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A cross sectional mixed method study to assess knowledge, practices and barriers of caregivers regarding oral health care in children (2-6 years) in selected rural areas of Meghalaya

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Abstract
Oral health is essential for children's overall well-being, especially in early childhood. Effective oral care practices prevent dental issues and establish lifelong hygiene habits. This study assessed caregivers' knowledge, practices, and barriers of caregivers related to Oral Health Care in Children (2-6 years) in rural areas of Meghalaya using a mixed-method approach and a semi structured questionnaire was used for an in-depth interview and a checklist for demonstration of the brushing technique. Among 110 caregivers surveyed, the average age was 30.4 years. Results indicated that 61.8% had average knowledge (mean score 64.84%), while 58.2% demonstrated poor oral health practices. Alarmingly, 99.2% did not take their children for regular dental check-ups, often seeking care only when problems arose. Key barriers included lack of oral health awareness, financial constraints, and limited access to free dental services. The study underscores the need for targeted education and support to enhance caregivers' knowledge and practices, ultimately improving oral health care for children.

Keywords: Knowledge, practice, barriers, caregivers, oral health care in children

Introduction
Oral health is multi-faceted, encompassing the ability to speak, smile, smell, taste, touch, chew, swallow, and convey emotions through facial expressions without pain or disease (FDI World Dental Federation) [1]. It plays a pivotal role in the overall well-being of children, particularly in formative years. Adequate oral health care practices in early childhood are crucial for preventing dental issues and establishing lifelong hygiene habits [2]. Oral and periodontal diseases can lead to tooth loss, halitosis, discomfort, and systemic health conditions like cardiovascular disease or diabetes. Difficulty in chewing may result in poor nutrition, while psychological effects like low self-esteem or anxiety can arise. Financial burdens and diminished quality of life are significant concerns. Preventive measures, including optimal oral hygiene and regular dental check-ups, are essential for mitigating these impacts [3, 5].

Caregivers' knowledge and practices regarding oral health care significantly impact children's outcomes. However, children in rural areas face unique challenges in accessing dental care and maintaining good oral health practices due to socio-economic, cultural, and infrastructural factors [5].

Needs of the study
According to the WHO Global Oral Health Status Report (2022), oral diseases affect approximately 3.5 billion people worldwide, with a significant concentration in middle-income countries [6]. In India, a nationwide survey by Kantar IMRB (2019) revealed that 80% of children face oral health issues, including gum inflammation, bleeding, visible caries, and plaque accumulation [7]. The prevalence of untreated dental caries in children under six years old was reported at 49.6% by the Ministry of Health-WHO India (2018) [8].

A study by Sherawat *et al.* (2016) in Uttar Pradesh indicated that only 24.9% of caregivers had good oral health knowledge, with significant gaps in awareness about preventive measures and dental care [9].

V Kumar *et al*. (2020) found that financial constraints (45.19%) and lack of awareness about local dental services (21.84%) were identified as major barriers to care among parents, highlighting the need for educational interventions [10].

This study aims to assess caregivers' knowledge and practices while identifying barriers to effective Oral Health Care in rural Meghalaya. By understanding these factors, targeted strategies can be developed to improve oral health outcomes and inform policy initiatives, community interventions, and educational programs to reduce disparities and enhance access to dental care for children in rural settings.

Objectives

Primary objective(s)

1. To assess knowledge and practices of caregivers regarding Oral Health Care in Children (2-6 years) in selected rural areas of Meghalaya.
2. To identify the barriers of caregivers in achieving Oral Health Care in Children (2-6 years) in selected rural areas of Meghalaya.

Secondary objective(s)

To find the associations between knowledge of caregivers regarding Oral Health Care in Children (2-6 years) with the selected demographic variables.

Methodology

Following the acquisition of Institutional Ethical clearance and Administrative permission, a community-based cross-sectional study was conducted from January 15 to February 10, 2024. This study utilized a mixed-methods approach incorporating both quantitative and qualitative methods to evaluate caregivers' knowledge, practices, and barriers related to Oral Health Care in Children (2 to 6 years). A total of 110 caregivers were selected through a multistage sampling technique for the quantitative analysis, while a purposive sampling technique was employed for the qualitative component to identify barriers in achieving optimal oral health care.

Research instruments were validated by experts from the Departments of Pediatrics, Community Medicine, Dentistry, and Nursing. Pre-testing and a pilot study confirmed the feasibility of the tools for the main study setting. Data were gathered using a semi-structured questionnaire through face to face interview method focused on Oral Health Care in Children in the specified age group. Based on a mean knowledge score of 69.5% reported by Suma Sogi, H P, *et al*., and a 9% margin of error, the sample size was determined to be 110 [11]. Ultimately, 110 caregivers were included, and 17 caregivers were purposively selected for in-depth interviews based on thematic saturation.

Study setting

The study was conducted in 5 selected villages under Jarain PHC, West Jaintia Hills District, Meghalaya namely Jarain, Thangbuli, Amlarem, Lai Lyngdoh and Amlatdoh village.The areas were selected using multi-stage method.

Study procedure

The purpose of the study was explained to the caregivers, confidentiality was assured, and informed consent was obtained from those meeting the inclusion criteria. Quantitative data were collected first through semi-structured interviews, which assessed demographic variables, knowledge, and practices regarding Oral Health Care in Children (2-6 years). A demonstration of brushing technique was evaluated using a checklist based on guidelines from the Indian Dental Association.

If caregivers demonstrated desirable practices such as taking their children for regular dental check-ups, data collection concluded at this point. However, if practices were found to be undesirable, those participants were further selected using purposive sampling for qualitative data collection. This involved semi-structured in-depth interviews aimed at identifying barriers to achieving optimal Oral Health Care for Children.

Statistical analysis

The quantitative data were analyzed using descriptive statistics (Mean, Standard deviation and Percentage) using SPSS version 22 software whereas qualitative data were analysed using thematic analysis.

Results

Table 1: Frequency and percentage distribution of caregivers according to demographic characteristics, N=110

Demographic variable of the caregiver	Frequency (f)	Percentage (%)
Age (in years)		
≤30	56	50.9
31-40	50	45.5
≥41	4	3.6
Informant		
Mothers	110	100
Education		
Primary level	39	35.5
Secondary level	44	40
Higher secondary level	17	15.4
Graduate	10	9.1
Occupation		
Housewife	67	60.9
Daily wager	36	32.7
Private worker	3	2.7
Govt servant	4	3.6
Monthly income (rupees)		
≤5000	53	48.2
5001-10000	52	47.3
≥10001	5	4.5
Total number of children		
1	19	17.3
2	20	18.2
3	27	24.5
4	23	20.9
≥5	21	19.1
Religion		
Christian	110	100

Findings in Table 1 show that majority of the caregivers i.e. 56 (50.9%) are in the age group 18-30 years of age and the mean age of the caregivers is 30.4 years. All the 110 informants were mothers (100%). 44 (40%) have secondary level of schooling. Majority 67 (60.9%) are housewives. Majority of the caregivers i.e. 67 (48.2%) had monthly income between ≤5000 rupees. Out of 110 caregivers, 27 (24.5%) had total of 3 children. All the 110 caregivers are Christian.

Table 2: Frequency and percentage distribution of knowledge score obtained by the caregivers regarding Oral Health Care in children, N=110

Level of knowledge score	Reference score range	Frequency (f)	Percentage (%)	Mean	Standard deviation
Poor	≤7 (≤50%)	19	17.3	9.67	2.23
Average	8-11 (51-75%)	68	61.8		
Good	≥12 (≥75%)	23	20.9		

Table 2 shows that out of 110 caregivers, majority i.e. 68 (61.8%) of them are having average knowledge, 23 (20.9%) have good knowledge and 19 (17.3%) are having poor knowledge regarding Oral Health Care of children with the overall mean knowledge score of 64.84% and the mean and standard deviation of 9.67±2.23, which concluded that most caregivers have average knowledge regarding Oral Health Care of children.

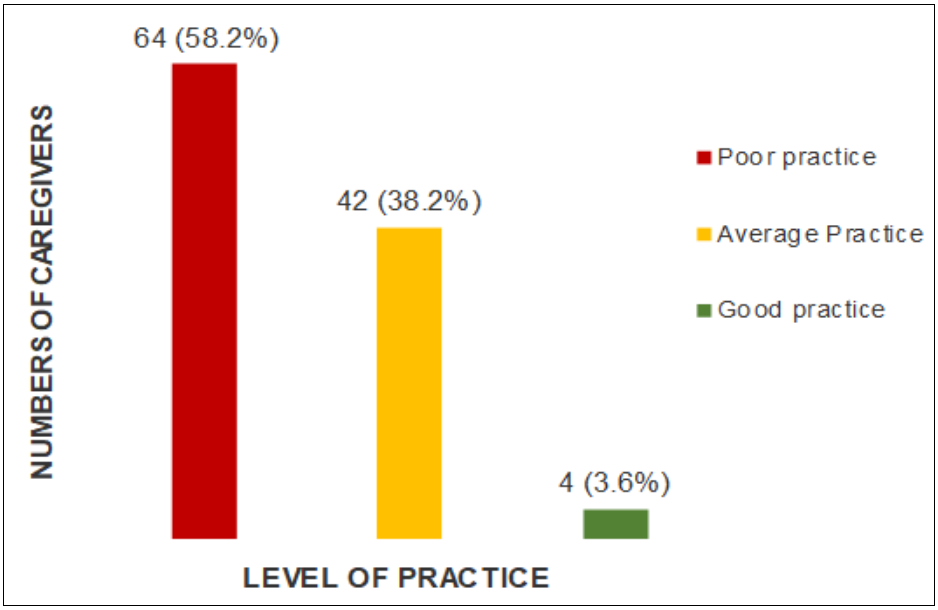

Fig 1: Frequency and percentage distribution of practice score obtained by the caregivers regarding Oral Health Care in children using semi structured questionnaire. N=110

Figure 1 shows that out of 110 caregivers, majority i.e. 64 (58.2%) of them have poor practice, 42 (38.2%) are having average practice and only 4 (3.6%) are having good practice with mean and standard deviation of 7.44±1.98, which concluded that most caregivers have poor practice regarding Oral Health Care of Children.

Table 3: Frequency and percentage distribution of practices of caregivers regarding Oral Health Care in children, N=110

ITEMS	Frequency (f)	Percentage (%)
Assisting their children in brushing	49	44.5
Reason for not assisting		
Too busy with household work	40	65.5
Assisting only when their child starts brushing	12	19.6
Their children are not allowing them to help	8	13.3
Too many children to take care	1	1.6
Brushing twice a day i.e. in the morning and before bedtime	25	22.7
Brushing at least two minutes	59	53.6
Uses of soft bristled tooth brush	108	98.2
Instruct their children to spit tooth paste after brushing	107	97.3
Sharing of toothbrush between siblings		
Yes	2	1.8
No	108	98.2
Reasons of sharing toothbrush(n=2)		
Unintentional	2	100
Frequency of Changing of toothbrush		
Every 3-4 months	75	68.2
Every 5-6months	35	31.8
Rinsing of mouth		
Yes	110	100
No	00	00
Frequency and solution use for rinsing		
3-4 times a day with water (after every meal)	66	60
2 times in a day with water (only after brushing)	44	40

Table 3 shows that out of 110 caregivers, only 49 (44.54%) are assisting their children in brushing teeth. Among the caregivers who are not assisting, 40 (65.7%) reported that they are too busy with household work, 12 (19.67%) reported that they are assisting only when their child starts brushing, 8 (13.3%) reported their children are not allowing them to help.

Only 25 out of 110 (22.7%) caregivers reported that their children brush their teeth twice a day and reported the same for brushing in the morning before meal and before bedtime at night. However, 59 (53.6%) reported that their children brush their teeth for at least 2 minutes. Majority of the caregivers 108 (98.2%) expressed that their children are using soft bristle toothbrush. Majority of the caregivers 107 (97.3%) reported that they instruct their children to spit tooth paste after brushing.

Only 2 (1.8%) caregivers revealed that their children are sharing toothbrushes and the reason was unintentional usage of sibling's toothbrush.

Majority of the caregivers 75 (68.2%) reported that they change their children's toothbrush once every 3-4 months and 35 (31.8%) change after every 5 -6 months

All the caregivers 110 (100%) expressed that their children rinse their mouth with water but not with mouthwash however 44 (40%) reported that their children rinse their mouth 2 times a day (only after brushing) with water and 66 (60%) reported that their children rinse 3-4 times a day with water.

Table 4: Frequency and percentage distribution of practices of caregivers regarding Oral Health Care in children, N=110

ITEMS	Frequency (f)	Percentage (%)
Massaging their children's gums after brushing	2	1.8
Food provided are combination of food like rice. Green vegetables, cereals, pulses, egg ,milk.	96	87.3
Consumption of sweet items like candies, chocolate and chips to children which can cause dental carries	95	86.4
Frequency of sweet (n=95)		
1-2 times per day	60	63.15
3-5 times per week	26	27.3
1-2 times per week	6	6.3
3-4 times per day	3	3.1
Caregivers self-examine their children mouth	95	86.4
Regularly lift the child's lip for examination	10	9.1
Examine to check for white or yellow or brown spot on the teeth, gum swelling and teeth cleanliness and alignment	43	39.1
Regular dental checkup		
Yes	2	1.8
No	108	98.2
Reasons for not taking their children for regular dental check-up (n=108)		
Show to dentist only when oral problem arises	58	53.7
Their children are not complaining of toothache or any oral problem	50	46.3

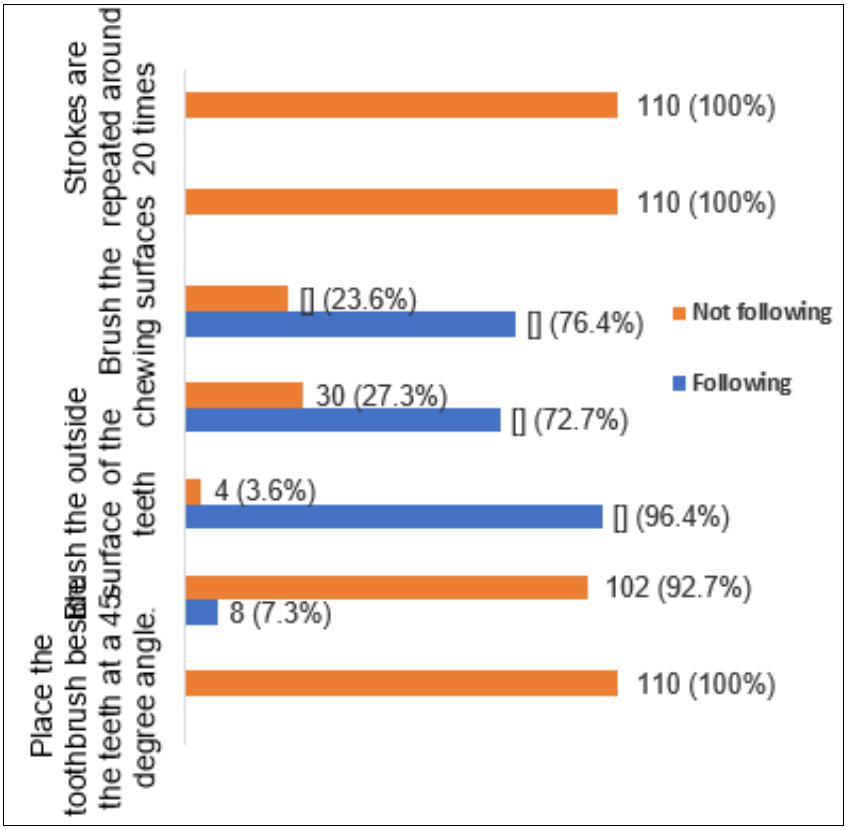

Fig 2: Frequency and percentage distribution of practice of caregivers regarding brushing technique assessed through an observational checklist N=110

Table 4 shows out of 20 caregivers, only 2 (1.8%) massage their children's gum after brushing. 96 (87.3%) of the caregivers provide combination of food like rice. green vegetables, cereals, pulses, egg, milk to their children however 95 (86.4%) of the caregivers also provide food causing dental carries to their children like sweet items like candies, chocolate and chips where majority i.e. 60 (63.15%) provide at least 1-2 times per day.

Majority of the caregivers 95 (86.4%) reported that they self-examine their children's mouth however only 10 (9.1%) examined in a correct way i.e. by regularly lift the child's lip for examination. 43 (39.1%) of the caregiver were examine to check for white or yellow or brown spot on the teeth, gum swelling and teeth cleanliness and alignment.

Out of 110,108 (99.2%) of the caregivers do not take their children for regular dental checkup and 58 (53.70%), reported the reasons is that they only bring their children for dental checkup when oral problem arise and the rest never have their children visited a dentist as they are not complaining of toothache or any oral problem.

Figure 2 shows that out of 110 caregivers, none of them place the toothbrush beside the teeth at a 45-degree angle while demonstrating brushing technique. Only 8 (7.3%) move the toothbrush gently in small circular motion. Majority of the caregivers i.e. 106 (96.4%) brush the outside of the teeth, 80 (72.7%) brushes the inside of the teeth and 84 (76.4%) brush the chewing surfaces. None of the caregiver stroke three teeth at a time neither did they repeated the strokes at least around 20 times.

Findings related barriers of caregivers regarding Oral Health Care in Children

The barriers in achieving optimal Oral Health Care in Children (2-6 years) were identified after analysis of qualitative data collected through in-depth interviews among 17 caregivers chosen purposively based on practice.

After careful, thorough and in-depth reading of the written transcripts, and after they were translated, five themes were identified based on the coding of the responses obtained from the interviews. The findings are reported using thematic analysis. The five themes are:

1. **Lack of oral health awareness:** It is indicated that all of the caregivers are lacking oral health awareness which is the primary barriers that emerge among the caregivers.
2. **Financial Constraints:** Many caregivers strongly felt that financial difficulty is another reason as failure to provide Oral Health Care and services to their children. They reported that visiting a dentist is costly therefore dentist visits were often for dental emergencies (e.g. Toothache, swelling) rather than preventive care.
3. **Time Pressures:** Some caregivers reported that the reason for them not being able to provide adequate oral care for their children is that they were too busy with their work or house hold chores or they felt that it's time consuming to take their children for a dental visit regularly.
4. **Inaccessibility to free oral health services:** Most caregivers reported that they don't have a government run dental clinic in their area of residence and some of them residing in villages like Thangbuli and Jarain have to travel to the block Headquarter which is 3-4 kms away as some private dental clinics are available there. Moreover, some grieve that if they could have dental clinic in their own area of residence that would be very helpful to the people. Therefore, inaccessibility to free and nearby oral health services may also be a reason for caregiver's inability to achieve adequate Oral Health Care for their children.
5. **Cultural Influences:** Cultural beliefs also influence the caregivers' perceptions and practices of their children's Oral Health Care.

Table 5: Association between knowledge of caregivers regarding Oral Health Care with the selected demographic variables, N=110

Demographic Variable of the caregiver		Level of knowledge			p-value
		Poor f (%)	Average f (%)	Good f (%)	
Age(in years)	≤30	13(11.8)	34 (30.9)	9 (8.1)	0.177
	31-40	5 (4.5)	33 (30)	1 (0.9)	
	≥41	1 (0.9)	1 (0.9)	2 (1.8)	
Education	Primary level	9 (8.1)	29 (26.4)	1 (0.8)	0.000*
	Secondary level	7 (6.4)	29 (26.4)	7 (6.4)	
	Higher secondary level	3 (2.7)	7 (6.4)	7 (6.4)	
	Graduate	0	3 (2.7)	7 (6.4)	
Occupation	Housewife	9 (8.1)	45 (40.9)	13(11.8)	0.009*
	Daily wager	9 (8.1)	22 (20)	5 (4.5)	
	Private worker	0	0	3 (2.7)	
	Govt servant	1 (0.9)	1 (0.9)	2 (1.8)	
Monthly income (in rupees)	≤5000	14(12.7)	33 (30)	6 (5.4)	0.001*
	5001-10000	5 (4.5)	34 (30.9)	13(11.8)	
	≥10000	0	1 (0.9)	4 (3.6)	
Total number of children	1	2 (1.8)	12 (10.9)	5 (4.5)	0.79
	2	6 (5.4)	10 (9.1)	4 (3.6)	
	3	4 (3.6)	18 (16.4)	5 (4.5)	
	4	5 (4.5)	14 (12.7)	4 (3.6)	
	≥5	2 (1.8)	14 (12.7)	5(4.5)	

*p-value ≤0.05 significance

Table 5 depicts that there is an association between knowledge of caregivers regarding Oral Health Care with their education level, occupation and monthly income of the caregivers as the calculated p-value is 0.000,0.009 and 0.001 respectively, which is less than or equal to 0.05 level of significance.

Discussion

1. In the present study, it is reported that the mean age of the participants is 30.4 years. A similar study by Dubey G *et al*. (2018) reported that the mean age of study subjects was 25.6 years [12].
2. In the present study the overall mean knowledge score of the present study is 64.84% which is supported by a study by Sogi S *et al*. (2016) whereas the mean knowledge score found was 69.5% [11].
3. In the present study, 31.8% are aware about the differences between primary teeth and secondary teeth. 33.6% knows about the importance of primary teeth. Only 18.2% of the caregivers are aware that they should start taking their children for dental check-up as early as 6 months whereas in a similar study by Kumar G *et al*. (2022), it was found that 89% of participants believed that primary teeth are important and 7.6% of the participants did not know. Only 5.8% answered that the first dental visit should be at 6 months of age [13].
4. In the present study, it was found that caregivers 68.2% reported that they practice changing their children's toothbrush once every 3-4 months and 31.8% change after every 5-6 months. All the caregivers, 99.2% do not take their children for regular dental checkup and 53.70% reported that the reasons is that they only bring their children for dental checkup when oral problem arise and the rest never take their children to visit a dentist. Only 1.8% had visited a dentist for their children's regular dental checkup which was supported by a similar study conducted by Gangasani *et al*. (2020) which revealed that 42% of the respondents (parents) had the practice of changing the child's tooth brush every 6 months, 27.3% once in a month, 19.9% when the bristles fray out, and 13.8% were not particular. It was noted that 64% of the parents visited a dentist while having oral problems, whereas 6.2% of them had the good practice of visiting the dentist at least once in a year [14].
5. In this present study, it shows that there is an association between knowledge of caregivers regarding Oral Health Care with their education (p<0.00), occupation (p<0.009) and monthly income of the caregivers (p<0.001). A similar study conducted by Khanal K *et al*. (2015) found significant association between knowledge category and the education status (p<0.001) [15].
6. In this study, most of the caregivers strongly felt that the lack of oral health awareness and financial constraints are the primary barriers that the caregivers strongly felt toward Oral Health Care in children. However, time pressures and inaccessibility to free oral health services are also contributing factors or barriers toward achieving optimum Oral Health Care in children. Some of the cultural beliefs of the Caregivers indicated that they might influence on the oral health of their children. A study by Kumar AV *et al*. (2020) reported that majority of the parents (62.1%) had access to private dental health services. The barriers to utilization of dental services majorly included financial constraints (45.19%) and parent's unawareness of the oral health-care facilities nearby (21.84%) [16].

Conclusion

In the present study, majority of the caregivers have average knowledge regarding Oral Health Care in Children exhibiting poor practices which could be due to the barriers such as lack of oral health awareness, financial Constraints, time pressures, inaccessibility to free oral health services and cultural influences that obstruct caregivers in achieving Oral Health Care in children.

Furthermore, the study also found that there is an association between knowledge of caregivers regarding Oral Health Care in children with their education level, occupation and monthly income of the caregivers. Therefore, there is a need to address the existing gap in the knowledge of the caregivers and to overcome the barriers in achieving Oral Health Care in Children.

Conflict of Interest

Not available.

Financial Support

Not available.

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