 384$$

However, this was adjusted with finite correction to the average number of children seen in the clinic weekly at 625, which is < 10,000; therefore, the formula below:

$$\text{n= } \boldsymbol{no/(1 + [no - \frac{1}{N}])}$$

Where n ◦ = initial sample size calculated (384), n = sample size with finite correction for population size, N = Population size (625).

Participants were selected for the study through systematic random sampling based on age as they visited the clinic for follow-up, ensuring the desired sample size. The data collection instruments included demographic data entered into a proforma derived from two World Health Organization (WHO) Oral Health questionnaires. These questionnaires were tailored for mothers of children under 8 and for children aged 8 and above, focusing on their knowledge, attitudes, and practices regarding oral health. During clinic visits, caregivers received a general health talk about their children's condition, and consent for the study was obtained. Participants were divided into two age groups: 6 months to under 8 years and 8 to 15 years, categorized based on the presence of primary or permanent teeth. Mothers and caregivers were interviewed about their dental care knowledge, attitudes, and practices for children below 8 years, while older children were directly interviewed.

The study evaluated knowledge, attitudes, and practices through scoring systems. Knowledge was measured by the number of correct answers, with scores ranging from 0-69%, indicating inadequate knowledge, and 70-100%, indicating adequate knowledge (Choufani & Barakat, 2023). Attitudes were assessed using a 3-point Likert scale, with responses classified as either negative (0-69%) or positive (70-100%). Practice was scored based on correctness, with over 70% indicating adequate practice. Data analysis involved inputting data from each subject

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and control using the Statistical Package for Social Sciences (SPSS) software version 22.0. The analysis included prevalence rates, age distribution, and mean scores, presented as percentages, means, and standard deviations. Frequency distribution tables, Chi-square tests, Fischer's exact test, and Pearson correlation were employed for analysis, with a significance level set at p-value <0.05.

Ethical considerations were meticulously adhered to. The Usmanu Danfodiyo University Teaching Hospital Ethics Committee, Sokoto, granted ethical approval (approval number UDUTH/HREC/2020/931/V1). Informed written consent was obtained from the legally authorized caregivers, and children aged 8 years and above-provided assent. Confidentiality was stringently maintained for all collected data.

3. Result

3.1. Socio-demographic characteristics of the study participants

Out of a total of 238 participants, there were 128 children aged 6 months to <8 years (58 males, 70 females), while 110 (56 males, 54 females) were aged above 8 years to 15 years. The majority were of the middle social class and the Hausa tribe. Table 1 shows the characteristics of the 2 groups of children according to their demographics and the socioeconomic status of their families.

Table 1. Socio-demographic parameters of the study participants (n = 238)

Variable	Children with primary teeth (6 months to <8 years) N=128	Children with permanent teeth (8 years to 15 years) N=110
Gender		
Male	58 (45.3)	56 (50.9)
Female	70 (54.7)	54 (49.1)
Socio-economic status		
Upper	20 (26.6)	16 (14.5)
Middle	74 (57.8)	58 (52.7)
Lower	34 (15.6)	36 (32.7)
Tribe		
Hausa	88 (68.8)	78 (70.9)
Fulani	18 (14.1)	26 (23.6)
Yoruba	8 (6.3)	4 (3.6)
Ibo	6 (4.7)	2 (1.8)
Others	8 (6.3)	0 (0.0)

3.2. Knowledge of oral health among mothers of children aged 6 months to 8 years

Even though the majority (87.5%) knew a caregiver should supervise young children's oral health practices, only about half of the mothers knew that unhealthy oral and dental habits could result in bloodstream infections. Only about 60% (76/128) knew that some toothpaste contains fluoride, essential for dental care. At the same time, more than 80% did not know the importance of fluoride. Just over half (53.1%; 69/128) had inadequate knowledge (scores < 7.0), while 46.9% had adequate knowledge. More detailed information can be seen in the table 2.

3.3. The attitude of mothers toward the oral health of their children

While all the mothers perceived that oral health is related to their child's well-being, a significant proportion felt that milk teeth do not require such care as they shall be shed off by 6 to 10 years. More than 90% felt dental care is only necessary when the child feels pain. All the mothers of 128 children (100%) had positive attitudes towards their children's oral and dental health. More detailed information can be seen in the table 3.

3.4. Practice of oral health of mothers of subjects with primary teeth

Most mothers, 60 (46.8%), started cleaning their children's teeth after 1 year. Only 9.4% commenced cleansing before tooth eruption. The mean age at the first tooth's eruption was 7.26 ± 1.3 months (males 8.2 ± 3.9; females 6.4 ± 1.5; P = 0.017). Most used their fingers to clean their children's teeth (62.5%) without toothpaste (54.7%). Only 14% had ever had a routine dental visit. Ninety (70.3%) admitted that they do not give sugary foods to their children. More detailed information can be seen in the table 4.

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Table 2. Responses by mothers on knowledge of oral and dental health of their children aged 6 months to 8 years

Questions	Yes	No	Do not know
Do you know your teeth are an essential part of your body?	122 (95.3)	6 (4.7)	0 (0.0)
Do you know children should have their teeth brushed by an adult until they are 7 to 8?	112 (87.5)	14 (10.9)	2 (1.6)
Do you know that some toothpaste contains fluoride?	76 (59.4)	52 (23.4)	22 (17.2)
Do you know that using fluoridated tooth paste is suitable for your children's teeth?	24 (18.8)	10 (7.8)	94 (73.4)
Do you know that consuming snacks like candies and cookies that stick to teeth will cause dental decay?	102 (79.7)	18 (14.1)	8 (6.3)
Do you know that unhealthy oral and dental habits can result in bloodstream and heart infections?	66 (51.6)	22 (17.2)	40 (31.3)
Do you know that Dentists play an important role in preventing oral diseases?	92 (71.9)	16 (12.5)	20 (15.6)
Do you know that it is necessary to go for dental check-up?	74 (57.8)	42 (32.8)	12 (9.4)
Overall knowledge score			
Adequate	59 (46.9)	Mean knowledge scores = 6.6 ± 1.6	
Inadequate	69 (53.1)	Range = 2.5 – 10.0	

Table 3. Attitudes of mothers about their children's oral health

Questions	Responses		
	Agree	Unsure	Disagree
Do you think it is good oral health is related to the general health of your child?	128 (100)	0 (0.0)	0 (0.0)
Do you think cleaning the child's teeth after every meal is necessary?	116 (90.6)	12 (9.4)	0 (0.0)
Do you think the mother should guide cleaning the child's teeth?	124 (96.9)	4 (3.1)	0 (0.0)
Do you believe milk teeth are essential for children to chew food properly?	102 (79.7)	26 (20.3)	0 (0.0)
Do you think brushing your child's teeth will help prevent tooth decay?	124 (96.9)	4 (3.1)	0 (0.0)
Do you think milk teeth do not require good care as they will disappear?	106 (82.8)	20 (15.6)	2 (1.6)
Do you believe visiting the dentist is only necessary when your child experiences pain?	118 (92.2)	0 (0.0)	10 (7.8)
Overall attitude score			
Positive	128 (100)	Mean attitude scores = 9.6 ± 0.7	
Negative	0 (0.0)	Range = 7.5 – 10.0	

3.5. Correlation of mother's knowledge, attitude, and practice scores

There was a moderate positive correlation between the knowledge vs. attitude scores r (126) = 0.485, p < 0.001, but a weak, non-significant positive correlation between knowledge vs. practice and attitude vs. practice.

3.6. Relationship of educational and occupation of parents to mother's knowledge, attitude, and practice grading

According to mothers ' educational status, there was a significant difference in the knowledge grading (inadequate vs adequate) (p =0.02). This was also observed for the father's educational status, as those with higher education had a higher proportion of adequate knowledge and practice. The attitude grade was not compared as all the respondents had good attitudes. More detailed information can be seen in the table 5.

Table 4. Mother's practices regarding oral health of subjects with primary teeth

Questions	Responses	
Age at the eruption of the first tooth	N	%
4-5 months	28	21.9
6 -7 months	64	50.0
8 – 12 months	24	18.8
>1 year	10	7.9

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Questions	Responses	
Age at the commencement of oral cleaning by the mother		
Before tooth erupted	12	9.4
Immediately after the tooth erupted	28	21.9
At 1 year	28	21.9
After 1 year	60	46.8
Aids used to clean teeth		
Finger	80	62.5
Toothbrush	44	34.4
Chewing stick	2	3.2
Do you ask your child to rinse their mouth after each meal?		
Yes	40	31.2
No	88	68.8
Use of toothpaste		
Yes	58	45.3
No	70	54.7
Does the paste contain fluoride?		
Yes	24	18.8
No/ I do not know/ NA	104	82.8
Do you give sweets to your child frequently?		
Yes	36	29.7
No	90	70.3
Are there any routine dental visits?		
Yes	18	14.1
No	110	85.9
Overall Practice score		
Adequate	26 (20.3)	Mean practice scores = 3.3 ± 1.3
Inadequate	102 (79.7)	Range = 1.0 – 7.0

3.7. Knowledge, Attitude, and Oral dental care Practices of older children > 8 years with permanent dentition

Most children recognized the importance of healthy teeth; however, only two-thirds knew that bloodstream infections could result from poor dental health and the necessity of regular check-ups. The overall knowledge score was adequate in 66 (60%) and inadequate in 44 (40%). More detailed information can be seen in the table 6.

About two-thirds of the children (61.8%) had positive attitudes about oral health. Even though the majority said they were satisfied with the appearance of their teeth, about two-thirds admitted they had issues with other children's perception of their teeth. More detailed information can be seen in the table 7.

Overall, oral and dental care practices were inadequate in 67.3%. Only 36 (32.7%) had visited a dentist, and 70 (63.4%) cleaned their teeth daily, while 82 (74.5%) took sweets daily. More detailed information can be seen in the table 8.

3.8. Correlation of mother's knowledge, attitude, and practice scores

There was a strong positive correlation between the knowledge vs attitude scores r (108) = 0.864, p = 0.001, a moderate positive correlation between the knowledge vs practice scores r (108) = 0.423, p = 0.001 and a moderate positive correlation between the perception vs. practice scores r (108) = 0.386, p = 0.004.

Table 5. Relationship of educational and occupation of parents to Knowledge and Practice grading

Parameter	Knowledge grade		Practice grade	
	Inadequate	Adequate	Inadequate	Adequate
Father's education				
None	14 (53.8)	13 (65.7)	24 (92.3)	2 (7.7)
Primary	0 (0.0)	2 (100)	0 (0.0)	2 (100)
Secondary	4 (13.3)	26 (86.7)	28 (93.3)	2 (6.7)

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Parameter	Knowledge grade		Practice grade	
	Inadequate	Adequate	Inadequate	Adequate
Tertiary	28 (40.0)	42 (60.0)	50 (71.4)	20 (28.6)
	FE = 9.6; p = 0.03*		FE = 10.1; p = 0.02*	
Father's occupation				
Unemployed	8 (100)	0 (0.0)	8 (100)	0 (0.0)
Laborer/petty trader	4 (22.2)	14 (77.8)	14 (77.8)	4 (22.2)
Lower civil servant*	0 (0.0)	2 (100)	2 (100)	0 (0.0)
Intermediate civil servant*	16 (34.8)	30 (65.2)	30 (65.2)	16 (34.8)
Higher civil servant*	18 (33.3)	36 (66.7)	48 (88.9)	6 (11.1)
	FE = 7.6; p = 0.07		FE = 5.1; p = 0.2	
Mother's education				
None	20 (34.5)	38 (65.5)	50 (86.2)	8 (13.8)
Primary	6 (100.0)	0 (0.0)	6 (100.0)	0 (0.0)
Secondary	12 (33.3)	24 (66.7)	26 (72.2)	10 (27.8)
Tertiary	4 (16.7)	20 (83.3)	20 (71.4)	8 (28.6)
	FE = 9.5; p = 0.02*		FE = 3.3; p = 0.50	
Mother's occupation				
Unemployed	32 (36.0)	64 (64.0)	50 (80.0)	20 (20.0)
Laborer/petty trader	2 (33.3)	4 (66.7)	6 (100)	0 (0.0)
Lower civil servant*	2 (33.3)	4 (66.7)	4 (33.3)	2 (66.7)
Intermediate civil servant*	4 (33.3)	8 (66.7)	4 (33.3)	8 (66.7)
Higher civil servant*	2 (50.0)	2 (50.0)	2 (53.8)	0 (65.7)
	FE = 0.9; p = 1.0		FE = 2.2; p = 0.8	

Table 6. Knowledge, Attitude, and Oral care Practices of older children

Knowledge level		
Questions	Yes	No
Do you know your teeth are an essential part of your body?	108 (98.2)	2 (1.8)
Do you know that consuming snacks like candies and cookies that stick to teeth will cause dental decay?	88 (80.0)	22 (20.0)
Do you know that unhealthy oral and dental habits can result in bloodstream and heart infections?	68 (61.8)	42 (38.2)
Do you know that Dentists play an important role in preventing oral diseases?	76 (69.1)	34 (30.1)
Do you know that it is necessary to go for a dental check-up?	66 (60.0)	44 (40.0)
Overall knowledge score	Mean knowledge scores = 3.7 ± 1.5	
Adequate 66 (60.0)	Range = 1.0 – 5.0	
Inadequate 44 (40.0)		

3.9. Relationship of educational and occupation of parents to knowledge, attitude, and practice grading of children aged 8 to 15 years

There was a significant difference in the knowledge and attitude grading (inadequate vs adequate) according to fathers' occupational status and mothers' educational status ($p < 0.05$). A higher proportion of children with better knowledge and attitude had mothers who were highly educated and fathers with higher levels of occupation. More detailed information can be seen in the table 9.

Table 7. Attitude regarding Oral and dental health amongst Older children

Attitude regarding Oral Health	Agree	Disagree
Would you describe the state of your teeth and gums as healthy?	110 (100)	0 (0)
Are you satisfied with the appearance of your teeth?	108 (98.2)	2 (1.8)
Do you often avoid smiling or laughing because of your teeth?	66 (60.0)	40 (36.4)
Do you feel other children make fun of your teeth?	66 (60.0)	40 (36.4)
Does toothache or discomfort cause you to miss school activities?	70 (63.6)	30 (27.3)
Do you have difficulty in biting hard food?	58 (52.7)	46 (41.8)
Do you have difficulty in chewing food?	62 (56.4)	46 (41.8)
Overall Attitude score		
Positive 68 (61.8)	Mean attitude scores = 17.4 ± 4.4	
Negative 42 (38.2)	Range = 11 – 21	

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Table 8. Oral and dental care Practices of older children

Oral and dental care Practices		
How often have you gone to the dentist during the past 12 months?		
Never		74 (67.3)
I visited at least once		36 (32.7)
How often do you clean your teeth?		
Not often		40 (36.4)
Cleans at least once a day		70 (63.4)
Do you use toothpaste to clean your teeth?		
Yes		94 (85.5)
No		16 (14.5)
Do you use toothpaste that contains fluoride?		
Yes		54 (57.4)
No/ I do not know.		40 (42.6)
Which item do you use to clean your teeth?		
Finger		92 (83.6)
Toothbrush		88 (80.0)
Chewing-stick		68 (61.8)
Toothpick		20 (18.2)
Charcoal		10 (9.1)
Floss		2 (1.8)
Frequency of intake of sugary items (sweets/gums)		
Frequent (several times daily/daily/several times weekly)		82 (74.5)
Infrequent (once a week/once a month)		28 (25.5)
Overall Practice score		
Adequate	36 (32.7)	Mean practice scores = 4.0 ± 1.5
Inadequate	74 (67.3)	Range = 1.0– 7.0

Based on the table 9 contains data on various parameters related to father's education, father's occupation, mother's education, and mother's occupation. Each parameter is analyzed based on knowledge grade, attitude grade, and practice grade.

Table 9. Relationship of educational and occupation of parents to Knowledge and practice grading

Parameter	**Knowledge grade**		**Attitude grade**		**Practice grade**	
Father's education	Inadequate	Adequate	Negative	Positive	Inadequate	Adequate
None	6 (75.0)	2 (25.0)	4 (75.0)	2 (25.0)	6 (75.0)	2 (25.0)
Secondary	6 (18.8)	26 (81.3)	6 (18.8)	26 (81.3)	18 (56.3)	14 (43.8)
Tertiary	28 (42.4)	38 (57.6)	26 (42.4)	36 (57.6)	46 (69.7)	20 (30.3)
	FE = 11.6; p = 0.07*		FE = 7.6; p = 0.06		FE = 2.6; p = 0.60	
Father's occupation						
Unemployed	12 (100)	0 (0.0)	12 (100)	0 (0.0)	10 (83.3)	2 (16.7)
Laborer/petty trader	6 (7.7)	24 (92.3)	6 (7.7)	24 (92.3)	14 (53.8)	12 (46.2)
Lower civil servant*	6 (60.0)	4 (40.0)	6 (60.0)	4 (40.0)	4 (40.0)	6 (60.0)
Intermediate civil servant*	16 (38.1)	26 (61.9)	18 (42.9)	24 (57.1)	30 (71.4)	12 (28.6)
Higher civil servant*	8 (40.0)	12 (60.0)	4 (20.0)	16 (80.0)	16 (80.0)	4 (20.0)
	FE = 15.7; p = 0.002		FE = 17.3; p = 0.001		FE = 4.1; p = 0.41	
Mother's education						
None	24 (66.7)	6 (33.3)	22 (61.1)	14 (38.9)	30 (83.3)	6 (16.7)
Primary	6 (60.0)	4 (40.0)	6 (60.0)	4 (40.0)	6 (60.0)	4 (40.0)
Secondary	8 (16.7)	20 (83.3)	6 (12.5)	42 (87.5)	24 (50.0)	24 (50.0)
Tertiary	6 (37.5)	10 (62.5)	8 (50.0)	8 (50.0)	14 (87.5)	2 (12.5)
	FE = 11.8; p = 0.005*		FE = 12.7; p = 0.03*		FE = 6.7; p = 0.07	
Mother's occupation						
Unemployed	36 (39.1)	56 (60.9)	36 (39.1)	56 (60.9)	58 (63.0)	34 (37.0)
Laborer/petty trader	4 (50.0)	4 (50.0)	2 (25.0)	6 (75.0)	8 (100)	0 (0.0)
Lower civil servant*	2 (50.0)	2 (50.0)	2 (50.0)	2 (50.0)	2 (50.0)	2 (50.0)
Intermediate civil servant*	2 (33.3)	4 (66.7)	2 (33.3)	4 (66.7)	6 (100)	0 (0.0)
Higher civil servant*	-	-	-	-	-	-

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Parameter	Knowledge grade	Attitude grade	Practice grade
	FE = 0.87; p = 1.0	FE = 0.86; p = 1.0	FE = 3.5; p = 0.31

4. Discussion

Oral hygiene is an essential aspect of general health and quality of life. Oral hygiene practices, when inculcated, tend to keep the mouth clean and healthy by maintaining plaque-free tooth surfaces. Poor oral health practices lead to the accumulation of dental plaque, which harbors bacteria that cause dental caries, gingivitis, and periodontitis. Individual, parental, family, and community factors all influence oral hygiene. These are influenced by communal knowledge, norms, beliefs, values, and practices (Oyedele et al., 2019).

This hospital-based study used different questionnaires to assess the knowledge, attitudes, and practices of mothers of young children below eight years and of older children with permanent teeth. Most of the respondents were Hausa-Fulani, which is unsurprising, being the prominent residents of the Sokoto metropolis in North-western Nigeria. The majority were also of middle socioeconomic status, as the hospital of study is the major tertiary hospital within the state and is patronized mainly by those who can afford their hospital bills (Isezuo et al., 2018).

Less than half of mothers (46.9%) had good knowledge of the oral and dental health of their children, while all (100%) had positive attitudes, and fewer (20.3%) had good practices. This showed that a positive attitude was higher than appropriate knowledge, and good practice was deficient among the mothers. Mothers in this study had lower levels of education. They were mainly unemployed, similar to a study by Choufani (Choufani & Barakat, 2023) in Beirut, which used a similar questionnaire among mothers. The proportion of sound knowledge, attitude, and practice in their study was 48.6%, 88.9%, and 13%, respectively, but was unlike BenGhasheer (BenGhasheer & Saub, 2022) in a study of Libyan parents of majorly upper social class where higher figures of 77.7%, 86.4% & 78.7% were reported respectively. Also, among mothers in Ibadan, Nigeria, 36% had a good attitude, while 64% had poor knowledge (Aderinokun et al., 1998).

Only 18% of mothers knew that fluoride was a protective component of toothpaste, which implies that mothers do not note whether their paste contains fluoride. A similar low proportion of 22.7% of mothers were aware of this in the study by Jain in India. More than 50% of mothers were aware in other studies, and they had a higher level of education than seen in our study, which could probably be responsible (BenGhasheer & Saub, 2022; Choufani & Barakat, 2023). This hospital-based study used different questionnaires to assess the knowledge, attitudes, and practices of mothers of young children below eight years and of older children with permanent teeth. Most of the respondents were Hausa-Fulani, which is unsurprising, being the prominent residents of the Sokoto metropolis in North-western Nigeria. The majority were also of middle socioeconomic status, as the hospital of study is the major tertiary hospital within the state and is patronized mainly by those who can afford their hospital bills (Isezuo et al., 2018).

All mothers had positive attitudes; however, it has been reported that a good attitude does not necessarily translate to good practice, and many may give socially acceptable responses to those queries. It was also observed that about 20% of mothers were unsure of the care of milk teeth since they would eventually fall off. This was also observed by Jain and Chinoufa (Choufani & Barakat, 2023; Uday Kumar et al., 2011). Milk teeth require appropriate care because apart from caries causing a child pain and distress, other complications such as periodontal infections and bloodstream infections may result. Sanaa from Morocco reported in their study that mothers' excellent knowledge and attitude positively affected their children's dental health (Chala et al., 2018).

Mothers in this study had a low practice score because less than 50% started teeth cleaning after a year and used toothpaste. Almost 90% did not know whether their paste had fluoride and did not practice routine visits to dentists. The majority used their fingers only to clean their children's teeth. In contrast, a study from Ibadan showed that most mothers used cotton wool (Aderinokun et al., 1998). Also, mothers needed to learn the age at which a child should be taken to the dental clinic for the first time and had not taken their child for any dental visit (Aderinokun

et al., 1998). Knowledge about the role of fluorides and the importance of frequent dental visits was found to need to be improved among the participants (Sehrawat et al., 2016; Whelan et al., 2021).

Among the older children in this study, the proportion of those with good knowledge, attitude, and practice level of oral health was 60%, 61.8%, and 32.7%, and there was also a positive correlation between the means of the scores, though more significant between knowledge and attitude. Practice level was also low, as was seen with the mothers supporting that parents acting as role models would positively impact their children's oral health. In Lagos, Sepuluh's findings among school students reveal that 65.5% had a good attitude, 64.0% had a positive attitude, and 70.5% had a good practice. Despite similar knowledge and attitude levels, their practice levels were much higher than those in our study. This could be due to more exposure and higher level of education of their parents, especially mothers, compared to this study. The knowledge and attitude were significantly related to their father's occupation and mother's education level; however, practice was not related. The pupil's gender and parents' occupation were predictors of oral health practice in another study; however, gender was not related (Akinyamoju et al., 2020).

4.1. Research Contribution

This study contributes significantly to the understanding of oral and dental health knowledge, attitudes, and practices among mothers and children in Northwestern Nigeria, addressing a crucial gap in public health education. By identifying the disparity between positive attitudes (100% among mothers) and inadequate practices (20.3%), it underscores the need for effective interventions targeting behavioral change. The originality of this research lies in its dual focus on both mothers and children, highlighting intergenerational influences on oral health practices. Furthermore, it provides practical implications for improving oral health education, emphasizing the role of socio-economic and educational factors, which can inform policies to promote healthier communities.

4.2. Limitations

This research acknowledges several limitations. Being a hospital-based study, the findings may not fully represent the broader community, particularly rural populations with differing socio-economic conditions. Additionally, the reliance on self-reported data introduces a risk of social desirability bias, where participants might have overstated their knowledge or attitudes. Another limitation is the cross-sectional design, which limits causal inferences about the relationship between knowledge, attitudes, and practices. Finally, the study does not account for cultural or regional variations beyond Sokoto, which may influence the generalizability of the findings.

4.3. Suggestions

Based on the findings, future research should adopt community-based approaches to include rural and underrepresented populations, ensuring a broader applicability of results. Practical recommendations include integrating oral health education into maternal and child healthcare services and school curricula, supported by culturally sensitive and locally tailored awareness campaigns. Policymakers should prioritize increasing access to fluoride-containing dental products and routine dental check-ups, especially in low-income areas (Oyedele et al., 2019; Alshammari et al., 2021; Soares et al., 2022). Further, longitudinal studies are recommended to explore the causal relationships between knowledge, attitudes, and practices and evaluate the long-term impact of educational interventions.

5. Conclusion

The study conducted at Usmanu Danfodiyo University Teaching Hospital in Sokoto, Nigeria, aimed to assess mothers' and children's oral and dental health knowledge, attitudes, and practices, revealing substantial gaps, particularly among mothers of younger children. Key findings include inadequate oral health practices, a strong correlation between the parents' socio-economic status and children's oral health knowledge, and a general yet superficial positive attitude towards oral

health. These results highlight the crucial need for integrating oral health education within broader healthcare and educational systems, especially in socio-economically disadvantaged communities. While the study provides valuable insights, its geographical limitation and reliance on self-reported data suggest a need for broader, more objective research. Overall, this study underscores the importance of educational interventions and community-based health programs in improving oral health outcomes in Nigeria.

Declarations

Author contribution statement

Khadijat Omeneke Isezuo conceived the idea. Usman Muhammad Sani, Usman Muhammad Waziri, and Bilkisu Garba Ilah conducted data collection, and performed the analysis. Adedayo Ibikunle and Abdulrazaq Olanrewaju Taiwo contributed to the developed theory of Oral Health Knowledge and Practices. Asma'u Adamu and Fatima Bello Jiya developed of early child. All authors engaged in discussions regarding the findings and made contributions to the final manuscript.

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Data availability statement

The dataset generated and analyzed during the research is available from the corresponding author upon reasonable request.

Declaration of interests statement

All authors declare that they have no financial or personal interests that could influence the work presented in this manuscript.

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